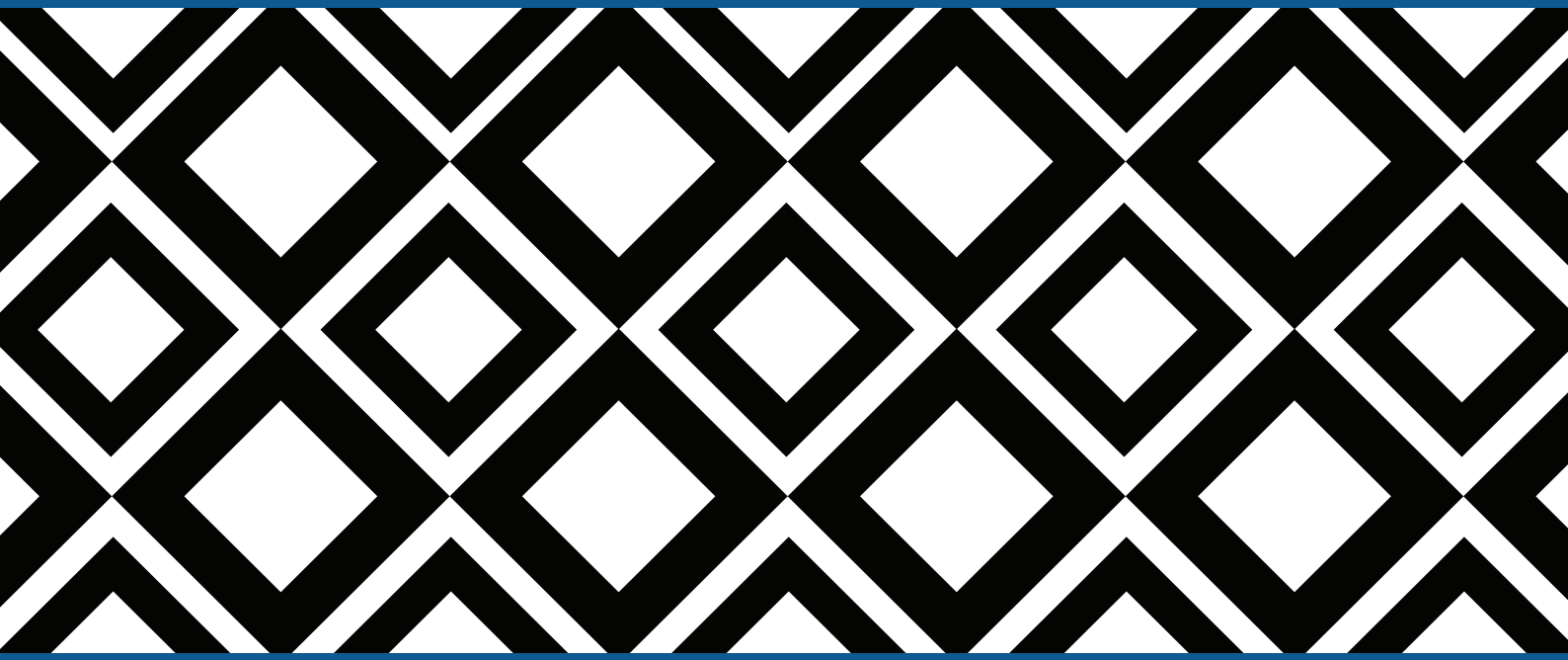
Rwanda



Demographic and Health Survey

2019-20

Key Indicators

Rwanda

Demographic and Health Survey 2019-20

Key Indicators

Republic of Rwanda

Rwanda Demographic and Health Survey 2019-20

Key Indicators Report

National Institute of Statistics of Rwanda
Kigali, Rwanda

Ministry of Health
Kigali, Rwanda

The DHS Program
ICF
Rockville, Maryland, USA

October 2020

The 2019-20 Rwanda Demographic and Health Survey (2019-20 RDHS) was implemented by the National Institute of Statistics of Rwanda (NISR) in collaboration with the Ministry of Health (MOH). The funding for the 2019-20 RDHS was provided by the Government of Rwanda, United States Agency for International Development (USAID), the United Nations Children Fund (UNICEF), the United Nations Population Fund (UNFPA), Enabel (Belgian Development Agency), UNWOMEN, and Centers for Disease Control and Prevention (CDC). ICF provided technical assistance through The DHS Program, a USAID-funded project that provides support and technical assistance in the implementation of population and health surveys in countries worldwide.

Additional information about the 2019-20 RDHS may be obtained from the National Institute of Statistics of Rwanda, 6139 Kigali, Rwanda; Telephone: +250 252 571035; Fax: +250 252 570705; Email: info@statistics.gov.rw; Website: www.statistics.gov.rw.

Information about The DHS Program may be obtained from ICF, 530 Gaither Road, Suite 500, Rockville, MD 20850, USA (telephone: +1-301-407-6500; fax: +1-301-407-6501; email: info@DHSprogram.com; internet: www.DHSprogram.com).

ISBN: 978-99977-43-09-1

Recommended citation:

National Institute of Statistics of Rwanda (NISR) [Rwanda], Ministry of Health (MOH) [Rwanda], and ICF. 2020. *Rwanda Demographic and Health Survey 2019-20 Key Indicators Report*. Kigali, Rwanda, and Rockville, Maryland, USA: NISR and ICF.

CONTENTS

TABLES AND FIGURES

ACRONYMS AND ABBREVIATIONS

ACT	artemisinin-based combination therapy
AIDS	acquired immunodeficiency syndrome
ANC	antenatal care
ANDI	African Network for Drugs and Diagnostics Initiative
ARI	acute respiratory infection
ASFR	age-specific fertility rate
BCG	bacillus Calmette-Guérin
BMGF	Bill and Melinda Gates Foundation
CAPI	computer-assisted personal interviewing
CBR	crude birth rate
CDC	Centers for Disease Control and Prevention
CPR	contraceptive prevalence rate
CSPro	Census and Survey Processing
DHS	Demographic and Health Survey
DPT	diphtheria, pertussis, and tetanus vaccine
EA	enumeration area
FMOH	Federal Ministry of Health
HepB	hepatitis B
Hib	*Hemophilus influenzae* type B
HIV	human immunodeficiency virus
HPLC	high-performance liquid chromatography
IFAIN	International Foundation Against Infectious Disease in Rwanda
IFSS	internet file streaming system
IPV	inactivated poliomyelitis vaccine
ITN	insecticide-treated net
IUD	intrauterine contraceptive device
IYCF	infant and young child feeding
LAM	lactational amenorrhea method
LGA	local government area
LLIN	long-lasting insecticidal net
LUTH	Lagos University Teaching Hospital
NHREC	National Health Research Ethics Committee of Rwanda
NMEP	National Malaria Elimination Program
NN	neonatal mortality
NPC	National Population Commission
NPHC	Population and Housing Census of the Federal Republic of Rwanda
ORS	oral rehydration salts

PCV	pneumococcal conjugate vaccine
PNC	postnatal care
PNN	postneonatal mortality
PSU	primary sampling unit
RDHS	Rwanda Demographic and Health Survey
RDT	rapid diagnostic test
SCD	sickle cell disease
SD	standard deviation
SDG	Sustainable Development Goal
SDM	standard days method
SP	sulfadoxine-pyrimethamine
STI	sexually transmitted infection
TFR	total fertility rate
UNFPA	United Nations Population Fund
USAID	United States Agency for International Development
WHO	World Health Organization

FOREWORD

The 2019-20 Rwanda Demographic and Health Survey (RDHS) was the sixth DHS survey to be conducted in Rwanda in collaboration with the worldwide Demographic and Health Surveys Program. It was implemented by the National Institute of Statistics of Rwanda (NISR), the Ministry of Health (MoH), and the Rwanda Biomedical Center (RBC).

This report, which presents key findings from the 2019-20 RDHS, is intended to provide policymakers and program managers with a first glimpse of the survey results. A more comprehensive and detailed report is scheduled to be published in 2021.

The NISR and the MoH wish to acknowledge the efforts of a number of organizations and individuals who contributed substantially to the success of the survey. First, we would like to acknowledge the financial assistance from the Government of Rwanda, the United States Agency for International Development (USAID), the One United Nations (ONE UN), the Centers for Disease Control and Prevention (CDC), the United Nations Children's Fund (UNICEF), the United Nations Population Fund (UNFPA), UNWOMEN and Enabel.

We would like to thank ICF for technical assistance throughout the survey. The survey also could not have been carried out successfully without the dedication of the staff of the NISR, the RBC and the MoH who planned, participated in, and oversaw the entire RDHS. Special thanks go to the fieldworkers for their valuable time that made this survey possible.

Finally, we are grateful to the survey respondents who generously gave their time to provide the information that forms the basis of this and future reports.

Murangwa Yusuf
Director General
National Institute of Statistics of Rwanda

1 INTRODUCTION

The 2019-20 Rwanda Demographic and Health Survey (RDHS) is the sixth Demographic and Health Survey (DHS) conducted in Rwanda, following those implemented in 1992, 2000, 2005, 2010, and 2014-15. The National Institute of Statistics (NISR), in collaboration with the Ministry of Health (MOH), implemented the survey. Data collection took place from November 9, 2019, to July 20, 2020. The data collection was interrupted for more than 2 months from March 21 to June 7, 2020, due the nationwide lockdown for the Coronavirus disease (COVID-19) pandemic. Funding for the 2019-20 RDHS was provided by the government of Rwanda, the United States Agency for International Development (USAID), the One United Nations (ONE UN), the Centers for Disease Control and Prevention (CDC), the United Nations Children's Fund (UNICEF), the United Nations Population Fund (UNFPA), UNWOMEN, and Enabel. ICF provided technical assistance through The DHS Program, which assists countries in the collection of data to monitor and evaluate population, health, and nutrition programs.

This key indicators report presents a first look at selected findings from the 2019-20 RDHS. A comprehensive analysis of the data will be presented in a final report in 2021.

1.1 SURVEY OBJECTIVES

The primary objective of the 2019-20 RDHS is to provide up-to-date estimates of basic demographic and health indicators. Specifically, the 2019-20 RDHS collected information on fertility, awareness and use of family planning methods, breastfeeding practices, nutritional status of women and children, maternal and child health, adult and childhood mortality, women's empowerment, domestic violence, awareness and behavior regarding HIV/AIDS and other sexually transmitted infections (STIs), and other health-related issues such as smoking. It also tested for the prevalence of anemia, malaria, HIV, and selected micronutrient indicators.

The information collected through the 2019-20 RDHS is intended to assist policymakers and program managers in designing and evaluating programs and strategies for improving the health of the country's population. The 2019-20 RDHS also provides indicators relevant to the Sustainable Development Goals (SDGs) for Rwanda.

2 SURVEY IMPLEMENTATION

2.1 SAMPLE DESIGN

The sampling frame used for the 2019-20 RDHS is the Fourth Rwanda Population and Housing Census (RPHC), which was conducted in 2012 by the NISR. The sampling frame is a complete list of Enumeration Areas (EAs) covering the whole country, provided by the National Institute of Statistics of Rwanda (NISR), the implementing agency for the RDHS. An EA is a natural village, or a part of a village, created for the 2012 RPHC, which served as the counting unit for the census.

The 2019-20 RDHS followed a two-stage sample design and was intended to allow estimates of key indicators at the national level as well as for urban and rural areas, five provinces, and each of Rwanda's 30 districts for some limited indicators. The first stage involved selecting sample points (clusters) consisting of EAs delineated for the 2012 RPHC. A total of 500 clusters were selected, 112 in urban areas and 388 in rural areas.

The second stage involved systematic sampling of households. A household listing operation was undertaken in all selected EAs in July 2019, and households to be included in the survey were randomly selected from these lists. Twenty-six households were selected from each sample point, for a total sample size of 13,000 households. Because of the approximately equal sample sizes in each district, the sample is not self-weighting at the national level, and weighting factors have been added to the data file so that the results will be proportional at the national level.

All women age 15-49 who were either permanent residents of the selected households or visitors who stayed in the household the night before the survey were eligible to be interviewed. In half of the households, all men age 15-59 who were either permanent residents of the selected households or visitors who stayed in the household the night before the survey were eligible to be interviewed. In the subsample of households selected for the male survey, height and weight measurement, anemia and malaria testing were performed among eligible women who consented to being tested and children age less than 5 years old with the parent's or guardian's consent. In the same subsample, blood samples were collected for testing of HIV from eligible women and men who consented. The domestic violence module for men was implemented in one-half of the households selected for the male survey (or 25% of the entire sample) and the domestic violence module for women was implemented in another one-half of the households selected for the male survey (or 25% of the entire sample). In one-half of subsample households not selected for the male survey (or 25% of the entire sample), venous blood samples were collected for micronutrient testing among children age 0-5 and for women age 15-49. In this micronutrient subsample, height and weight measurement, anemia and malaria (rapid test only) testing for children and women were also performed.

2.2 QUESTIONNAIRES

Five questionnaires were used for the 2019-20 RDHS: the Household Questionnaire, the Woman's Questionnaire, the Man's Questionnaire, the Biomarker Questionnaire, and the Fieldworker Questionnaire. The questionnaires, based on The DHS Program's standard Demographic and Health Survey (DHS-7) questionnaires, were adapted to reflect the population and health issues relevant to Rwanda. Comments were solicited from various stakeholders representing government ministries and agencies, nongovernmental organizations, and development partners. The survey protocol was reviewed and approved by the Rwanda National Ethics Committee (RNEC) and the ICF Institutional Review Board. After all questionnaires were finalized in English, they were translated into Kinyarwanda. The 2019-20 RDHS used computer-assisted personal interviewing (CAPI) for data collection.

The Household Questionnaire listed all members of and visitors to selected households. Basic demographic information was collected on each person listed, including age, sex, marital status, education, and relationship to the head of the household. For children under age 18, survival status of parents was determined. Data on age, sex, and marital status of household members were used to identify women and

men who were eligible for individual interviews. The Household Questionnaire also collected information on characteristics of the household's dwelling unit, such as source of drinking water; type of toilet facilities; materials used for flooring, external walls, and roofing; ownership of various durable goods; and ownership of mosquito nets. In addition, a disability module was added into this questionnaire.

The Woman's Questionnaire was used to collect information from all eligible women age 15-49. These women were asked questions on the following topics:

- Background characteristics (including age, education, and media exposure)
- Birth history and child mortality
- Knowledge, use, and source of family planning methods
- Antenatal, delivery, and postnatal care
- Vaccinations and childhood illnesses
- Breastfeeding and infant feeding practices
- Women's minimum dietary diversity
- Marriage and sexual activity
- Fertility preferences (including desire for more children and ideal number of children)
- Women's work and husbands' background characteristics
- Knowledge, awareness, and behavior regarding HIV/AIDS and other sexually transmitted infections (STIs)
- Knowledge, attitudes, and behavior related to other health issues (e.g., smoking)
- Early childhood development
- Adult and maternal mortality
- Domestic violence

The Man's Questionnaire was administered to all men age 15-59 in the subsample of households selected for the men's survey. The Man's Questionnaire collected much of the same information as the Woman's Questionnaire but was shorter because it did not contain a detailed reproductive history or questions on maternal and child health.

The Biomarker Questionnaire was used to record the results of anthropometry measurements and other biomarkers for women, men, and children. This questionnaire was administered only to the subsamples selected for the respective biomarker component.

The Fieldworker Questionnaire recorded background information from the interviewers that will serve as a tool in conducting analyses of data quality. Each interviewer completed the self-administered Fieldworker Questionnaire after the final selection of interviewers and before the fieldworkers entered the field. No personal identifiers were attached to the 2019-20 RDHS fieldworkers' data file.

The interviewers used tablet computers for data collection. The tablet computers were equipped with Bluetooth® technology to enable remote electronic transfer of files, such as assignments from the team supervisor to the interviewers, individual questionnaires to survey team members, and completed questionnaires from interviewers to team supervisors. The computer-assisted personal interviewing (CAPI) data collection system employed in the 2019-20 RDHS was developed by The DHS Program with the mobile version of CSPro.

2.3 ANTHROPOMETRY, ANEMIA TESTING, MALARIA, HIV, AND MICRONUTRIENT TESTING

In the half of the households selected for the male survey, the 2019-20 RDHS implemented anthropometry measurement, anemia testing, and malaria testing for children and women; and HIV testing for adults.

Anthropometry: Height and weight measurements were recorded for children age 0-5 and women age 15-49. The 2019-20 RDHS included quality assurance procedures to improve anthropometry data quality. These procedures, undertaken in real time during data collection, included re-measurement of all children

with data outside of pre-specified flagged values on a subsequent day and re-measurement of the height and weight of a random selection of children (10%) on a subsequent day.

Anemia testing: Blood specimens for hemoglobin measurement were collected from women age 15-49 and from all children age 6 months to 5 years for whom consent was obtained from their parents or the adult responsible for the children. Blood samples were drawn from a drop of blood taken from a finger prick (or a heel prick in the case of children age 6-11 months) and collected in a microcuvette. Hemoglobin analysis was carried out on-site using a battery-operated portable HemoCue 201+ analyzer. Results were provided verbally and in writing. Parents of children with a hemoglobin level under 7 g/dl were instructed to take the child to a health facility for follow-up care. Likewise, nonpregnant women and pregnant women were referred for follow-up care if their hemoglobin levels were below 7 g/dl and 9 g/dl respectively.

Malaria testing: Malaria diagnostic tests, including a rapid diagnostic test (RDT) and a test using thick and thin blood smears, were conducted on eligible women and children in the 2019-20 RDHS. For the RDT for malaria, a drop of blood was obtained by a prick at the end of the finger, usually at the same time as anemia testing. Results from the RDTs were recorded on the Biomarker Questionnaire and later entered into the computer tablet on the same day. The RDT results were used to diagnose malaria and guide treatment of parasitaemic children during the survey. The parent or guardian of a child with a positive RDT was provided with written results, and the children were offered a full course of treatment according to the standard procedures for treating malaria in Rwanda if they did not have a severe case of malaria (diagnosed by symptoms or the presence of severe anemia), were not currently on treatment, and had not completed a full course of artemisinin-based combination therapy (ACT) during the preceding 2 weeks. Women with a positive RDT were referred to the nearest health center for treatment. An informed consent form was read to the eligible person or parent or adult responsible for the child or unmarried young adult age 15-17. The anemia brochure also contained information on malaria and was given to all households in which malaria testing was conducted.

Thin and thick blood smears were also collected from participants who agreed to malaria testing. These blood smears were dried and packed carefully in the field, assigned barcode labels corresponding to the Biomarker Questionnaire, and then transported to malaria laboratory, where they were stained. Microscopic examination to determine malaria infection was carried out in this laboratory. The malaria testing in the lab was not complete at the time this report was prepared.

HIV testing: In the subsample selected for men's survey women and men interviewed on the individual questionnaire were eligible for HIV testing. The survey featured a parallel system for HIV testing, in which RDT was performed in the household according to a national HIV testing algorithm for respondents who wished to be informed of their status, and dried blood spot (DBS) specimens were collected and transported to a central lab for anonymized testing. HIV prevalence for the survey will be based on the laboratory test results.

The Rwanda HIV rapid testing algorithm applies two tests in sequence: First Alere Combo (Alere Determine™ HIV-1/2 Ag/Ab Combo) followed by HIV Stat Pak (Chembio | HIV 1/2 STAT-PAK® Assay). Individuals with a non-reactive result on the first test will be reported as HIV-negative. Individuals with a reactive first test result will undergo subsequent testing with STAT-PAK. Those with a reactive result on both screening tests will be classified as HIV-positive for the purposes of the survey but will be referred to the nearby health facility for verification testing, and subsequent enrolment into care, as required by the national testing algorithm. Individuals with a reactive first test result followed by a non-reactive second test result will be classified as indeterminate and will be referred for retesting in four weeks as per the national guidelines.

Dedicated nurse counselors who provided pre- and post-test counseling conducted HIV rapid testing. Pre-test counseling included an explanation of HIV infection and transmission, the meaning of test results,

risks associated with sexual behaviors, and how to prevent and treat HIV and sexually transmitted infections. Post-test counseling messages were tailored to the participant's HIV results and risk profiles.

The testing and delivery of results at home was done after creating the conditions that would guarantee the confidentiality of the respondents. All participants with HIV-seropositive or indeterminate results were referred to the nearest health facility with a referral form, to liaise with the health provider for further care and treatment.

For HIV testing using DBS samples, at the time of collection of the blood sample, a unique and random barcoded identification number was assigned to each participant who consented to testing. Sheets of peel-off labels with the unique barcodes were pre-printed for use in the field. Matching barcode labels were affixed to the Biomarker Questionnaire, a fresh filter paper card, and a blood sample transmittal sheet.

Approximately every 2 weeks, or more frequently, all DBS samples and transmittal sheets from the same clusters were picked up from teams in the field by central office supervisors and transported to the National Referral Laboratory (NRL) for processing and registration. Each specimen was then assigned a unique, serial laboratory number during the registration process at the lab before being stored in a freezer for preservation. The DBS laboratory testing is scheduled to be conducted at NRL from the fourth quarter of 2020 to the first quarter of 2021.

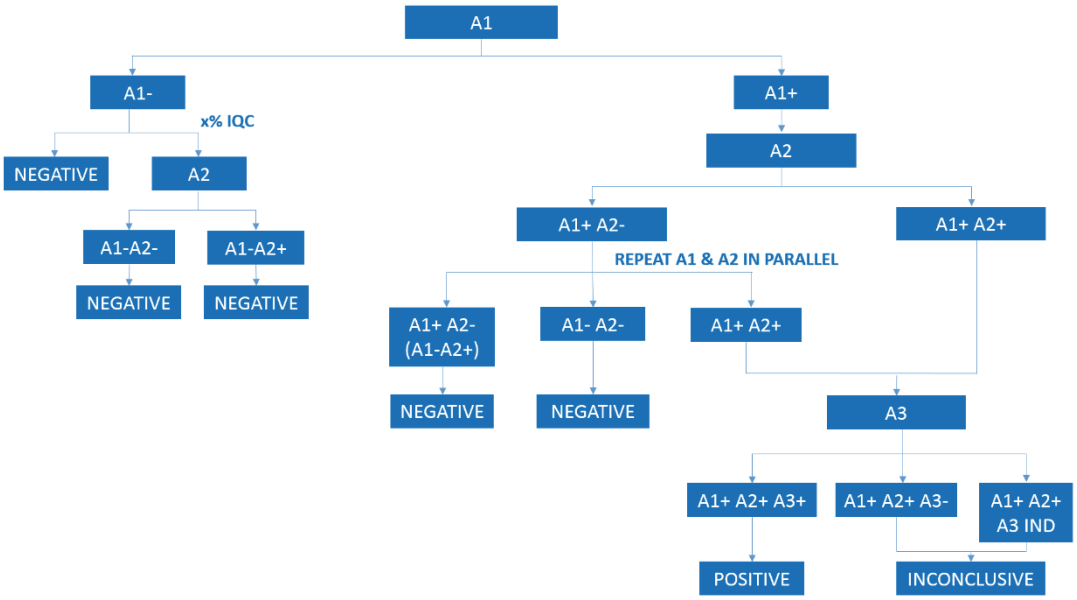
Interviewers collected finger-prick dried blood spot (DBS) specimens for laboratory testing of HIV from women age 15-49 and men age 15-59 who consented to be tested. The protocol for DBS collection and analysis was based on the anonymous linked protocol developed for The DHS Program. This protocol allows for merging of HIV test results with the background characteristics and other data collected with the individual questionnaires after removal of all information that could potentially identify an individual.

Interviewers explained the procedure, the confidentiality of the data, and the fact that the test results would not be made available to the respondent. If consent was given for HIV testing, five blood spots from the finger prick were collected on a filter paper card to which a barcode label unique to the respondent was affixed. A duplicate label was attached to the Biomarker Data Collection Form. A third copy of the same barcode was affixed to the DBS Transmittal Sheet to track the blood samples from the field to the laboratory.

Blood samples were dried overnight and packaged for storage the following morning. Samples were periodically collected from the field and transported to the National Reference Laboratory (NRL) in Kigali. Upon arrival at the NRL, each blood sample was logged into the CSPro HIV Test Tracking System database and stored at -20˚C until tested.

The HIV testing protocol stipulated that blood could be tested only after questionnaire data collection had been completed, data had been verified and cleaned, and all unique identifiers other than the anonymous barcode number had been removed from the data file. As of this report, HIV testing had not been completed.

Figure 1 **Algorithm for laboratory-based testing for HIV**



The HIV testing algorithm (see Figure 1) calls for testing all samples on the first assay test; Murex (A1). A random 10% of samples deemed negative to the A1 are subjected for a second assay test; Ezygnost (A2). The other 90% of negative samples are recorded as negative. Concordant negative and discordant results on both A1 and A2 tests are recorded as negative.

All samples deemed positive to A1 are subjected to the A2. Specimens with discordant result (A1+ and A2-) will be retested with A1 and A2 in parallel. Concordant negative and discordant will be recorded as negative. Concordant positive will be tested with the third assay; Genius (A3). Also specimens with positive concordant result (A1+ and A2+) at the second level will also be tested for A3.

Samples were recorded as positive, negative, or inconclusive if the A3 result is positive, negative or inconclusive respectively.

After HIV testing has been completed, the HIV test results for the 2019-20 RDHS will be entered into a spreadsheet with a barcode as the unique identifier. The barcode will be used to link the HIV test results with the data from the individual interviews. Data from the HIV results and linked demographic and health data will be published in the 2019-20 RDHS final report.

All households, whether they were part of the subsample for anthropometry, anemia, malaria, or HIV testing or not, were given a brochure explaining the causes and prevention of anemia, malaria, and HIV. Each respondent (whether providing consent or not) was given an informational brochure on HIV and a list of nearby sites providing HIV voluntary counseling and testing (VCT) services. Respondents who consented to the HIV testing were given a voucher for transportation and a meal if they wished to receive free VCT services.

Micronutrient testing: In about one-half of the households not selected for men survey (7 households out of 13), the 2019-20 RDHS implemented micronutrient testing for children and women. This included anthropometry measurement, anemia testing, malaria RDT, and laboratory testing for various micronutrient markers. Approximately 7 mL of blood and 5 mL of urine (women only) were collected from consented participants. Although the anthropometry measurement was the same in the micronutrient households as was done in the households selected for men survey (described above), point of care anemia and malaria testing used venous blood collection methods, and the malaria testing did not include thick and

thin smears. Below are descriptions of anemia and malaria testing specific to the micronutrient households and the laboratory testing for various micronutrient markers.

Anemia testing (micronutrient): Blood specimens for hemoglobin measurement were collected from women age 15-49 and from all children age 6 months to 5 years for whom consent was obtained from their parents or the adult responsible for the children. Venous blood samples were collected in a purple top vacutainer. Hemoglobin analysis was carried out on-site using a battery-operated portable HemoCue 201+ analyzer. Results and referrals for anemia were performed the same way as described in the men's survey (above).

Malaria testing (micronutrient): Malaria rapid diagnostic tests (RDT) were conducted on eligible women and children in the 2019-20 RDHS. For the RDT for malaria, a drop of whole blood was obtained from a venous collection that had been transferred to a purple top vacutainer. Results, treatment and referrals for malaria were performed the same way as described in the men's survey (above).

Laboratory testing for micronutrient biomarkers and inflammatory proteins: In the micronutrient subsample, women 15-49 years old that were interviewed on the individual questionnaire were eligible for urine collection and venous blood collection, and children age 6 months to 5 years for whom consent was obtained from their parents or the adult responsible for the children participated in venous blood collection. Urine and venous blood were collected following the universal precautions for biospecimen collection and were transported refrigerated in cooler boxes with gel packs to satellite clinics equipped with -17°C freezers. The cold chain operated such that time of specimen collection to processing did not exceed 24 hours, and time from collection to storage in -80°C did not exceed 7 days. Urine, collected from women, will be assessed for iodine concentrations by the Rwanda Biomedical Center (RBC) to determine the median urinary iodine concentration of pregnant and non-pregnant women of reproductive age. Venous blood was processed in the field to create three aliquots of serum, a plasma aliquot and, among women, whole blood lysate samples were prepared such that red blood cell folate could be assessed. Serum retinol, serum ferritin, soluble transferrin receptor, C-reactive protein (CRP), and alpha-1-acid glycoprotein (AGP) will be measured among all women and children that have sufficient volume of serum available for measurement. RBC is responsible for the assessment of retinol using high performance liquid chromatography methods, and the VitMin laboratory in Germany is responsible for assessment of ferritin, soluble transferrin receptor, CRP, and AGP using an in-house sandwich ELISA method. Serum will be stored at -80°C for future assessment of vitamin B12 among women and children. Serum and whole blood lysate samples will be stored at -80°C for future assessment of folate (serum and red blood cell) among women. Plasma samples will be stored as backup samples.

Laboratory testing for salt iodine: The 7 households per cluster eligible for micronutrient subsample were asked to provide a 50g sample of salt from their households, and they were provided replacement salt. The individual household salt samples were stored in airtight (hard plastic) primary packaging with secondary packaging (paper or plastic bag) to prevent cross-contamination. Household salt samples will be tested for the presence or absence of iodine using a rapid test kit. Samples that are positive for iodine will be tested using quantitative titration with sodium thiosulfate methods to determine the concentration of iodine.

2.4 PRETEST

A pretest was conducted from July 29 through August 14, 2019; when 25 candidates (15 females and 10 males) participated in questionnaire training. Additionally, 10 biomarker health technicians participated in biomarker training conducted separately in parallel. The trainings were conducted in English and Kinyarwanda during the 2 weeks. The training included discussions of the different sections and modules of the questionnaires, mock interviews, role play, group work, presentations, and in-class practice sessions. Training was conducted by trainers from NISR and MOH, with technical assistance from ICF International. UNICEF provided training on the Early Childhood Development module. Classroom

instructions were provided during the first three weeks, and pretest field practice took place over five days in three rural villages and two urban villages. Following field practice, a debriefing session was held with the pretest field staff, and modifications to the questionnaires were made based on lessons drawn from the exercise.

The CAPI training was conducted by ICF staff with assistance from two NISR data processing coordinators who focused on the technical components of the CAPI data collection system. The training focused on key components of the survey, interview techniques and procedures for completing the RDHS questionnaires, and administration of interviews using the CAPI system.

The biomarker training included orientation on collecting height and weight data; testing for anemia and malaria, HIV and venous blood drawing and processing for micronutrient tests; and standardization procedures for anthropometry. The participants worked in groups using various training techniques, including interactive question-and-answer sessions, case studies, and role-plays. Before starting the fieldwork, the participants were given ample opportunities to practice the questionnaires and to practice collection of biomarkers among women and children.

The fieldwork for the pretest was carried out in Muhanga district and in the clusters that were not selected for the survey sample. Each team carried out the pretest in an urban and a rural location, completing five clusters in total. The participants administered the questionnaires in the field, provided feedback on the content and language of the questionnaires, tested the CAPI software program, commented on the biomarker procedure, and learned various training techniques. Following the fieldwork, a debriefing session was held with the pretest field staff, and modifications to the questionnaires were made based on lessons drawn from the exercise.

2.5 TRAINING OF FIELD STAFF

The main training of the 2019-20 Rwanda DHS started on September 30 and ended on November 1, 2019. A total of 160 participants from all over the country were invited to participate in the training. They were selected based on merit. Eighty-five participants were selected to be interviewers and team leaders, and 51 participants to be health technicians. The training sessions were held in the main auditorium of the NISR's training center and were conducted by NISR trainers with support from ICF. Training on biomarkers was provided by trainers from the NRL, with support from ICF and CDC.

Participants were evaluated through in-class exercises, quizzes, and observations made during field practice. By the end of the main training, 17 teams were formed, consisting of 17 individuals selected to serve as team leaders, 17 as male interviewers, 51 as female interviewers, and 51 as health technicians. The team leaders received additional training on how to identify the selected households, different subsamples, data quality control procedures, and fieldwork coordination.

The training utilized a variety of different learning tools. Plenary lectures were held on the technical aspects of biomarker collection, and other tools included video and hands-on demonstrations on the process of biomarker collection, instructions on how to fill out the questionnaire and transmittal sheets, and instructions on data quality procedures. In addition, break-out sessions were held daily at which trainees had the opportunity for hands-on practice with both adults and children. A total of three anthropometry standardization exercises were carried out in a community health center. Following the standardization exercise, the results of the exercise were presented. General observations on accuracy (difference between the reference value and the participant's value) and precision (difference between the first and second readings) were discussed.

The field coordinators were trained on the use of the Biomarker Checklist. Also implemented were random re-measurements for quality assurance and re-visitation of households for re-measurements for flagged cases involving children whose Z-score values were less than -3 or greater than 3. A three-day field

practice was conducted. The nurses and laboratory scientists later joined the main team for refresher training before moving on to data collection.

2.6 FIELDWORK

Data collection was carried out by 17 field teams. Each team was provided a four-wheel drive truck with a driver. All blood smears and DBS specimen were transferred to the NISR office every 3-4 days by 10 supervisors from the NISR and NRL who also coordinated and supervised fieldwork activities. Venous blood specimens were processed in the field laboratory set up in the district hospitals, and serum aliquots were stored in the mobile freezers (-20 degrees) and were transferred to the regional laboratories, then to the NRL. ICF and CDC provided technical assistance during the entire data collection period.

The fieldwork for the 2019-20 RDHS was carried out under close supervision starting on November 9, 2019, in the clusters in the 17 districts (all districts of the North and West provinces, and 5 districts of the East province). The teams were closely monitored by the field coordinators for quality control. After completion of the fieldwork in the 17 districts, the teams were then dispatched to the final 13 districts. However, in the wake of the COVID-19 pandemic, the fieldwork was suspended From April to June 2020. Data collection resumed on June 04 and was completed on July 20, 2020.

Fieldwork monitoring was an integral part of the 2019-20 RDHS, and several rounds of monitoring were carried out by the survey coordinators of NISR and RBC team and ICF staff. The coordinators were provided with guidelines for overseeing the fieldwork. Weekly field check tables were generated from the completed interviews sent to the central office to monitor fieldwork progress, and regular feedback was sent out to the teams.

2.7 DATA PROCESSING

The processing of the 2019-20 RDHS data began almost as soon as the fieldwork started. As data collection was completed in each cluster, all electronic data files were transferred via the internet file streaming system (IFSS) to the NISR central office in Kigali. These data files were registered and checked for inconsistencies, incompleteness, and outliers. The field teams were alerted to any inconsistencies and errors. Secondary editing, carried out in the central office, involved resolving inconsistencies and coding the open-ended questions. The NISR data processor coordinated the exercise at the central office. The biomarker paper questionnaires were compared with electronic data files to check for any inconsistencies in data entry. Data entry and editing were carried out using the CSPro software package. The concurrent processing of the data offered a distinct advantage because it maximized the likelihood of the data being error-free and accurate. Timely generation of field check tables allowed for effective monitoring. The secondary editing of the data was completed in the second week of September 2020.

Throughout this report, numbers in the tables reflect weighted numbers. Percentages based on 25 to 49 unweighted cases are shown in parentheses, and percentages based on fewer than 25 unweighted cases are suppressed and replaced with an asterisk, to caution readers when interpreting data that a percentage based on fewer than 50 cases may not be statistically reliable.

3 KEY FINDINGS

3.1 RESPONSE RATES

Table 1 shows response rates for the 2019-20 RDHS. A total of 13,005 households were selected for the sample, of which 12,951 were occupied. All, but three occupied households (12,949) were successfully interviewed, yielding a response rate of 100.0%. In the interviewed households, 14,675 women age 15-49 were identified for individual interviews; interviews were completed with 14,634 women, yielding a response rate of 99.7%. In the subsample selected for the male survey, 6,503 households were selected, of which 6,472 were occupied. All, but two occupied households (6,471) were successfully interviewed, yielding a response rate of 100.0%. In this subsample 6,544 men age 15-59 were identified and 6,513 were successfully interviewed, yielding a response rate of 99.5%. In the subsample selected for the micronutrient survey, 3,501 households were selected, of which 3,492 were occupied. All, but one occupied household (3,491) were successfully interviewed, yielding a response rate of 100.0%.

Table 1 Results of the household and individual interviews

Number of households, number of interviews, and response rates, according to residence (unweighted), Rwanda DHS 2019-20

	Residence		
Result	Urban	Rural	Total
Household interviews			
Households selected	2,913	10,092	13,005
Households occupied	2,892	10,059	12,951
Households interviewed	2,892	10,057	12,949
Household response rate[1]	100.0	100.0	100.0
Interviews with women age 15-49			
Number of eligible women	3,564	11,111	14,675
Number of eligible women interviewed	3,551	11,083	14,634
Eligible women response rate[2]	99.6	99.7	99.7
Household interviews in men subsample			
Households selected	1,456	5,047	6,503
Households occupied	1,441	5,031	6,472
Households interviewed	1,441	5,030	6,471
Household response rate in subsample[1]	100.0	100.0	100.0
Interviews with men age 15-59			
Number of eligible men	1,514	5,030	6,544
Number of eligible men interviewed	1,504	5,009	6,513
Eligible men response rate[2]	99.3	99.6	99.5
Household interviews in micronutrient subsample			
Households selected	784	2,717	3,501
Households occupied	784	2,708	3,492
Households interviewed	784	2,707	3,491
Household response rate in subsample[1]	100.0	100.0	100.0

[1] Households interviewed/households occupied.
[2] Respondents interviewed/eligible respondents.

3.2 CHARACTERISTICS OF RESPONDENTS

Table 2 shows, by background characteristics, the weighted and unweighted numbers and the weighted percent distributions of women and men age 15-49 interviewed in the 2019-20 RDHS. More than half of the women (53%) and men (55%) in the sample are under age 30.

Table 2 Background characteristics of respondents

Percent distribution of women and men age 15-49 by selected background characteristics, Rwanda DHS 2019-20

Background characteristic	Women			Men		
	Weighted percent	Weighted number	Unweighted number	Weighted percent	Weighted number	Unweighted number
Age						
15-19	22.3	3,258	3,308	26.1	1,526	1,534
20-24	16.5	2,414	2,424	16.4	960	954
25-29	14.2	2,073	2,047	12.1	710	735
30-34	14.5	2,118	2,095	14.3	835	816
35-39	14.2	2,072	2,043	13.6	793	784
40-44	10.2	1,488	1,487	9.8	575	570
45-49	8.3	1,211	1,230	7.7	447	440
Religion						
Catholic	36.7	5,364	5,506	42.0	2,455	2,520
Protestant	47.2	6,905	6,754	40.0	2,340	2,262
Adventist	12.5	1,836	1,842	12.8	748	748
Muslim	1.8	269	287	2.6	153	161
Traditional	0.0	1	1	0.0	0	1
Jehovah witness	0.9	128	114	0.5	30	28
Other	0.2	29	24	0.1	8	6
No religion	0.7	104	106	1.9	112	107
Marital status						
Never married	40.4	5,914	6,060	49.0	2,867	2,908
Married	32.1	4,703	4,706	30.6	1,786	1,779
Living together	18.4	2,698	2,584	18.4	1,074	1,026
Divorced/separated	6.4	935	906	1.8	105	107
Widowed	2.6	383	378	0.2	14	13
Residence						
Urban	19.9	2,909	3,551	19.1	1,115	1,366
Rural	80.1	11,725	11,083	80.9	4,731	4,467
Province						
Kigali	14.8	2,166	1,921	15.0	879	766
South	20.9	3,065	3,482	21.2	1,239	1,409
West	21.7	3,174	3,312	21.7	1,268	1,334
North	15.2	2,226	2,294	15.1	886	915
East	27.4	4,003	3,625	26.9	1,574	1,409
Education						
No education	9.4	1,377	1,352	7.2	420	417
Primary	57.1	8,363	8,326	59.4	3,471	3,421
Secondary	29.1	4,252	4,284	28.4	1,659	1,666
More than secondary	4.4	642	672	5.0	295	329
Wealth quintile						
Lowest	18.7	2,741	2,844	15.8	924	967
Second	18.8	2,756	2,707	18.4	1,076	1,058
Middle	18.8	2,757	2,709	21.0	1,227	1,182
Fourth	20.3	2,966	2,884	21.9	1,278	1,261
Highest	23.3	3,414	3,490	23.0	1,342	1,365
Total 15-49	100.0	14,634	14,634	100.0	5,846	5,833
50-59	na	na	na	na	667	680
Total 15-59	na	na	na	na	6,513	6,513

Note: Education categories refer to the highest level of education attended, whether or not that level was completed.
na = Not applicable

Over 80% of respondents are Christians and about 2 in 5 are Catholic. Forty percent of women and 49% of men have never been married. About half of the respondents are married or living together with a partner (51% of women and 48% of men). However, women are more likely to report that they are divorced or separated (6%) than men (2%). Three percent of women report that they are widowed, as compared with less than 1% of men. Four in five respondents live in rural areas (80% of women and 81% of men).

With respect to educational status, 9% of women and 7% of men report that they have never attended school. Fifty-seven percent of women and 59% of men received some primary education. Twenty-eight percent of women and 27% of men attended secondary school. Four percent of women and 5% of men attended a level of education higher than secondary school.

3.3 FERTILITY

To generate data on fertility, all women who were interviewed were asked to report the total number of sons and daughters to whom they had ever given birth. To ensure that all information was reported, women were asked separately about children still living at home, those living elsewhere, and those who had died. A complete birth history was then obtained, including information on the sex, date of birth, and survival status of each child; age at death for children who had died was also recorded.

Table 3 shows age-specific fertility rates (ASFRs) among women by 5-year age groups for the 3-year period preceding the survey. Age-specific and total fertility rates were calculated directly from the birth history data, taking into account live births.[1] The sum of age-specific fertility rates (known as the total fertility rate, or TFR) is a summary measure of the level of fertility. It can be interpreted as the number of children a woman would have by the end of her childbearing years if she were to pass through those years bearing children at the currently observed age-specific rates. If fertility were to remain constant at current levels, a woman in Rwanda would bear an average of 4.1 children in her lifetime. As shown in Figure 2, the TFR declined from 6.1 children per woman in 2005 to 4.2 childern per woman in 2014-2015 where it has remained relatively constant in 2019-20. Fertility is higher among rural women than among urban women; on average, rural women will give birth to 0.9 more children during their reproductive years than urban women (4.3 and 3.4, respectively).

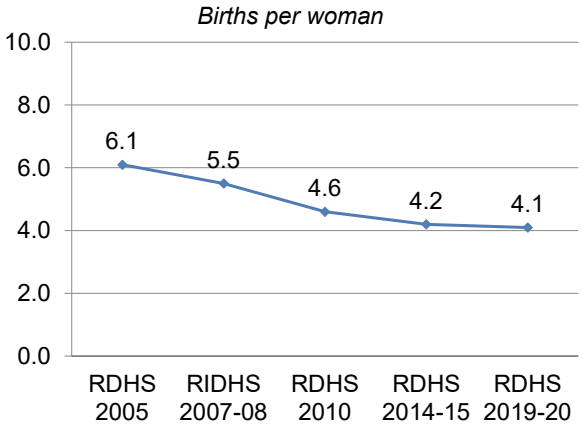
Table 3 Current fertility

Age-specific and total fertility rates, general fertility rate, and the crude birth rate for the 3 years preceding the survey, according to residence, Rwanda DHS 2019-20

	Residence		
Age group	Urban	Rural	Total
10-14	0	0	0
15-19	22	34	32
20-24	110	168	154
25-29	180	210	202
30-34	170	202	196
35-39	137	156	153
40-44	57	81	77
45-49	3	12	11
TFR (15-49)	3.4	4.3	4.1
GFR	113	139	134
CBR	32.4	31.6	31.8

Notes: Age-specific fertility rates are per 1,000 women. Estimates in brackets are truncated. Rates are for the period 1-36 months preceding the interview. Rates for the 10-14 age group are based on retrospective data from women age 15-17.
TFR: Total fertility rate expressed per woman
GFR: General fertility rate expressed per 1,000 women age 15-44
CBR: Crude birth rate, expressed per 1,000 population

***Figure 2* Trends in fertility rate for the 3 years before each survey**



[1] Numerators for the age-specific rates are calculated by summing the births that occurred during the 1-36 months preceding the survey, classified by the 5-year age group of the mother at the time of the birth. The denominators are the numbers of woman-years lived in each 5-year age group during the 1-36 months preceding the survey.

3.4 TEENAGE PREGNANCY AND MOTHERHOOD

The issue of adolescent fertility is important on both health and social grounds. Children born to very young mothers are at increased risk of sickness and death. Teenage mothers are more likely to experience adverse pregnancy outcomes and are more constrained in their ability to pursue educational opportunities than young women who delay childbearing.

Table 4 shows the percent distribution of women age 15-19 who have given birth or were pregnant with their first child at the time of the survey, according to background characteristics. Overall, 5% of women age 15-19 have begun childbearing: 4% have had a live birth, and 1% were pregnant at the time of the interview. The proportion of teenagers who have begun childbearing rises rapidly with age, from less than 1% at age 15 to 15% at age 19. Teenagers with no education and those in the lowest wealth quintile tend to start childbearing earlier than other teenagers. Teenagers in East province are more likely to start childbearing earlier than their counterparts.

Table 4 Teenage pregnancy and motherhood

Percentage of women age 15-19 who have had a live birth or who are pregnant with their first child, and percentage who have begun childbearing, according to background characteristics, Rwanda DHS 2019-20

Background characteristic	Percentage of women age 15-19 who:		Percentage who have begun childbearing	Number of women
	Have had a live birth	Are pregnant with first child		
Age				
15	0.1	0.0	0.1	810
16	0.6	0.4	1.0	680
17	2.1	1.8	3.9	667
18	6.7	1.9	8.6	504
19	12.1	3.3	15.4	596
Residence				
Urban	3.2	1.8	5.0	579
Rural	4.0	1.3	5.2	2,680
Province				
Kigali	2.5	2.0	4.4	397
South	3.7	1.8	5.5	681
West	3.3	0.8	4.1	694
North	3.5	1.1	4.6	497
East	5.0	1.4	6.4	989
Education				
No education	(8.6)	(16.5)	(25.1)	32
Primary	5.9	1.5	7.3	1,623
Secondary	1.7	0.9	2.7	1,591
More than secondary	*	*	*	13
Wealth quintile				
Lowest	5.7	2.0	7.7	497
Second	4.1	2.4	6.5	619
Middle	5.5	1.0	6.4	650
Fourth	2.5	1.4	4.0	678
Highest	2.2	0.5	2.7	814
Total	3.8	1.4	5.2	3,258

Note: Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.

3.5 FERTILITY PREFERENCES

Information on fertility preferences is used to assess the potential demand for family planning services for the purposes of spacing or limiting future childbearing. To elicit information on fertility preferences, several questions were asked of currently married women (pregnant or not) regarding whether they wanted to have another child and, if so, how soon.

Table 5 shows that 10% of women want to have another child soon (within the next 2 years), and 34% want to have another child later (in 2 or more years). Forty-nine percent of women want no more children whereas 2% have already been sterilized and 3% have declared infecund.

Table 5 Fertility preferences by number of living children

Percent distribution of currently married women age 15-49 by desire for children, according to number of living children, Rwanda DHS 2019-20

	Number of living children[1]							
Desire for children	0	1	2	3	4	5	6+	Total
Have another soon[2]	86.5	22.6	11.6	5.9	3.0	1.7	0.9	10.3
Have another later[3]	0.5	71.8	57.4	32.5	14.1	8.4	4.7	34.4
Have another, undecided when	2.7	1.0	1.0	0.4	0.7	0.2	0.8	0.7
Undecided	1.7	0.6	0.7	1.0	0.7	1.0	1.5	0.9
Want no more	0.9	3.4	27.5	56.9	73.4	79.3	82.1	48.8
Sterilized[4]	0.0	0.2	0.3	1.1	4.4	4.9	4.7	2.1
Declared infecund	7.8	0.4	1.5	2.2	3.7	4.4	5.3	2.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number of women	193	1,144	1,650	1,522	1,194	806	893	7,401

[1] The number of living children includes the current pregnancy
[2] Wants next birth within 2 years
[3] Wants to delay next birth for 2 or more years
[4] Includes both female and male sterilization

Fertility preferences are closely related to the number of living children. Eighty-seven percent of women with no living children want a child soon, as compared with 23% of women who already have a child. In general, the more children a woman has, the higher the likelihood that she does not want another child.

3.6 FAMILY PLANNING

Family planning refers to a conscious effort by a couple to limit or space the number of children they have through the use of contraceptive methods. Contraceptive methods are classified as modern or traditional methods. Modern methods include female sterilization, male sterilization, the pill, the intrauterine device (IUD), injectables, implants, male condoms, female condoms, lactational amenorrhea method (LAM), and standard days method (SDM). Methods such as rhythm and withdrawal are defined as traditional.

Table 6 shows the percent distribution of currently married women and sexually active unmarried women by the contraceptive method they currently use. Overall, 64% of currently married women use a method of family planning, with 58% using a modern method and 6% using a traditional method. Among currently married women, the most popular methods are implants (27%), injectable (15%) and pill (7%). The contraceptive prevalence rate (CPR) among married women varies with age, rising from 53% among women age 15-19 to a peak of 70% among women age 30-34 before declining to 46% among women age 45-49.

Women in rural areas are slightly more likely to use a contraceptive method than women in urban areas (65% and 61%, respectively). Use of contraception is highest among currently married women in the North province (69%) and the East province (66%) and lowest among those in Kigali (61%). Use of contraception does not have a linear association with educational attainment and is highest among those with a primary education (67%). Women in the highest wealth quintile are less likely to use a method of contraception than those in the lowest-fourth quintiles (59% versus 64%-67%).

Table 6 indicates that sexually active unmarried women are less likely to use a method of contraception as than currently married women. Only one in two sexually active unmarried women use a method of contraception, with 48% using a modern method. The most popular method among these women is also the implant (22%) and injectable (15%). Six percent of sexually active unmarried women use male condoms, while 4% use pills.

A comparison of results from the previous RDHS surveys reveals that the CPR among married women in Rwanda has steadily increased.

Table 6 Current use of contraception according to background characteristics

Percent distribution of currently married women and sexually active unmarried women age 15-49, by contraceptive method currently used, according to background characteristics, Rwanda DHS 2019-20

Background characteristic	Any method	Modern method										Traditional method				Not currently using	Total	Number of women
		Any modern method	Female sterili-zation	Pill	IUD	Inject-ables	Implants	Male condom	SDM	LAM	Other	Any tradi-tional method	Rhythm	With-drawal	Other			
CURRENTLY MARRIED WOMEN																		
Number of living children																		
0	2.8	2.8	0.0	0.0	0.0	0.3	1.6	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	97.2	100.0	363
1-2	66.8	62.3	0.2	7.0	2.4	17.5	31.0	2.8	1.0	0.2	0.1	4.4	2.1	2.1	0.3	33.2	100.0	2,782
3-4	71.9	65.9	2.5	7.8	2.5	17.5	29.1	4.3	1.8	0.1	0.3	6.0	2.7	3.1	0.1	28.1	100.0	2,610
5+	60.8	52.2	4.5	6.8	1.5	11.2	20.6	4.7	2.1	0.3	0.7	8.6	3.7	4.7	0.2	39.2	100.0	1,647
Age																		
15-19	52.7	52.7	0.0	3.8	0.0	7.0	40.1	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.3	100.0	73
20-24	64.5	61.9	0.0	4.6	0.6	16.7	36.5	2.9	0.4	0.1	0.0	2.6	1.0	1.4	0.1	35.5	100.0	750
25-29	66.6	63.0	0.1	6.2	1.9	17.8	33.6	2.2	0.8	0.3	0.1	3.6	1.5	1.8	0.3	33.4	100.0	1,297
30-34	69.8	65.2	0.7	7.0	3.2	15.9	32.9	3.9	1.3	0.2	0.1	4.6	2.0	2.4	0.2	30.2	100.0	1,642
35-39	66.9	61.2	2.5	8.1	2.5	16.8	23.8	4.3	2.5	0.2	0.4	5.7	2.2	3.5	0.1	33.1	100.0	1,690
40-44	62.4	54.0	4.7	8.5	2.5	13.0	18.0	4.1	2.1	0.3	0.8	8.4	4.6	3.7	0.1	37.6	100.0	1,139
45-49	46.0	35.2	4.4	5.2	0.8	9.2	9.8	4.4	1.2	0.1	0.2	10.7	5.1	5.3	0.3	54.0	100.0	809
Residence																		
Urban	60.5	55.0	3.1	8.3	6.1	12.8	17.4	4.5	2.1	0.4	0.3	5.5	2.8	2.3	0.4	39.5	100.0	1,288
Rural	64.9	59.2	1.7	6.6	1.3	15.8	28.5	3.5	1.3	0.2	0.3	5.7	2.5	3.1	0.1	35.1	100.0	6,114
Province																		
Kigali	60.6	54.9	2.5	8.4	6.9	15.1	14.7	4.7	1.9	0.5	0.2	5.7	2.5	2.6	0.6	39.4	100.0	1,006
South	62.5	56.0	1.4	7.2	1.6	13.4	26.7	3.9	1.3	0.2	0.3	6.5	2.7	3.6	0.2	37.5	100.0	1,559
West	61.5	54.4	3.2	4.7	1.0	14.4	26.3	3.0	1.5	0.2	0.1	7.1	3.4	3.7	0.0	38.5	100.0	1,628
North	69.4	64.9	1.0	7.2	0.8	16.4	34.2	2.8	2.0	0.3	0.3	4.5	1.7	2.6	0.2	30.6	100.0	1,201
East	66.1	61.5	1.7	7.5	1.8	16.8	28.1	4.0	1.1	0.0	0.5	4.7	2.4	2.3	0.1	33.9	100.0	2,007
Education																		
No education	57.7	51.6	1.9	3.9	0.9	15.0	27.0	2.2	0.5	0.0	0.1	6.1	2.5	3.3	0.3	42.3	100.0	952
Primary	66.7	60.8	2.0	7.5	0.9	16.3	28.6	3.7	1.4	0.2	0.3	5.9	2.6	3.2	0.1	33.3	100.0	4,737
Secondary	61.0	56.4	1.7	7.0	3.9	13.9	23.3	4.2	1.8	0.3	0.2	4.7	2.1	2.4	0.2	39.0	100.0	1,348
More than secondary	59.4	53.7	3.0	6.7	15.0	7.4	12.0	4.6	4.0	0.4	0.6	5.7	4.1	1.4	0.3	40.6	100.0	365
Wealth quintile																		
Lowest	64.1	60.2	0.9	4.3	0.7	15.8	35.0	2.7	0.7	0.1	0.0	3.9	1.7	2.1	0.1	35.9	100.0	1,443
Second	66.0	60.6	0.6	5.6	1.0	15.7	33.0	3.4	0.8	0.1	0.3	5.5	2.1	3.3	0.1	34.0	100.0	1,397
Middle	66.8	60.8	1.9	7.1	1.0	18.2	28.4	2.7	0.9	0.2	0.3	6.0	2.7	3.3	0.0	33.2	100.0	1,509
Fourth	65.4	59.2	3.1	9.1	1.3	15.4	23.8	4.5	1.3	0.3	0.3	6.2	2.7	3.1	0.4	34.6	100.0	1,520
Highest	58.6	51.8	3.1	8.0	6.4	11.3	13.8	4.9	3.5	0.3	0.5	6.7	3.5	3.0	0.3	41.4	100.0	1,532
Total	64.1	58.4	2.0	6.9	2.1	15.3	26.6	3.7	1.5	0.2	0.3	5.7	2.6	3.0	0.2	35.9	100.0	7,401
SEXUALLY ACTIVE UNMARRIED WOMEN[1]																		
Residence																		
Urban	49.1	47.4	0.0	5.7	1.2	16.3	15.4	7.7	1.2	na	na	1.7	0.2	1.5	na	50.9	100.0	110
Rural	50.2	48.3	0.3	3.1	0.7	14.5	24.3	5.0	0.3	na	na	1.9	1.6	0.3	na	49.8	100.0	307
Total	49.9	48.1	0.2	3.8	0.8	15.0	21.9	5.8	0.6	na	na	1.8	1.2	0.6	na	50.1	100.0	417

Note: If more than one method is used, only the most effective method is considered in this tabulation. Other modern method includes 11 cases of male sterilization, 2 cases of female condom and 6 cases of emergency contraception (Unweighted cases)
na = Not applicable
SDM = Standard days method
LAM = Lactational amenorrhea method
[1] Women who have had sexual intercourse within 30 days preceding the survey.

3.7 NEED AND DEMAND FOR FAMILY PLANNING

The proportion of women who want to stop childbearing or who want to space their next birth is a crude measure of the extent of the need for family planning, given that not all of these women are exposed to the risk of pregnancy and some may already be using contraception. This section discusses a more refined extent of need and the potential demand for family planning services. Women who want to postpone their next birth for 2 or more years, or who want to stop childbearing altogether but are not using a contraceptive method, are said to have an unmet need for family planning. Pregnant women are considered to have an unmet need for spacing or limiting if their pregnancy was mistimed or unwanted, respectively. Similarly, amenorrheic women are categorized as having an unmet need if their last birth was mistimed or unwanted. Women who are currently using a family planning method are said to have a met need for family planning. Total demand for family planning services comprises those who fall in the met need and unmet need categories.

Table 7 presents data on unmet need, met need, and total demand for family planning among currently married women. These indicators help evaluate the extent to which family planning programs in Rwanda meet the demand for services. Fourteen percent of currently married women have an unmet need for family planning services. Sixty-four percent of married women are currently using a contraceptive method. Therefore, 78% of currently married women have a demand for family planning. At present, 83% of the potential demand for family planning is being met. Thus, if all married women who said they want to space or limit their children were to use family planning methods, the CPR would increase from 64% to 78%.

Unmet need for family planning is highest in the Kigali and in the West province (16% each) and lowest in the North (10%). Women with no education also have the highest unmet need (19%).

Table 7 Need and demand for family planning among currently married women

Percentage of currently married women sexually active unmarried women age 15-49 with unmet need for family planning, percentage with met need for family planning, percentage with met need for family planning who are using modern methods, percentage with demand for family planning, percentage of the demand for family planning that is satisfied, and percentage of the demand for family planning that is satisfied with modern methods, according to background characteristics, Rwanda DHS 2019-20

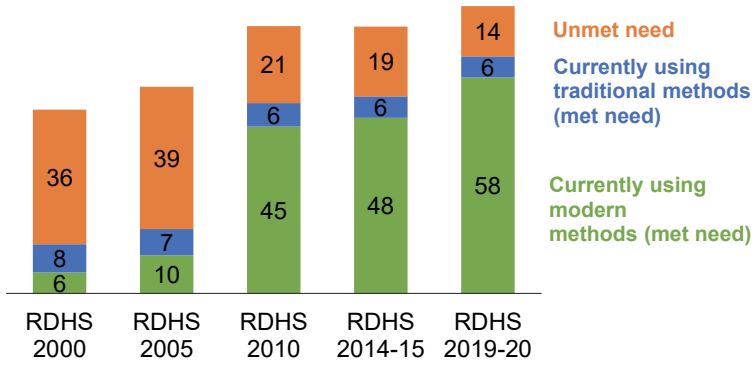
Background characteristic	Unmet need for family planning	Met need for family planning (currently using)		Total demand for family planning[3]	Number of women	Percentage of demand satisfied[1]	
		All methods	Modern methods[2]			All methods	Modern methods[2]
CURRENTLY MARRIED WOMEN							
Age							
15-19	7.6	52.7	52.7	60.3	73	87.4	87.4
20-24	7.8	64.5	61.9	72.3	750	89.2	85.7
25-29	11.0	66.6	63.0	77.6	1,297	85.8	81.2
30-34	13.2	69.8	65.2	82.9	1,642	84.1	78.6
35-39	16.1	66.9	61.2	83.0	1,690	80.6	73.7
40-44	17.0	62.4	54.0	79.4	1,139	78.6	68.0
45-49	14.8	46.0	35.2	60.8	809	75.6	58.0
Residence							
Urban	14.9	60.5	55.0	75.4	1,288	80.2	73.0
Rural	13.4	64.9	59.2	78.3	6,114	82.9	75.6
Province							
Kigali	15.7	60.6	54.9	76.3	1,006	79.5	72.0
South	13.6	62.5	56.0	76.1	1,559	82.1	73.7
West	16.4	61.5	54.4	77.9	1,628	78.9	69.8
North	9.8	69.4	64.9	79.2	1,201	87.6	81.9
East	12.7	66.1	61.5	78.8	2,007	83.9	78.0
Education							
No education	19.4	57.7	51.6	77.0	952	74.9	66.9
Primary	13.1	66.7	60.8	79.7	4,737	83.6	76.2
Secondary	11.9	61.0	56.4	73.0	1,348	83.7	77.3
More than secondary	12.6	59.4	53.7	72.0	365	82.5	74.6
Wealth quintile							
Lowest	15.5	64.1	60.2	79.5	1,443	80.5	75.7
Second	13.5	66.0	60.6	79.5	1,397	83.0	76.2
Middle	12.1	66.8	60.8	78.8	1,509	84.7	77.1
Fourth	13.3	65.4	59.2	78.7	1,520	83.1	75.2
Highest	14.0	58.6	51.8	72.5	1,532	80.8	71.5
Total	13.6	64.1	58.4	77.8	7,401	82.5	75.2
SEXUALLY ACTIVE UNMARRIED WOMEN[4]							
Residence							
Urban	43.4	49.1	47.4	92.6	110	53.1	51.3
Rural	35.1	50.2	48.3	85.3	307	58.8	56.6

Note: Numbers in this table correspond to the revised definition of unmet need described in Bradley et al., 2012.
[1] Percentage of demand satisfied is met need divided by total demand
[2] Modern methods include female sterilization, male sterilization, pill, IUD, injectables, implants, male condom, female condom, emergency contraception, standard days method (SDM), lactational amenorrhea method (LAM) and other modern methods
[3] Total demand is the sum of unmet need and met need.
[4] Women who have had sexual intercourse within 30 days preceding the survey.

Unmet need for family planning increased from 36% in 2000 to 39% in 2005, then declined consistently to 14% in 2019-20 (Figure 3). During the last 5 years, the use of modern methods has increased from 48% to 58%, and the total demand for contraception has increased from 72% to 78%. Demand satisfied with modern methods has increased from 66% to 75% during the same period.

Figure 3 **Trends in use, need, and demand for family planning**

Percentage of currently married women age 15-49



3.8 EARLY CHILDHOOD MORTALITY

Infant and child mortality rates are basic indicators of a country's socioeconomic situation and quality of life (United Nations Development Program [UNDP] 2007). Estimates of child mortality are based on information collected in the birth history section of the Woman's Questionnaire, which includes questions about aggregate childbearing experience (that is, the number of sons and daughters who live with their mother, the number who live elsewhere, and the number who have died). Table 8 presents estimates for three successive 5-year periods prior to the 2019-20 RDHS. The rates are estimated directly from the information in the birth history on children's birth date, survivorship status, and age at death for children who died. This information is used to directly estimate the following five mortality rates:

Neonatal mortality: the probability of dying within the first month of life
Postneonatal mortality: the difference between infant and neonatal mortality
Infant mortality: the probability of dying before the first birthday
Child mortality: the probability of dying between the first and the fifth birthday
Under-5 mortality: the probability of dying between birth and the fifth birthday

All rates are expressed per 1,000 live births with the exception of child mortality, which is expressed per 1,000 children surviving to age 12 months.

As shown in Table 8, during the 5 years immediately preceding the survey, the infant mortality rate was 33 deaths per 1,000 live births. The child mortality rate was 13 deaths per 1,000 children surviving to age 12 months, while the overall under-5 mortality rate was 45 deaths per 1,000 live births. Seventy-three percent of all deaths among children under age 5 in Rwanda take place before a child's first birthday, with 42% occurring during the first month of life. However, child mortality accounts for 29% of all under-5 deaths.

Table 8 Early childhood mortality rates

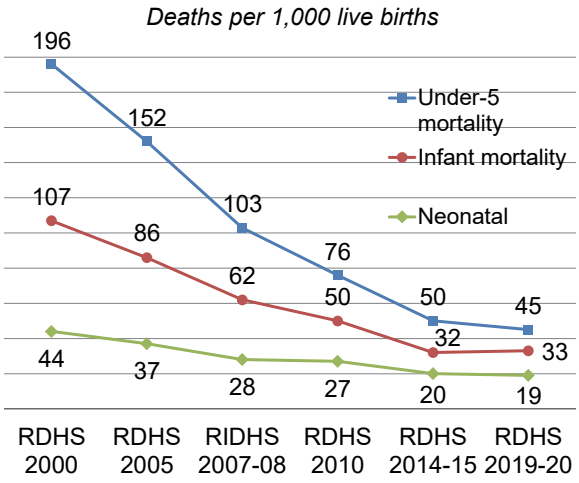
Neonatal, post-neonatal, infant, child and under-5 mortality rates for 5-year periods preceding the survey, Rwanda DHS 2019-20

Years preceding the survey	Neonatal mortality (NN)	Post-neonatal mortality (PNN)[1]	Infant mortality ($_1q_0$)	Child mortality ($_4q_1$)[1]	Under-5 mortality ($_5q_0$)
0-4	19	14	33	13	45
5-9	23	14	37	18	55
10-14	24	24	48	28	75

[1] Computed as the difference between the infant and neonatal mortality rates

The 2019-20 RDHS documents that the under-5 mortality rate continues to decline from 50 deaths per 1,000 live births in the 2014-15 RDHS to 45 deaths per 1,000 live births in the current survey. However, the declining in childhood mortality rates have slowed down and eventually stagnated among the new-born and infant (Figure 4). After declining from 50 deaths per 1,000 live births to 32 deaths per 1,000 live births (between 2010 RDHS and 2014-15 RDHS), the overall infant mortality rate has practically unchanged in the most recent 5-year period (33 deaths per 1,000 live births). This is because the neonatal mortality and post neonatal mortality remained at almost the same level.

Figure 4 **Trends in childhood mortality, 2000 to 2019-20**



3.9 MATERNAL CARE

Proper care during pregnancy and delivery is important for the health of both the mother and the baby. In the 2019-20 RDHS, women who had given birth in the 5 years preceding the survey were asked a number of questions about maternal care. Mothers were asked whether they had obtained antenatal care during the pregnancy for their most recent live birth in the 5 years preceding the survey and whether they had received tetanus toxoid injections while pregnant. For each live birth over the same period, mothers were also asked what type of assistance they received at the time of delivery. Finally, women who had a live birth in the 2 years before the survey were asked if they received a postnatal check-up within 2 days of delivery. Table 9 summarizes information on the coverage of these maternal health services.

3.9.1 Antenatal Care

Antenatal care (ANC) from a skilled provider is important to monitor pregnancy and reduce morbidity and mortality risks for the mother and child during pregnancy, at delivery, and during the postnatal period (42 days after delivery). The 2019-20 RDHS results show that practically all of Rwandan women (98%) who gave birth in the 5 years preceding the survey received antenatal care from a skilled provider at least once for their last birth. Forty-seven percent of women had four or more ANC visits.

Women who have more education are more likely than those who have less education to receive ANC from a skilled provider. For instance, 95% of women with no education received ANC from a skilled provider, as compared with 100% of women with more than a secondary education. The proportion of women who receive ANC from a skilled provider increases steadily with increasing wealth.

Table 9 Maternal care indicators

Among women age 15-49 who had a live birth in the 5 years preceding the survey, percentage who received antenatal care from a skilled provider for the most recent live birth, percentage with four or more ANC visits for the most recent live birth, and percentage whose most recent live birth was protected against neonatal tetanus; among all live births in the 5 years before the survey, percentage delivered by a skilled provider and percentage delivered in a health facility; and among women age 15-49 who had a live birth in the 2 years preceding the survey, percentage who received a postnatal check during the first 2 days after giving birth, according to background characteristics, Rwanda DHS 2019-20

	Women who had a live birth in the 5 years preceding the survey				Live births in the 5 years preceding the survey			Women who had a live birth in the 2 years preceding the survey	
Background characteristic	Percentage receiving antenatal care from a skilled provider[1]	Percentage with 4+ ANC visits	Percentage whose most recent live birth was protected against neonatal tetanus[2]	Number of women	Percentage delivered by a skilled provider[1]	Percentage delivered in a health facility	Number of births	Percentage of women with a postnatal check during the first 2 days after birth[3]	Number of women
Mother's age at birth									
<20	98.9	43.6	60.2	354	97.7	96.5	485	71.4	185
20-34	97.8	48.5	79.9	4,423	95.2	94.2	6,004	71.0	2,237
35-49	97.3	44.2	81.8	1,525	90.5	88.9	1,836	68.2	813
Residence									
Urban	97.9	49.2	80.6	1,123	98.1	97.5	1,454	72.9	526
Rural	97.7	46.8	78.9	5,179	93.5	92.2	6,870	69.8	2,710
Province									
Kigali	97.2	46.2	80.6	866	97.3	97.0	1,164	73.0	422
South	97.5	49.6	82.3	1,305	92.9	91.6	1,672	73.4	689
West	97.7	47.3	76.7	1,425	93.8	91.9	2,009	58.3	775
North	98.8	46.9	80.0	1,004	96.7	95.5	1,267	67.0	477
East	97.6	45.9	77.8	1,702	93.0	92.1	2,212	79.1	873
Mother's education									
No education	94.8	41.7	79.8	698	84.7	82.3	957	62.4	326
Primary	97.7	45.2	79.4	4,020	94.4	93.1	5,335	69.6	2,028
Secondary	98.9	51.0	77.3	1,309	98.3	98.0	1,672	73.8	727
More than secondary	99.7	72.7	85.0	275	99.9	100.0	360	81.2	155
Wealth quintile									
Lowest	95.7	38.3	75.6	1,448	89.1	87.0	1,961	65.2	754
Second	97.2	44.0	78.8	1,217	92.8	91.2	1,624	66.3	657
Middle	98.1	47.9	79.9	1,224	94.8	93.6	1,607	71.3	613
Fourth	98.6	51.3	80.4	1,234	97.4	96.8	1,608	73.7	641
Highest	99.5	56.3	82.2	1,178	99.0	98.8	1,525	76.9	571
Total	97.7	47.2	79.2	6,302	94.3	93.1	8,324	70.3	3,236

Note: If more than one source of assistance was mentioned, only the provider with the highest qualifications is considered in this tabulation.
[1] Skilled provider includes doctor, nurse/midwife, auxiliary midwife, community health worker, community mother and child
[2] Includes mothers with two injections during the pregnancy of her most recent live birth, or two or more injections (the last within 3 years of the most recent live birth), or three or more injections (the last within 5 years of the most recent live birth), or four or more injections (the last within 10 years of the most recent live birth), or five or more injections at any time prior to the last live birth
[3] Includes women who received a check from a doctor, midwife, nurse, or community health worker

3.9.2 Tetanus Toxoid

Tetanus toxoid injections are given during pregnancy to prevent neonatal tetanus, a major cause of early infant death in many developing countries, often due to failure to observe hygienic procedures during delivery. Table 9 shows that 79% of women with a birth in the 5 years before the survey received sufficient doses of tetanus toxoid to protect their last birth against neonatal tetanus. The percentage of women whose last birth was protected from tetanus varies with level of wealth. Women in the lowest wealth quintile are slightly less likely to have had their last birth protected from tetanus. For instance, 76% of women in the lowest wealth quintile had their last birth protected from tetanus, as compared with 82% of women in the highest wealth quintile.

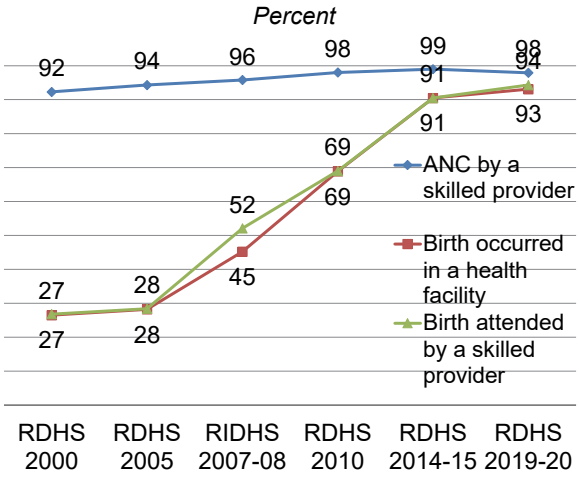
3.9.3 Delivery Care

Access to proper medical attention and hygienic conditions during delivery can reduce the risk of complications and infections that may lead to death or serious illness for the mother and/or baby (Van Lerberghe and De Brouwere 2001; WHO 2006). The survey data show that, in Rwanda, 94% of the births in the 5 years preceding the survey were delivered by a skilled provider and 93% were delivered in a health facility (Table 9).

Births in urban areas are more likely to benefit from skilled delivery care than those in rural areas. Ninety-eight percent of births to urban mothers were assisted by a skilled provider and were delivered in a health facility, as compared with 94% and 92%, respectively, of births to rural women.

Mothers' educational status correlates highly with whether their delivery is assisted by a skilled provider and whether the birth is delivered in a health facility. For example, 85% of births to mothers with no education were assisted by a skilled provider and 82% were delivered in a health facility, as compared with 100% respectively, of births to mothers with more than a secondary education. A similar relationship is observed with wealth.

Figure 5 **Trends in maternal health care, 2000 to 2019-20**



There has been a gradual improvement in maternal health care indicators over the past decades. The percentage of women receiving ANC from a skilled provider has been consistently above 90% since 2000 (Figure 5). There were substantial improvements in the percentage of births delivered at a health facility (from 27% to 93%) and the percentage of births attended by skilled providers (from 27% to 94%).

3.9.4 Postnatal Care for the Mother

A large proportion of maternal and neonatal deaths occur during the first 48 hours after delivery. Thus, prompt postnatal care (PNC) for both the mother and the child is important to treat any complications arising from the delivery, as well as to provide the mother with important information on how to care for herself and her child. Safe motherhood programs recommend that all women receive a check of their health within 2 days after delivery.

To assess the extent of postnatal care utilization, respondents were asked, for their last birth in the 2 years preceding the survey, whether they had received a checkup after delivery and the timing of the first checkup. As shown in Table 9, 70% of women reported having received a PNC checkup in the first 2 days after birth.

The proportion of women receiving a postnatal checkup within 2 days of delivery is slightly higher in urban than rural areas and substantially increases with increasing education and wealth.

3.10 CHILD HEALTH AND NUTRITION

The 2019-20 RDHS collected data on a number of key child health indicators, including vaccinations of young children, nutritional status as assessed by anthropometry, infant feeding practices, and treatment practices when a child is ill.

3.10.1 Vaccination of Children

Universal immunization of children against six common vaccine-preventable diseases, namely tuberculosis, diphtheria, whooping cough (pertussis), tetanus, polio, and measles, is crucial to reducing infant and child mortality. In Rwanda, vaccines against Hemophilus influenza type B and hepatitis B were used in combination with DPT and called pentavalent. As such, the 2019-20 RDHS reports on pentavalent vaccine coverage as opposed to DPT coverage. A phased rollout of the pneumococcal conjugate vaccine (PCV) that protects against *Streptococcus pneumoniae* bacteria, which cause severe pneumonia, meningitis, and other illnesses, commenced on December 22, 2014, in Rwanda. On February 20, 2015, Rwanda introduced one dose of inactivated poliomyelitis vaccine (IPV) at 14 weeks of age into its national

routine immunization schedule. The IPV does not replace the oral polio vaccine but is used with that vaccine to strengthen a child's immune system and protect against polio.

Rwanda has established a schedule for the administration of all basic childhood vaccines based on the World Health Organization's guidelines. Historically, an important measure of vaccination coverage has been the proportion of children age 12-23 months who have received all "basic" vaccinations. A child is considered to have received all basic vaccinations if he or she has received a bacille Calmette-Guérin (BCG) vaccination against tuberculosis; three doses of DPT vaccine to prevent diphtheria, pertussis, and tetanus; at least three doses of polio vaccine; and one dose of measles vaccine. These vaccinations should be received during the first year of life. BCG should be given shortly after birth or at first clinical contact. Polio vaccine should be given at approximately age 6 weeks, 10 weeks, and 14 weeks. Pentavalent vaccine should also be given at approximately age 6, 10, and 14 weeks. Measles vaccine should be given at or soon after the child reaches age 9 months.

A second, more critical measure of vaccination coverage is the proportion of children age 12-23 months and 24-35 months who have received all age-appropriate vaccinations. A child age 12-23 months is considered to have received all age-appropriate vaccinations if the child has received all basic vaccinations along with a birth dose of hepatitis B and polio vaccine, one dose of inactivated polio vaccine, and three doses of pneumococcal vaccine (also given at age 6, 10, and 14 weeks). Similarly, a child who is age 24-35 months has received all age-appropriate vaccinations if the child has received a second dose of measles given at 18 months in addition to all of the age-appropriate vaccinations relevant for a child age 12-23 months.

In the 2019-20 RDHS, information on vaccination coverage was obtained in two ways—from health cards and from mothers' verbal reports. All mothers were asked to show the interviewer the cards on which vaccination dates are recorded for all children born since January 2017. If the card was available, the interviewer then recorded from the card the dates of each vaccination received. In cases in which the card indicated the child had not received all basic vaccinations, the mother was asked whether the child had received other vaccinations that were not recorded on the card, and, if so, they too were recorded. If there was no card, or if the mother was unable to show the card to the interviewer, the child's vaccination information was based on the mother's recall. The mother was asked to recall whether the child had received the BCG, hepatitis B (birth dose), polio, pentavalent, pneumococcal, inactivated polio vaccine, and measles vaccines. If she indicated that the child had received the polio, pentavalent, pneumococcal, or measles vaccine, she was asked about the number of doses that the child received. The results presented here are based on the vaccination card and, for those children without a card, information provided by the mother. Cards were seen for 97% of children age 12-23 months and 93% of children age 24-35 months (data not shown).

Table 10 pertains to children age 12-23 months and 24-35 months, the age by which children should have received all basic vaccinations. Overall, 96% of children have received all basic vaccinations, and 84% have received all age-appropriate vaccinations. Ninety-nine percent of children have received BCG, 99% have received the three doses of pentavalent, and 98% have received three doses of oral polio. Coverage of vaccination against measles is 98%. Less than 1% of children in Rwanda have not received any vaccinations.

Table 10 Vaccinations by background characteristics

Percentage of children age 12-23 months and children age 24-35 months who received specific vaccines at any time before the survey (according to a vaccination card or the mother's report), percentage with all basic vaccinations, and percentage with all age appropriate vaccinations, according to background characteristics, Rwanda DHS 2019-20

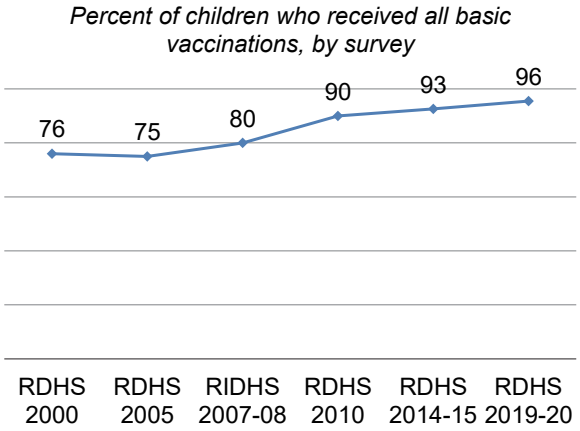
		DPT-HepB-Hib			Polio2				IPV	Pneumococcal			Rotavirus							Children age 24-35 months:		
Background characteristic	BCG	1	2	3	0 (birth dose)	1	2	3	IPV	1	2	3	1	2	Measles & Rubella	All basic vaccina-tions[3]	All age appropriate vaccina-tions[4]	No vaccina-tions	Number of children	Measles & Rubella	All age appropriate vaccina-tions[5]	Number of children
Sex																						
Male	99.1	99.6	99.2	98.7	92.8	99.6	99.0	97.6	92.2	99.6	99.0	98.5	99.5	99.1	97.3	94.7	83.2	0.3	835	93.1	68.8	851
Female	99.4	99.6	99.6	99.3	95.1	99.6	99.6	97.8	92.7	99.6	99.6	99.2	99.5	99.5	98.3	96.4	85.7	0.4	797	94.5	70.0	780
Birth order																						
1	99.6	99.6	99.5	99.2	96.4	99.9	99.4	98.0	91.4	99.7	99.2	98.9	99.9	99.4	98.6	96.1	85.3	0.1	439	96.3	67.9	425
2-3	99.5	99.6	99.3	98.8	94.5	99.5	99.3	97.6	93.5	99.6	99.3	98.7	99.6	99.4	98.5	96.7	86.6	0.4	652	94.8	72.1	689
4-5	98.7	99.7	99.7	99.3	92.1	99.7	99.2	98.1	93.0	99.7	99.7	99.3	99.7	99.7	97.1	94.8	83.0	0.3	323	90.5	67.9	325
6+	98.5	99.3	99.3	98.3	90.1	99.3	99.3	96.8	90.6	99.3	99.3	98.2	98.2	98.2	94.9	92.0	78.3	0.7	219	89.7	65.1	192
Vaccination card																						
Seen	99.4	99.9	99.7	99.4	94.1	99.9	99.7	99.1	92.7	99.9	99.7	99.3	99.7	99.5	97.9	97.0	85.7	0.1	1,588	94.8	72.7	1,516
Not seen/no card	(93.1)	(90.9)	(87.4)	(82.7)	(89.8)	(91.3)	(83.4)	(46.4)	(84.0)	(91.0)	(84.7)	(81.2)	(93.1)	(91.4)	(91.4)	(44.2)	(38.8)	(6.9)	45	80.4	25.8	115
Residence																						
Urban	99.2	98.9	98.9	98.9	96.8	99.2	99.2	98.3	91.7	99.2	99.2	99.1	99.2	99.2	98.3	97.0	88.1	0.8	269	93.3	71.7	319
Rural	99.2	99.8	99.5	99.0	93.4	99.7	99.3	97.6	92.6	99.7	99.4	98.8	99.6	99.3	97.7	95.2	83.7	0.2	1,364	93.9	68.8	1,312
Province																						
Kigali	99.0	99.0	99.0	99.0	95.7	99.0	99.0	98.6	95.5	99.0	99.0	99.0	99.0	99.0	97.5	97.1	91.2	1.0	209	92.2	77.4	244
South	99.2	100.0	99.3	99.0	92.1	99.8	99.3	98.6	93.9	100.0	99.3	99.3	100.0	99.5	99.1	97.3	85.3	0.0	346	97.6	73.2	311
West	98.9	99.7	99.7	99.1	95.1	99.7	99.7	97.3	97.2	99.7	99.7	99.1	99.7	99.7	97.3	94.6	89.1	0.3	385	92.6	71.6	387
North	99.7	99.3	99.3	98.1	97.7	99.7	99.2	97.2	78.5	99.3	98.8	97.1	98.8	98.3	96.8	93.8	73.4	0.3	262	94.0	55.2	247
East	99.4	99.7	99.5	99.2	91.3	99.7	99.1	97.1	94.1	99.7	99.5	99.2	99.7	99.5	97.8	95.2	83.1	0.3	431	92.8	68.1	442
Education																						
No education	98.5	99.1	98.5	98.5	90.3	99.1	98.5	96.2	93.4	99.1	98.5	97.7	99.1	98.5	97.8	95.0	83.6	0.9	159	89.2	65.8	180
Primary	99.2	99.7	99.5	98.9	93.1	99.7	99.3	98.1	92.5	99.7	99.4	98.8	99.6	99.3	97.4	95.3	83.3	0.2	1,048	94.1	69.2	1,043
Secondary	99.8	99.8	99.8	99.5	97.4	99.8	99.8	97.6	92.5	99.8	99.8	99.7	99.8	99.8	98.8	96.6	87.6	0.2	351	95.0	70.8	330
More than secondary	98.1	98.1	98.1	98.1	98.1	98.1	98.1	95.8	89.4	98.1	98.1	98.1	98.1	98.1	98.1	95.8	87.1	1.9	75	95.0	73.3	78
Wealth quintile																						
Lowest	99.0	100.0	99.3	98.5	92.5	100.0	99.0	96.2	90.9	99.7	98.7	97.8	100.0	99.3	97.3	93.4	80.2	0.0	357	92.5	65.6	403
Second	98.7	99.3	99.1	98.4	91.6	99.1	98.7	97.3	90.6	99.3	99.1	98.4	99.3	99.0	97.9	95.2	81.2	0.7	351	94.0	72.4	280
Middle	100.0	100.0	100.0	99.7	93.5	100.0	100.0	98.2	95.5	100.0	100.0	99.5	99.6	99.6	96.9	95.1	84.3	0.0	323	92.3	66.7	323
Fourth	99.4	99.7	99.7	99.4	96.1	99.7	99.7	99.1	95.8	99.7	99.7	99.4	99.4	99.4	98.2	97.5	91.2	0.3	338	95.9	72.3	286
Highest	99.2	98.9	98.9	98.9	96.8	99.2	99.2	97.8	89.0	99.2	99.2	99.2	99.2	99.2	98.7	96.9	85.8	0.8	264	94.5	71.3	339
Total	99.2	99.6	99.4	99.0	93.9	99.6	99.3	97.7	92.4	99.6	99.3	98.8	99.5	99.3	97.8	95.5	84.4	0.3	1,633	93.8	69.4	1,631

BCG = Bacille Calmette-Guérin
DPT = Diphtheria-pertussis-tetanus
HepB = Hepatitis B
Hib = Hemophilus influenzae type b
Note: Figures in parentheses are based on 25-49 unweighted cases. Children are considered to have received the vaccine if it was either written on the child's vaccination card or reported by the mother. For children whose vaccination information is based on the mother's report, date of vaccination is not collected. The proportions of vaccinations given during the first and second years of life are assumed to be the same as for children with a written record of vaccination.
[1] For children whose vaccination information is based on the mother's report, children reported to have received HepB (birth dose) received the vaccine within 24 hours after birth. For children whose vaccination information is based on the written record of vaccination, children are considered to have received hepatitis B (birth dose) if this vaccine is recorded on their card, regardless of when the dose was administered.
[2] Polio 0 is the polio vaccination given at birth.
[3] BCG, three doses of DPT-HepB-Hib (pentavalent), three doses of oral polio vaccine (excluding polio vaccine given at birth), and one dose of measles
[4] BCG, hepatitis B (birth dose), three doses of DPT-HepB-Hib (pentavalent), four doses of oral polio vaccine, one dose of inactivated polio vaccine, three doses of pneumococcal vaccine, and one dose of measles
[5] BCG, hepatitis B (birth dose), three doses of DPT-HepB-Hib (pentavalent), four doses of oral polio vaccine, one dose of inactivated polio vaccine, three doses of pneumococcal vaccine, and two doses of measles

Basic vaccination coverage differs slightly by residence, mother's education and wealth.

Figure 6 shows the trend of children age 12-23 who received all basic vaccinations since 2000.

Figure 6 Trends in childhood vaccinations, 2000 to 2019-20



3.10.2 Childhood Acute Respiratory Infection, Fever, and Diarrhea

Acute respiratory infection (ARI), fever, and dehydration from diarrhea are important contributing causes of childhood morbidity and mortality in developing countries (WHO 2003). Prompt medical attention when a child has the symptoms of these illnesses is, therefore, crucial in reducing child deaths. In the 2019-20 RDHS, for each child under age 5, mothers were asked if the child had experienced a cough accompanied by short, rapid breathing or difficulty in breathing as a result of a chest-related problem (symptoms of ARI); a fever; or an episode of diarrhea in the 2 weeks preceding the survey. Respondents were also asked if treatment was sought when the child was ill. Overall, 2% of children under age 5 showed symptoms of ARI, 19% had a fever, and 14% experienced diarrhea in the 2 weeks preceding the survey (data not shown). It should be noted that the morbidity data collected are subjective because they are based on a mother's perception of illnesses without validation by medical personnel.

Table 11 shows that treatment from a health facility or provider was sought for 73% of children with ARI symptoms and 62% of those with a fever. Treatment was sought from a health facility or health provider for 52% of children with diarrhea. Thirty-four percent of children with diarrhea received a rehydration solution from an oral rehydration salt (ORS) packet; 37% of children with diarrhea were given zinc supplements, and 22% received both ORS and zinc supplements.

Table 11 Treatment for acute respiratory infection, fever, and diarrhea

Among children under age 5 who had symptoms of acute respiratory infection (ARI) or had fever in the 2 weeks preceding the survey, percentage for whom advice or treatment was sought, and among children under age 5 who had diarrhea during the 2 weeks preceding the survey, percentage for whom advice or treatment was sought, percentage given a fluid made from oral rehydration salt (ORS) packets or given pre-packaged ORS fluid, percentage given zinc, and percentage given ORS and zinc, according to background characteristics, Rwanda DHS 2019-20

Background characteristic	Children with symptoms of ARI[1]		Children with fever		Children with diarrhea				
	Percentage for whom advice or treatment was sought[2]	Number of children	Percentage for whom advice or treatment was sought[2]	Number of children	Percentage for whom advice or treatment was sought[2]	Percentage given fluid from ORS packet or pre-packaged	Percentage given zinc	Percentage given ORS and zinc	Number of children
Age in months									
<6	*	19	54.1	111	(42.5)	(16.9)	(16.0)	(5.4)	53
6-11	*	20	64.0	208	46.8	28.4	27.9	14.2	191
12-23	(79.1)	37	65.6	437	58.6	39.5	41.3	26.3	408
24-35	*	23	61.3	304	50.5	35.2	38.3	24.0	238
36-47	*	21	58.8	261	45.1	29.4	38.6	22.6	151
48-59	*	16	64.3	186	52.8	37.2	36.9	25.3	99
Sex									
Male	66.7	74	63.6	770	51.9	34.0	35.5	22.3	600
Female	79.7	62	61.0	736	51.9	34.4	37.7	22.1	541
Residence									
Urban	*	14	68.9	212	46.0	26.0	27.6	16.3	163
Rural	71.1	123	61.2	1,295	52.9	35.5	38.0	23.2	978
Province									
Kigali	*	13	71.8	175	42.8	21.4	20.3	8.8	133
South	*	19	61.6	260	52.4	34.0	34.3	21.5	211
West	67.2	51	63.3	443	53.3	38.1	42.3	26.2	358
North	*	19	53.3	257	50.7	32.3	37.3	21.4	197
East	(82.2)	34	63.4	372	55.3	36.9	38.2	25.1	242
Mother's education									
No education	*	19	57.1	164	44.4	33.1	29.4	20.5	154
Primary	68.7	97	59.0	996	51.3	33.8	36.9	22.0	758
Secondary	*	17	72.2	304	59.7	35.9	42.7	25.7	207
More than secondary	*	3	(89.3)	43	*	*	*	*	22
Wealth quintile									
Lowest	(66.8)	40	52.3	364	46.6	31.1	32.2	19.1	311
Second	(63.8)	38	56.5	333	45.9	33.5	34.6	22.5	255
Middle	*	30	62.3	316	54.2	38.4	41.1	27.0	239
Fourth	*	13	70.5	275	63.0	37.5	43.5	25.2	201
Highest	*	15	77.4	219	55.0	29.9	31.8	16.2	135
Total	72.7	137	62.3	1,507	51.9	34.1	36.5	22.2	1,141

Note: Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.
[1] Symptoms of ARI include short, rapid breathing which was chest-related and/or difficult breathing which was chest-related.
[2] Excludes advice or treatment from a traditional practitioner

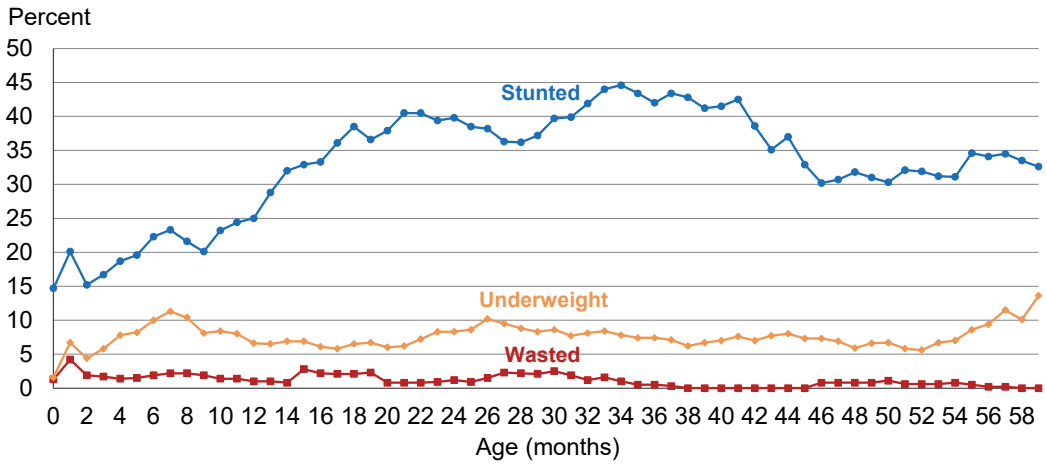
3.10.3 Nutritional Status of Children

Anthropometric measurements (height and weight) for young children were collected in the 2019-20 RDHS to provide outcome measures of nutritional status. Each team of interviewers carried a scale and measuring board. Weight measurements were taken using lightweight SECA scales with digital displays (model no. SECA 878U), which were designed and manufactured under the authority of the United Nations Children's Fund (UNICEF). Height/length measurements were taken using a standard measuring board (Shorr Board®). Recumbent length (lying down) was measured for children younger than age 24 months; standing height was measured for older children.

As recommended by WHO, evaluation of nutritional status in this report is based on a comparison of three indices for the children in the survey with indices reported for a reference population of well-nourished children (WHO Multicentre Growth Reference Study Group 2006). The three indices (height-for-age, weight-for-height, and weight-for-age) are expressed as standard deviation units from the median for the reference group. Children who fall below minus two standard deviations (-2 SD) from the median of the reference population are regarded as moderately malnourished, while those who fall below minus three standard deviations (-3 SD) from the reference population median are considered severely malnourished.

Each of these indices provides information about growth and body composition that is useful in assessing nutritional status. *Stunting*, or low height-for-age, is a sign of chronic undernutrition that reflects failure to receive adequate nutrition over a long period. The most direct causes are (1) not eating enough or eating foods that lack growth-promoting nutrients and (2) recurrent infections or chronic diseases that cause poor nutrient intake, absorption, or utilization. *Wasting*, or low weight-for-height, is a measure of acute undernutrition. It represents a failure to receive adequate nutrition in the period immediately before the survey. Wasting may result from inadequate food intake or from a recent episode of illness causing weight loss. *Overweight and obesity*, or high weight-for-height, results from an imbalance between energy consumed (too much) and energy expended (too little). Overweight and obesity are now problems in many countries. *Weight-for-age* is a composite index of height-for-age and weight-for-height. It includes both acute (wasting) and chronic (stunting) undernutrition and is an indicator of overall undernutrition.

Figure 7 **Nutritional status of children by age**



Note: *Stunting* reflects chronic malnutrition; *wasting* reflects acute malnutrition; *underweight* reflects chronic or acute malnutrition or a combination of both. Plotted values are smoothed by a five-month moving average.

The means of the Z-scores for height-for-age, weight-for-height, and weight-for-age are also calculated as summary statistics representing the nutritional status of children in a population. These mean scores describe the nutritional status of the entire population of children without the use of a cut-off point. A mean Z-score of less than 0 (that is, a negative mean value for stunting, wasting, or underweight) suggests a downward shift in the entire sample population's nutritional status relative to the reference population. The farther away mean Z-scores are from 0, the higher the prevalence of undernutrition.

Height and weight measurements were obtained for 4,052 (unweighted) children under age 5 who were eligible to be measured in the 2019-20 RDHS subsample households at the time of the survey. The analysis of anthropometric indices (height-for-age, weight-for-height, and weight-for-age) included valid dates of birth and measures of both height and weight. Valid height and weight data were available for nearly all children (99.7%).

Table 12 and Figure 7 show nutritional status for children under age 5 according to the three anthropometric indices. Thirty-three percent of children in Rwanda are stunted (below -2 SD), and 9% are severely stunted (below -3 SD). Stunting generally increases with age, peaking at 40% among children age 24-35 months. A higher proportion of children in rural areas (36%) than urban areas (20%) are stunted. Similarly, children in North province (41%) and West province (40%) are more likely to be stunted than other children. Stunting is strongly correlated with mother's education level. Children of women with no education are more likely to be stunted than those whose mothers have been to school. Stunting is inversely related to wealth quintile; 49% of children in the lowest wealth quintile are stunted, as compared with 11% of children in the highest quintile.

Table 12 Nutritional status of children

Percentage of children under age 5 classified as malnourished according to three anthropometric indices of nutritional status: height-for-age, weight-for-height, and weight-for-age, according to background characteristics, Rwanda DHS 2019-20

Background characteristic	Height-for-age[1]				Weight-for-height					Weight-for-age				
	Percentage below -3 SD	Percentage below -2 SD[2]	Mean Z-score (SD)	Number of children	Percentage below -3 SD	Percentage below -2 SD[2]	Percentage above +2 SD	Mean Z-score (SD)	Number of children	Percentage below -3 SD	Percentage below -2 SD[2]	Percentage above +2 SD	Mean Z-Score (SD)	Number of children
Age in months														
<6	4.5	16.2	-0.9	397	0.6	1.5	11.4	0.7	395	2.4	5.1	1.8	-0.2	396
6-8	5.7	22.7	-1.1	219	0.3	2.7	9.2	0.3	218	2.9	10.2	2.9	-0.4	219
9-11	5.2	19.8	-1.2	222	0.9	1.3	5.5	0.2	222	2.7	8.3	1.4	-0.5	222
12-17	7.3	32.8	-1.5	409	0.5	2.2	4.0	0.3	410	1.2	7.2	0.2	-0.5	410
18-23	10.9	39.0	-1.7	411	0.0	0.7	5.4	0.4	411	0.2	5.8	0.4	-0.5	411
24-35	11.8	40.4	-1.7	854	0.1	1.7	6.2	0.5	854	1.2	9.3	0.4	-0.6	854
36-47	9.5	37.9	-1.7	818	0.0	0.0	4.7	0.5	820	0.8	6.7	0.3	-0.6	818
48-59	10.7	32.5	-1.6	827	0.0	0.7	3.2	0.3	828	1.2	8.5	0.3	-0.8	829
Sex														
Male	11.0	37.0	-1.6	2,084	0.0	0.9	5.8	0.5	2,083	1.6	9.0	0.7	-0.6	2,085
Female	7.5	29.2	-1.4	2,074	0.3	1.4	5.4	0.4	2,075	1.1	6.3	0.6	-0.5	2,075
Mother's interview status														
Interviewed	9.0	33.1	-1.5	3,908	0.2	1.2	5.7	0.4	3,906	1.3	7.5	0.7	-0.6	3,909
Not interviewed, but in household	*	*	*	18	*	*	*	*	18	*	*	*	*	18
Not interviewed, not in household[3]	13.2	33.2	-1.6	232	0.0	0.5	4.5	0.5	234	1.7	10.3	0.0	-0.6	232
Residence														
Urban	4.9	19.8	-1.0	694	0.4	1.6	6.7	0.4	693	0.3	3.7	1.1	-0.2	696
Rural	10.1	35.8	-1.6	3,464	0.2	1.0	5.4	0.4	3,466	1.5	8.5	0.6	-0.6	3,464
Province														
Kigali	5.9	21.3	-1.1	561	0.4	1.8	6.3	0.3	559	1.0	4.8	1.6	-0.3	562
South	9.1	32.7	-1.6	835	0.1	2.2	3.1	0.2	834	2.1	10.4	0.1	-0.7	835
West	13.2	40.2	-1.7	997	0.3	0.6	6.2	0.5	996	1.2	8.1	0.7	-0.7	996
North	11.7	40.5	-1.8	635	0.0	0.5	7.7	0.7	636	1.7	7.3	0.2	-0.5	637
East	6.0	28.8	-1.4	1,130	0.2	0.8	5.5	0.4	1,133	0.8	6.9	0.8	-0.5	1,130
Mother's education														
No education	14.5	45.1	-1.9	473	0.2	0.8	5.6	0.4	473	2.8	10.5	0.6	-0.8	474
Primary	10.0	35.6	-1.6	2,517	0.2	1.3	5.3	0.4	2,516	1.3	8.3	0.6	-0.7	2,517
Secondary	3.8	23.3	-1.2	778	0.0	0.7	5.8	0.4	778	0.7	4.6	0.6	-0.3	778
More than secondary	1.9	5.6	-0.3	158	1.2	3.2	11.5	0.6	158	0.0	0.2	3.1	0.3	159
Wealth quintile														
Lowest	15.9	48.5	-1.9	948	0.2	1.4	5.5	0.4	949	2.0	12.2	0.3	-0.9	950
Second	11.8	40.5	-1.8	850	0.2	1.1	3.6	0.4	850	1.3	10.1	0.0	-0.8	850
Middle	8.4	32.8	-1.5	799	0.3	1.2	5.5	0.4	800	2.0	6.7	0.2	-0.6	797
Fourth	6.6	28.6	-1.4	798	0.0	0.8	6.3	0.4	798	0.6	6.1	1.2	-0.5	798
Highest	1.7	10.7	-0.8	763	0.3	1.1	7.4	0.5	762	0.5	1.9	1.7	-0.0	765
Total	9.2	33.1	-1.5	4,158	0.2	1.1	5.6	0.4	4,158	1.3	7.7	0.6	-0.6	4,160

Note: Each of the indices is expressed in standard deviation units (SD) from the median of the WHO Child Growth Standards. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.

[1] Recumbent length is measured for children under age 2; standing height is measured for all other children

[2] Includes children who are below –3 standard deviations (SD) from the WHO Growth Standards population median

[3] Includes children whose mothers are deceased

[4] For women who are not interviewed, information is taken from the Household Questionnaire. Excludes children whose mothers are not listed in the Household Questionnaire.

Only 1% of children in Rwanda are wasted and less than 1% are severely wasted. Overall, 6% of children under age 5 are overweight.

The results show that 8% of all children under age 5 are underweight and 1% are severely underweight. The proportion of children who are underweight is greater in rural areas (9%) than urban areas (4%). Underweight is strongly associated with mother's education; 11% of children whose mothers have no education compared to less than 1% of children whose mothers have more than a secondary education. Underweight is inversely related to wealth; 12% of children in the lowest wealth quintile are underweight, as compared with 2% of children in the highest quintile.

3.10.4 Infant and Young Child Feeding Practices

Breastfeeding is sufficient and beneficial for infant nutrition in the first 6 months of life. Breastfeeding immediately after birth also helps the uterus contract, hence reducing the mother's postpartum blood loss. Giving any other foods and water (in addition to breast milk) before the child is age 6 months is discouraged because it may inhibit breastfeeding and expose the infant to illness. Infants older than age 6 months need other food and drink while they continue to breastfeed until age 2 or older; breast milk remains an important source of energy, protein, and other nutrients such as vitamin A and iron. The food given should include a variety of options such as peeled, cooked, and mashed vegetables; grains; fruit; some oil; and also meat, eggs, chicken, and dairy products to provide adequate nourishment (Pan American Health Organization 2002).

Table 13 Breastfeeding status by age

Percent distribution of youngest children under age 2 who are living with their mother, by breastfeeding status and the percentage currently breastfeeding; and percentage of all children under age 2 using a bottle with a nipple, according to age in months, Rwanda DHS 2019-20

	Breastfeeding status										
Age in months	Not breast-feeding	Exclusively breast-feeding	Breast-feeding and consuming plain water only	Breast-feeding and consuming non-milk liquids[1]	Breast-feeding and consuming other milk	Breast-feeding and consuming comple-mentary foods	Total	Percentage currently breast-feeding	Number of youngest children under age 2 living with the mother	Percentage using a bottle with a nipple	Number of all children under age 2
0-1	0.8	86.9	0.2	8.2	2.0	1.9	100.0	99.2	238	3.1	242
2-3	0.0	88.9	1.1	7.5	2.5	0.0	100.0	100.0	265	2.2	266
4-5	2.1	68.1	3.2	8.5	6.9	11.1	100.0	97.9	278	7.6	283
6-8	3.1	9.7	0.2	3.0	5.3	78.7	100.0	96.9	412	13.2	420
9-11	2.0	1.7	0.2	1.6	0.0	94.4	100.0	98.0	405	11.2	417
12-17	4.7	0.3	0.1	0.7	0.0	94.3	100.0	95.3	797	6.8	825
18-23	14.8	0.0	0.1	0.1	0.0	84.9	100.0	85.2	750	4.0	807
0-3	0.4	88.0	0.7	7.8	2.3	0.9	100.0	99.6	503	2.6	508
0-5	1.0	80.9	1.6	8.1	3.9	4.5	100.0	99.0	781	4.4	791
6-9	2.4	8.0	0.3	2.7	4.1	82.4	100.0	97.6	531	12.3	546
12-15	3.8	0.4	0.1	0.6	0.0	95.1	100.0	96.2	556	7.4	576
12-23	9.6	0.1	0.1	0.4	0.0	89.7	100.0	90.4	1,547	5.4	1,633
20-23	14.6	0.0	0.2	0.0	0.0	85.2	100.0	85.4	509	3.9	551

Note: Breastfeeding status refers to a "24-hour" period (yesterday and last night). Children who are classified as breastfeeding and consuming plain water only consumed no liquid or solid supplements. The categories of not breastfeeding, exclusively breastfeeding, breastfeeding and consuming plain water, non-milk liquids, other milk, and complementary foods (solids and semi-solids) are hierarchical and mutually exclusive, and their percentages add to 100%. Thus children who receive breast milk and non-milk liquids and who do not receive other milk and who do not receive complementary foods are classified in the non-milk liquid category even though they may also get plain water. Any children who get complementary food are classified in that category as long as they are breastfeeding as well.

[1] Non-milk liquids include juice, juice drinks or other liquids

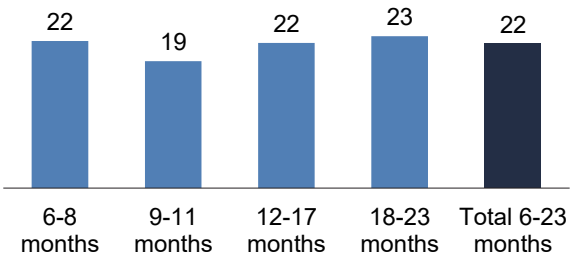
The 2019-20 RDHS collected data on infant and young child feeding (IYCF) practices for all children born in the 2 years preceding the survey. Table 13 shows breastfeeding practices by child's age. The results show that 81% of children under age 6 months are exclusively breastfed, this is slightly decreased from the 87% figure reported in 2014-15. In addition to breast milk, 2% of these young children consume plain water, 8% consume non-milk liquids, 4% consume other milk, and 5% consume complementary foods. Four percent of infants under age 6 months are fed using a bottle with a nipple, a practice that is

discouraged because of the risk of illness to the child. Seventy-nine percent of children age 6-8 months receive timely complementary foods.

The minimum acceptable diet indicator is used to assess the proportion of children age 6-23 months who meet minimum standards with respect to IYCF practices. Specifically, children age 6-23 months who have a minimum acceptable diet meet all three IYCF criteria below:

Figure 8 **Minimum acceptable diet by age, in months**

Percent of children fed a minimum acceptable diet, by age in months



- Breastfeeding, or not breastfeeding and receiving two or more feedings of commercial infant formula; fresh, tinned, or powdered animal milk; or yogurt.
- Fed with foods from five or more of the following groups: (a) breast milk; (b) grains, roots, and tubers, including porridge and fortified baby food from grains; (c) legumes and nuts; (d) dairy products (milk, yogurt, cheese); (e) eggs; (f) meat, poultry, fish, and shellfish (and organ meats); (g) vitamin A-rich fruits and vegetables (and red palm oil); and (h) other fruits and vegetables.
- Fed the minimum recommended number of times per day, according to their age and breastfeeding status:
  - For breastfed children, minimum meal frequency is receiving solid, semisolid, or soft food at least twice a day (for infants age 6-8 months) or at least three times a day (for children age 9-23 months).
  - For nonbreastfed children age 6-23 months, minimum meal frequency is receiving solid, semisolid, or soft food or milk feeds at least four times a day. At least one of the feeds must be a solid, semisolid, or soft food.

Figure 8 shows the percentage of children being fed the minimum acceptable diet, by age. Among children age 6-23 months, only 22% are fed in accordance with the criteria for a minimum acceptable diet.

3.11 ANEMIA PREVALENCE IN CHILDREN

Anemia is a condition that is marked by low levels of hemoglobin in the blood. Iron is a key component of hemoglobin, and iron deficiency is estimated to be responsible for half of all anemia globally. Other causes of anemia include hookworm and other helminths, other nutritional deficiencies, chronic infections, and genetic conditions. Anemia is a serious concern for children because it can impair cognitive development, stunt growth, and increase morbidity from infectious diseases.

The 2019-20 RDHS included direct measurement of hemoglobin levels using the HemoCue system. This system consists of a battery-operated photometer and a disposable microcuvette coated with a dried reagent that serves as the blood collection device. For the test, a drop of capillary blood taken from a child's fingertip or heel is drawn into the microcuvette. The blood in the microcuvette is analyzed using the photometer, which displays the hemoglobin concentration. Hemoglobin levels were successfully measured in nearly all (99.8%) of the children eligible for testing (data not shown). Results were given verbally and in writing. Parents of children with a hemoglobin level below 8 g/dl were instructed to take the child to a health facility for follow-up care. All households in which biomarker data were collected were given a brochure with results and an explanation of the causes and prevention of anemia and malaria.

Table 14 presents anemia prevalence among children age 6-59 months, by background characteristics. Hemoglobin levels for children were adjusted for altitude. Children with hemoglobin levels below 11.0 g/dl were defined as anemic.

Table 14 Prevalence of anemia in children

Percentage of children age 6-59 months classified as having anemia, according to background characteristics, Rwanda DHS 2019-20

Background characteristic	Anemia status by hemoglobin level				Number of children age 6-59 months
	Any anemia (<11.0 g/dl)	Mild anemia (10.0-10.9 g/dl)	Moderate anemia (7.0-9.9 g/dl)	Severe anemia (<7.0 g/dl)	
Age in months					
6-8	70.1	36.5	32.7	0.9	219
9-11	64.3	27.7	36.5	0.0	222
12-17	50.9	28.8	21.5	0.7	411
18-23	39.5	22.6	16.4	0.5	411
24-35	31.6	19.4	11.9	0.3	853
36-47	29.8	19.4	10.4	0.1	820
48-59	23.5	15.3	8.2	0.0	829
Sex					
Male	38.0	21.8	15.7	0.4	1,895
Female	35.1	20.8	14.1	0.2	1,870
Residence					
Urban	34.0	21.3	12.4	0.3	641
Rural	37.1	21.3	15.5	0.3	3,123
Province					
Kigali	36.7	23.3	13.0	0.3	513
South	32.1	18.3	13.5	0.3	761
West	40.9	20.3	20.4	0.1	886
North	41.4	24.4	16.6	0.4	584
East	33.3	21.7	11.3	0.3	1,021
Wealth quintile					
Lowest	41.8	22.4	19.3	0.1	852
Second	37.0	21.4	15.4	0.2	781
Middle	37.1	20.7	15.9	0.5	733
Fourth	35.2	22.5	12.6	0.1	708
Highest	30.4	19.3	10.5	0.6	690
Total	36.6	21.3	14.9	0.3	3,765

Notes: Table is based on children who stayed in the household on the night before the interview and who were tested for anemia. Prevalence of anemia, based on hemoglobin levels, is adjusted for altitude using formulas in CDC, 1998. Hemoglobin in grams per deciliter (g/dl).

Overall, 37% of children suffered from some degree of anemia: 21% were classified as mildly anemic, 15% were moderately anemic, and less than 1% were severely anemic. The prevalence of anemia decreases with age, from a high of 70% among children age 12-17 months to a low of 24% among children age 48-59 months. Anemia prevalence is higher among children in rural areas than among those in urban areas (37% and 34%, respectively). Anemia prevalence varies by province, from a low of 32% in South province to a high of 41% in West province and North province respectively. Prevalence of anemia in children is inversely correlated with wealth quintile.

3.12 ANEMIA PREVALENCE IN WOMEN

The 2019-20 RDHS also included measurement of hemoglobin levels among women age 15-49. Hemoglobin levels among women were measured using procedures similar to those used for children, except that capillary blood was collected exclusively from a finger prick. Hemoglobin levels were successfully measured for 99.7% of the women eligible for testing (data not shown). Results were given verbally and in writing. Nonpregnant women and pregnant women were referred for follow-up care if their hemoglobin levels were below 8 g/dl and 7 g/dl, respectively. All households in which anthropometry and anemia testing were conducted received a brochure explaining the causes and prevention of anemia.

Table 15 presents anemia prevalence among women age 15-49 by background characteristics. Hemoglobin levels for women were adjusted for altitude and smoking status. Pregnant women with hemoglobin levels below 11.0 g/dl and nonpregnant women with hemoglobin levels below 12.0 g/dl were defined as anemic.

Table 15 Prevalence of anemia in women

Percentage of women age 15-49 with anemia, according to background characteristics, Rwanda DHS 2019-20

Background characteristic	Anemia status by hemoglobin level				Number of women
	Any	Mild	Moderate	Severe	
Age					
5-19	14.7	10.7	4.0	0.1	1,620
20-29	12.8	8.1	4.5	0.2	2,158
30-39	12.2	8.6	3.2	0.4	2,116
40-49	13.2	7.4	5.5	0.3	1,371
Number of living children					
0	14.1	9.2	4.7	0.3	2,598
1	12.6	8.7	3.6	0.3	920
2-3	12.1	7.5	4.1	0.4	1,886
4-5	11.5	7.7	3.7	0.1	1,073
6+	15.2	11.0	4.1	0.1	788
Maternity status					
Pregnant	24.5	16.2	8.1	0.2	434
Breastfeeding	11.6	8.4	3.1	0.2	1,797
Neither	12.7	8.1	4.3	0.3	5,033
Residence					
Urban	12.3	7.0	4.5	0.7	1,428
Rural	13.3	9.1	4.1	0.1	5,837
Province					
Kigali	14.5	8.7	5.0	0.8	1,050
South	14.5	9.0	5.2	0.4	1,521
West	12.7	9.0	3.6	0.1	1,604
North	11.4	7.8	3.5	0.1	1,091
East	12.6	8.7	3.8	0.1	1,999
Education					
No education	14.1	9.6	4.5	0.0	721
Primary	12.9	8.7	4.1	0.2	4,131
Secondary	12.5	8.2	4.0	0.3	2,098
More than secondary	17.6	9.8	6.9	0.9	315
Wealth quintile					
Lowest	15.8	10.8	4.9	0.1	1,281
Second	12.9	8.7	4.0	0.1	1,408
Middle	12.2	8.1	3.9	0.2	1,381
Fourth	12.3	9.0	3.3	0.1	1,506
Highest	12.8	7.1	5.0	0.7	1,689
Total	13.1	8.7	4.2	0.3	7,265

Note: Prevalence is adjusted for altitude and for smoking status, if known, using formulas in CDC, 1998. Nonpregnant women with a hemoglobin level below 8.0 g/dl and pregnant women with a level below 7.0 g/dl have severe anemia; nonpregnant women with a level of 8.0-10.9 g/dl and pregnant women with a level of 7.0-9.9 g/dl have moderate anemia; and nonpregnant women with a level of 10.0-11.9 g/dl and pregnant women with a level of 10.0-10.9 g/dl have mild anemia.

Thirteen percent of women age 15-49 are anemic. Most of these women are mildly anemic (9%); 4% are moderately anemic, and less than1% are severely anemic. Pregnant women (25%) and women in the lowest wealth quintile (16%) are more likely to be anemic than other women.

3.13 OWNERSHIP AND USE OF MOSQUITO NETS

3.13.1 Ownership of Mosquito Nets

The use of insecticide-treated mosquito nets (ITNs) is a primary health intervention designed to reduce malaria transmission in Rwanda. An ITN is defined as a factory-treated net that does not require any further treatment. In the previous RDHS and Rwanda Malaria Indicator Survey (RMIS) surveys, the definition of an ITN included nets that had been soaked with insecticides within the past 12 months. In the most recent questionnaires, The DHS Program dropped questions on retreatment of nets. This was done because bed nets that require annual retreatment and the products used for retreatment are no longer distributed, and the distinction between ITNs and long-lasting insecticide-treated nets (LLINs) is no longer meaningful. What are defined as ITNs in the 2019-20 RDHS were previously known as LLINs in previous RDHS and RMIS surveys.

All households in the 2019-20 RDHS were asked if they owned mosquito nets and, if so, what type and how many. Table 16 presents the percentage of households with at least one ITN, the average number of nets per household, and the percentage of households with at least one ITN for each two persons who stayed in the household the previous night, by background characteristics. About six in ten households (66%) have at least one ITN. On average, there is 1.3 ITN per household.

Table 16 Household possession of insecticide-treated nets

Percentage of households with at least one insecticide-treated net (ITN); average number of ITNs per household; and percentage of households with at least one ITN per two persons who stayed in the household last night, according to background characteristics, Rwanda DHS 2019-20

Background characteristic	Percentage of households with at least one insecticide-treated net (ITN)[1]	Average number of insecticide-treated nets (ITN)[1] per households	Number of households	Percentage of households with at least one insecticide-treated net (ITN)[1] for every two persons who stayed in the household last night[2]	Number of households with at least one person who stayed in the household last night
Residence					
Urban	76.2	1.8	2,355	52.9	2,353
Rural	64.2	1.2	10,594	30.2	10,591
Province					
Kigali	86.0	2.1	1,810	63.5	1,808
South	64.9	1.2	3,003	31.6	3,001
West	64.2	1.1	2,770	27.3	2,770
North	65.7	1.2	2,012	31.2	2,012
East	59.3	1.2	3,353	28.7	3,353
Wealth quintile					
Lowest	45.6	0.7	2,837	18.4	2,836
Second	61.1	1.0	2,609	26.7	2,608
Middle	70.4	1.3	2,473	32.0	2,473
Fourth	75.9	1.5	2,570	39.7	2,570
Highest	81.9	2.1	2,460	57.6	2,457
Total	66.4	1.3	12,949	34.3	12,944

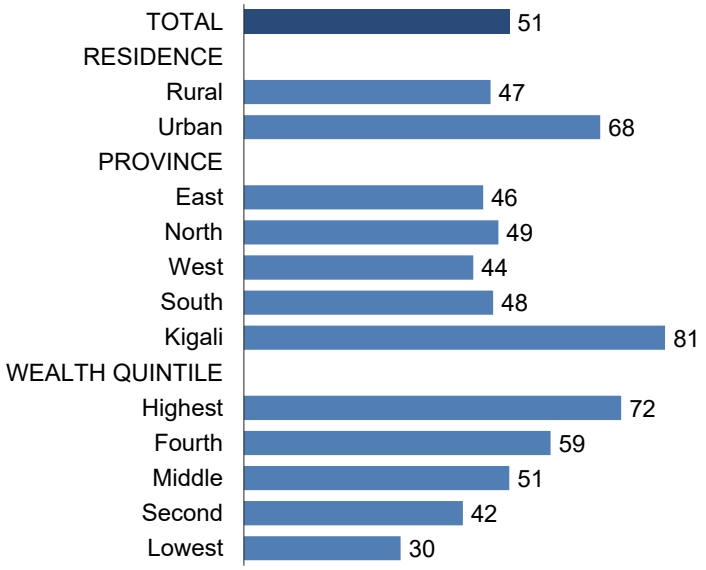
[1] Percentage of de facto household population who could sleep under an ITN if each ITN in the household were used by up to two people

Rural households are less likely to own at least one ITN than urban households (64% versus 76%). Households in Kigali are more likely to have at least one ITN (86%) and to also have at least one ITN per two persons (64%). Possession of an ITN is strongly positively associated with wealth. Fewer households in the lowest wealth quintile than those in the highest wealth quintile reported having an ITN (46% versus 82%).

Thirty-four percent of the households in Rwanda have at least one ITN for every two persons who stayed in the household the night before the survey. The percentage of households with at least one ITN for every two persons who stayed in the household the night before the survey is higher in urban areas (53%) than in rural areas (30%). Households in Kigali are at least two times more likely than those in other provinces to have at least one ITN for every two persons who stayed in the household the night before the survey (64% versus 27%-32%).

Figure 9 shows the percentage of the de facto population with access to an ITN. Overall, 51% of the household population has access to an ITN, which means that all de facto household members could sleep under an ITN if each ITN in the household were used by up to two people. Those living in urban areas (68%), those living in Kigali (81%), and those in the highest wealth quintile (72%) are most likely to have access to an ITN.

Figure 9 **Percentage of the de facto population with access to an ITN in the household**



3.13.2 Use of ITNs by Children and Pregnant Women

Community-level protection against malaria helps reduce the spread of the disease and offers an additional layer of protection against malaria for those who are most vulnerable: children under age 5 and pregnant women. This section describes use of mosquito nets among children and pregnant women.

Table 17 shows that 56% of children under age 5 slept under an ITN the night before the survey. Seventy-four percent of children in urban areas slept under an ITN, as compared with 52% of those in rural areas. Among households with at least one ITN, more than three quarters of children (77%) slept under an ITN the night before the survey.

Table 17 Use of insecticide-treated nets by children and pregnant women

Percentage of children under age 5 who, the night before the survey, slept under an insecticide-treated net (ITN); and among children under age 5 in households with at least one ITN, percentage who slept under an ITN the night before the survey; percentage of pregnant women age 15-49 who, the night before the survey, slept under an ITN; and among pregnant women age 15-49 in households with at least one ITN, percentage who slept under an ITN the night before the survey, according to background characteristics, Rwanda DHS 2019-20

	Children under age 5 in all households		Children under age 5 in households with at least one ITN[1]		Pregnant women age 15-49 in all households		Pregnant women age 15-49 in households with at least one ITN[1]	
Background characteristic	Percentage who slept under an ITN[1] last night	Number of children	Percentage who slept under an ITN[1] last night	Number of children	Percentage who slept under an ITN[1] last night	Number of pregnant women	Percentage who slept under an ITN[1] last night	Number of pregnant women
Residence								
Urban	74.2	1,111	86.9	948	73.9	122	89.0	101
Rural	51.6	5,322	74.9	3,667	53.1	562	79.6	375
Province								
Kigali	81.0	867	86.7	810	80.0	88	88.4	79
South	56.5	1,320	79.6	937	61.5	168	86.3	120
West	51.5	1,530	75.6	1,044	56.8	154	82.6	106
North	51.5	972	72.1	694	53.8	102	79.7	69
East	47.9	1,744	73.9	1,131	42.2	173	71.2	102
Wealth quintile								
Lowest	36.4	1,494	72.4	751	34.9	121	68.6	62
Second	46.7	1,256	72.3	811	49.2	139	77.5	88
Middle	58.8	1,247	77.2	951	54.8	146	84.1	95
Fourth	67.1	1,226	80.4	1,024	65.0	133	82.7	104
Highest	73.2	1,209	82.0	1,079	76.9	146	88.1	127
Total	55.5	6,433	77.4	4,615	56.8	684	81.6	476

Note: Table is based on children and pregnant women who stayed in the household the night before the interview.
[1] Percentage of de facto household population who could sleep under an ITN if each ITN in the household were used by up to two people

Table 17 also shows that 57% of pregnant women slept under an ITN the night before the survey. Among households with at least one ITN, more than 8 in 10 pregnant women (82%) slept under an ITN the night before the survey. Pregnant women in urban households with at least one ITN are more likely to sleep under an ITN than those in rural areas (89% and 79%, respectively).

3.13.3 Prevalence, Diagnosis, and Prompt Treatment of Fever among Children

In moderately to highly endemic areas of malaria, acute clinical disease is almost always confined to young children who suffer high parasite densities. If untreated, this condition can progress very rapidly to severe malaria, which can lead to death. The diagnosis of malaria is based on clinical criteria and supplemented by the detection of parasites in the blood (parasitological or confirmatory diagnosis). Fever is a major manifestation of malaria in young children, although it also accompanies other illnesses. In Rwanda, artemisinin-based combination therapy (ACT) is the recommended first-line treatment for uncomplicated malaria.

In the 2019-20 RDHS, for each child under age 5, mothers were asked if the child had experienced an episode of fever in the 2 weeks preceding the survey and, if so, whether treatment and advice were sought. Table 18 shows the percentage of children under age 5 who had a fever in the 2 weeks preceding the survey. Also shown, among children with a fever, are the percentage for whom advice or treatment was sought, the percentage who had a drop of blood taken from a finger or heel prick (presumably for a malaria test), and, among those who took any antimalarial drug, the percentage who took any ACT.

Table 18 Prevalence, diagnosis, and prompt treatment of children with fever

Percentage of children under age 5 with fever in the 2 weeks preceding the survey; among children under age 5 with fever, percentage for whom advice or treatment was sought, percentage who had blood taken from a finger or heel; and among children under age 5 with fever who took any antimalarial drug, percentage who took any artemisinin-based combination therapy (ACT), according to background characteristics, Rwanda DHS 2019-20

	Children under age 5		Children under age 5 with fever			Children under age 5 with fever who took any antimalarial drug	
Background characteristic	Percentage with fever in the 2 weeks preceding the survey	Number of children	Percentage for whom advice or treatment was sought[1]	Percentage who had blood taken from a finger or heel for testing	Number of children	Percentage who took any ACT	Number of children
Residence							
Urban	15.0	1,411	68.9	49.4	212	*	15
Rural	19.6	6,608	61.2	39.3	1,295	92.1	107
Province							
Kigali	15.4	1,133	71.8	50.7	175	*	13
South	16.2	1,610	61.6	43.1	260	(89.9)	29
West	22.8	1,940	63.3	40.5	443	(94.4)	45
North	21.1	1,214	53.3	26.0	257	*	12
East	17.5	2,123	63.4	44.6	372	*	25
Wealth quintile							
Lowest	19.5	1,866	52.3	35.5	364	(89.8)	35
Second	21.6	1,542	56.5	32.6	333	(93.6)	28
Middle	20.3	1,560	62.3	36.1	316	*	23
Fourth	17.6	1,560	70.5	53.3	275	*	25
Highest	14.7	1,491	77.4	52.5	219	*	11
Total	18.8	8,020	62.3	40.7	1,507	92.4	122

Note: Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.
[1] Includes advice or treatment from public medical sector, private medical sector, kiosk/shop, church, friend/relative; and excludes advice or treatment from a traditional healers.

About one in five children under age 5 (19%) had a fever during the 2 weeks preceding the survey. The prevalence of fever is higher among children in rural areas than children in urban areas (20% and 15%, respectively). Advice or treatment was sought for 62% of children with a fever, and 41% had blood taken from a finger or heel for testing. Advice or treatment for fever is more likely to be sought for children in urban areas than children in rural areas (69% and 61%, respectively). Nearly all (92%) children with a fever who took any antimalarial drug took ACT.

3.14 HIV/AIDS AWARENESS, KNOWLEDGE, AND BEHAVIOR

3.14.1 Knowledge of HIV Prevention

The 2019-20 RDHS included a series of questions asked of both women and men that addressed respondents' knowledge of HIV prevention, awareness of modes of HIV transmission, and behaviors that can prevent the spread of HIV.

Nearly all women (99.7%) and men (99.9%) have heard of AIDS (data not shown). Table 19 shows that 92% of women and 95% of men age 15-49 know that consistent use of condoms is a means of preventing the spread of HIV. Eighty-nine percent of women and 87% of men know that limiting sexual intercourse to one faithful, uninfected partner can reduce the chance of contracting HIV. Finally, 83% of women and men, each, know that both using condoms and limiting sexual intercourse to one uninfected partner are means of preventing HIV.

Table 19 Knowledge of HIV prevention methods

Percentage of women and men age 15-49 who, in response to prompted questions, say that people can reduce the risk of getting HIV by using condoms every time they have sexual intercourse and by having one sex partner who is not infected and has no other partners, according to background characteristics, Rwanda DHS 2019-20

	Percentage of women who say HIV can be prevented by:				Percentage of men who say HIV can be prevented by:			
Background characteristic	Using condoms[1]	Limiting sexual intercourse to one uninfected partner[2]	Using condoms and limiting sexual intercourse to one uninfected partner[2]	Number of women	Using condoms[1]	Limiting sexual intercourse to one uninfected partner[2]	Using condoms and limiting sexual intercourse to one uninfected partner[2]	Number of men
Age								
15-24	90.3	87.2	80.4	5,672	93.1	85.5	81.1	2,486
15-19	89.1	85.9	78.6	3,258	92.5	84.5	80.1	1,526
20-24	92.0	89.0	82.8	2,414	94.1	86.9	82.7	960
25-29	93.2	89.6	84.7	2,073	95.7	89.1	85.5	710
30-39	93.7	89.8	85.1	4,190	96.0	89.1	86.0	1,628
40-49	93.8	89.4	85.3	2,699	95.2	85.4	81.8	1,022
Residence								
Urban	92.7	83.2	78.8	2,909	95.6	91.0	87.9	1,115
Rural	92.2	90.0	84.4	11,725	94.3	85.9	82.0	4,731
Province								
Kigali	91.3	80.3	74.1	2,166	95.2	95.7	92.5	879
South	92.0	92.9	86.8	3,065	94.6	88.8	84.9	1,239
West	92.4	89.9	83.8	3,174	94.7	88.4	84.0	1,268
North	92.2	88.6	83.7	2,226	93.8	77.2	73.7	886
East	93.2	89.1	84.8	4,003	94.7	84.8	81.1	1,574
Education								
No education	91.9	91.0	85.0	1,377	94.5	87.4	83.9	420
Primary	91.6	89.1	83.1	8,363	93.8	87.1	82.7	3,471
Secondary	93.4	88.3	83.6	4,252	95.6	86.1	83.2	1,659
More than secondary	96.2	81.1	78.9	642	98.3	88.5	87.0	295
Wealth quintile								
Lowest	90.3	91.0	83.8	2,741	93.3	85.3	80.8	924
Second	90.6	89.6	83.4	2,756	94.5	85.2	81.5	1,076
Middle	93.6	89.4	85.0	2,757	94.8	86.3	82.4	1,227
Fourth	93.7	90.3	85.5	2,966	93.9	86.7	82.7	1,278
Highest	93.2	84.2	79.3	3,414	96.1	90.2	87.2	1,342
Total 15-49	92.3	88.7	83.3	14,634	94.6	86.9	83.1	5,846
50-59	na	na	na	na	93.1	91.0	85.4	667
Total 15-59	na	na	na	na	94.4	87.3	83.4	6,513

na = Not applicable
[1] Using condoms every time they have sexual intercourse
[2] Partner who has no other partners

3.14.2 Comprehensive Knowledge about HIV Prevention among Young People

Table 20 presents information about comprehensive knowledge of HIV prevention among young people age 15-24. Comprehensive knowledge of HIV prevention is defined as knowing that both condom use and limiting sexual intercourse to one uninfected partner are HIV prevention methods, knowing that a healthy-

looking person can have HIV, and rejecting the two most common local misconceptions about HIV transmission: that HIV can be transmitted by mosquito bites and by sharing food with a person who has HIV. Knowledge of how HIV is transmitted is crucial in enabling people to avoid HIV infection.

Table 20 Knowledge about HIV prevention among young people

Percentage of young women and young men age 15-24 with comprehensive knowledge about HIV prevention, according to background characteristics, Rwanda DHS 2019-20

Background characteristic	Women age 15-24		Men age 15-24	
	Percentage with knowledge about HIV prevention[1]	Number of women	Percentage with knowledge about HIV prevention[1]	Number of men
Age				
15-19	54.3	3,258	54.7	1,526
15-17	52.4	2,158	53.8	1,001
18-19	58.1	1,100	56.3	525
20-24	65.0	2,414	61.6	960
20-22	63.3	1,470	59.9	612
23-24	67.6	943	64.5	348
Marital status				
Never married	57.3	4,732	57.2	2,346
Ever had sex	60.2	1,151	61.5	707
Never had sex	56.3	3,582	55.4	1,639
Ever married	66.7	940	59.3	140
Residence				
Urban	60.3	1,140	64.7	462
Rural	58.5	4,532	55.7	2,024
Province				
Kigali	56.3	809	64.2	344
South	60.6	1,150	63.0	526
West	54.5	1,215	56.2	560
North	56.8	879	46.8	373
East	63.3	1,619	56.2	683
Education				
No education	49.1	77	(33.0)	49
Primary	52.6	2,778	52.4	1,336
Secondary	65.1	2,691	63.8	1,051
More than secondary	69.1	126	78.2	50
Total 15-24	58.8	5,672	57.4	2,486

[1] Knowledge about HIV prevention means knowing that consistent use of condoms during sexual intercourse and having just one uninfected faithful partner can reduce the chance of getting HIV, knowing that a healthy-looking person can have HIV, and rejecting the two most common local misconceptions about transmission or prevention of HIV

Table 20 shows that 59% of young women and 57% of young men have comprehensive knowledge of HIV prevention. Ever-married young women and men are slightly more likely to be knowledgeable about HIV prevention than young women and men who had never married. Among both sexes, the proportion with knowledge generally increases with age and educational attainment. Urban young people are slightly more likely than rural young people to have knowledge of HIV prevention.

3.14.3 Multiple Sexual Partners

Limiting the number of sexual partners and practicing protected sex are crucial in the fight against the spread of sexually transmitted infections, including HIV. Respondents to the 2019-20 RDHS were asked detailed questions about their sexual behavior, including the number of partners they had in the 12 months preceding the survey and condom use during their most recent sexual encounter. Table 21.1 shows that only 1% of women reported having multiple sexual partners in the 12 months preceding the survey and 9% reported having sexual intercourse with a person who was neither their husband nor lived with them. Fifteen percent each of never-married women and 27% of divorced, separated, or widowed women had sexual intercourse with a person who was neither their husband nor lived with them. Among women who had multiple sexual partners in the 12 months preceding the survey, 45% used a condom during their last sexual intercourse. Similarly, 46% of women who had sexual intercourse with a person who was neither their husband nor lived with them used a condom during their last sexual intercourse. Women in Rwanda have had an average of 1.7 sexual partners in their lifetime.

Table 21.1 Multiple sexual partners and higher-risk sexual intercourse in the past 12 months: Women

Among all women age 15-49, percentage who had sexual intercourse with more than one sexual partner in the past 12 months, and percentage who had intercourse in the past 12 months with a person who was neither their husband nor lived with them; among those having more than one partner in the past 12 months, percentage reporting that a condom was used during last intercourse; among women age 15-49 who had sexual intercourse in the past 12 months with a person who was neither their husband nor lived with them, percentage who used a condom during last sexual intercourse with such a partner; and among women who ever had sexual intercourse, mean number of sexual partners during their lifetime, according to background characteristics, Rwanda DHS 2019-20

	All women			Women who had 2+ partners in the past 12 months		Women who had intercourse in the past 12 months with a person who was neither their husband nor lived with them		Women who ever had sexual intercourse[1]	
Background characteristic	Percentage who had 2+ partners in the past 12 months	Percentage who had inter-course in the past 12 months with a person who was neither their husband nor lived with them	Number of women	Percentage who reported using a condom during last sexual intercourse	Number of women	Percentage who reported using a condom during last sexual intercourse with such a partner	Number of women	Mean number of sexual partners in lifetime	Number of women
Age									
15-24	1.2	10.1	5,672	44.8	69	45.7	576	1.8	2,089
15-19	0.6	6.1	3,258	*	21	42.8	199	1.6	539
20-24	2.0	15.6	2,414	(45.4)	49	47.3	377	1.8	1,550
25-29	2.3	12.2	2,073	(49.5)	48	52.0	252	1.7	1,853
30-39	1.3	7.1	4,190	44.8	54	44.9	296	1.8	4,059
40-49	0.8	6.4	2,699	*	21	39.1	174	1.7	2,667
Marital status									
Never married	1.4	14.7	5,914	61.0	85	47.5	869	2.1	1,956
Married/living together	0.7	1.1	7,401	(10.0)	53	46.0	78	1.4	7,397
Divorced/separated/ widowed	4.1	26.5	1,318	(55.0)	54	42.0	349	2.8	1,316
Residence									
Urban	2.5	13.3	2,909	54.6	73	58.6	386	2.3	2,101
Rural	1.0	7.8	11,725	39.5	120	40.5	911	1.6	8,567
Province									
Kigali	3.1	13.3	2,166	50.6	68	60.2	289	2.5	1,602
South	1.2	8.8	3,065	(38.2)	35	38.4	270	1.7	2,253
West	0.9	7.2	3,174	(54.5)	28	50.8	228	1.5	2,266
North	1.0	7.3	2,226	*	22	43.8	162	1.5	1,620
East	1.0	8.7	4,003	(38.5)	39	37.6	349	1.7	2,927
Education									
No education	0.8	7.1	1,377	*	11	28.9	97	1.8	1,312
Primary	1.5	9.0	8,363	41.5	126	42.5	751	1.8	6,621
Secondary	1.2	9.2	4,252	(62.7)	49	53.6	392	1.7	2,246
More than secondary	1.0	8.8	642	*	6	66.7	57	1.5	489
Wealth quintile									
Lowest	1.3	10.0	2,741	(27.1)	36	28.7	274	1.7	2,212
Second	1.1	8.4	2,756	(50.8)	29	36.5	232	1.6	2,025
Middle	1.4	7.0	2,757	(45.9)	38	45.7	193	1.7	2,004
Fourth	1.5	9.1	2,966	(62.9)	45	56.8	271	1.9	2,129
Highest	1.3	9.6	3,414	(37.6)	44	58.0	327	1.7	2,300
Total	1.3	8.9	14,634	45.2	192	45.9	1,297	1.7	10,669

Note: Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.

[1] Means are calculated excluding respondents who gave non-numeric responses.

Table 21.2 Multiple sexual partners and higher-risk sexual intercourse in the past 12 months: Men

Among all men age 15-49, percentage who had sexual intercourse with more than one sexual partner in the past 12 months, and percentage who had intercourse in the past 12 months with a person who was neither their wife nor lived with them; among those having more than one partner in the past 12 months, percentage reporting that a condom was used during last intercourse; among men age 15-49 who had sexual intercourse in the past 12 months with a person who was neither their wife nor lived with them, percentage who used a condom during last sexual intercourse with such a partner; and among men who ever had sexual intercourse, mean number of sexual partners during their lifetime, according to background characteristics, Rwanda DHS 2019-20

	All men			Men who had 2+ partners in the past 12 months		Men who had intercourse in the past 12 months with a person who was neither their wife nor lived with them		Men who ever had sexual intercourse[1]	
Background characteristic	Percentage who had 2+ partners in the past 12 months	Percentage who had inter-course in the past 12 months with a person who was neither their wife nor lived with them	Number of men	Percentage who reported using a condom during last sexual intercourse	Number of men	Percentage who reported using a condom during last sexual intercourse with such a partner	Number of men	Mean number of sexual partners in lifetime	Number of men
Age									
15-24	2.0	12.5	2,486	(59.4)	51	78.4	310	2.2	847
15-19	0.7	6.1	1,526	*	10	75.1	93	1.7	280
20-24	4.2	22.6	960	(64.9)	40	79.8	217	2.4	567
25-29	9.5	21.9	710	43.9	67	67.5	156	2.8	623
30-39	8.0	11.8	1,628	21.9	130	60.7	192	3.0	1,598
40-49	7.0	6.4	1,022	6.1	71	58.5	65	3.1	1,019
Marital status									
Never married	3.4	17.3	2,867	69.7	97	74.3	495	2.8	1,109
Married/living together	7.5	6.4	2,860	9.3	214	57.2	184	2.7	2,860
Divorced/separated/ widowed	7.7	36.7	119	*	9	(67.6)	44	5.3	119
Type of union									
In polygynous union	58.6	20.9	77	(7.3)	45	*	16	6.5	77
Not in polygynous union	6.1	6.0	2,783	9.8	169	56.2	168	2.6	2,783
Not currently in union	3.5	18.0	2,986	68.8	106	73.8	539	3.1	1,227
Residence									
Urban	7.6	20.3	1,115	33.6	85	71.9	226	4.4	811
Rural	5.0	10.5	4,731	27.2	235	68.5	496	2.4	3,277
Province									
Kigali	7.5	20.3	879	43.7	66	69.5	178	4.6	642
South	3.8	10.3	1,239	20.2	48	60.6	128	2.3	855
West	6.2	11.0	1,268	22.8	78	70.8	140	2.6	876
North	3.4	9.9	886	(21.9)	30	71.0	88	2.1	621
East	6.2	12.0	1,574	30.4	98	74.2	189	2.8	1,094
Education									
No education	5.9	6.1	420	*	25	(50.6)	25	2.5	388
Primary	5.5	11.3	3,471	24.9	192	65.0	393	2.8	2,584
Secondary	5.2	14.8	1,659	40.3	86	77.9	246	3.1	867
More than secondary	6.3	19.7	295	*	18	73.8	58	3.2	249
Wealth quintile									
Lowest	5.0	10.6	924	(19.1)	47	54.4	97	2.4	702
Second	3.4	8.4	1,076	(23.2)	36	63.1	90	2.4	737
Middle	5.8	10.4	1,227	24.8	71	66.4	128	2.3	841
Fourth	6.1	12.9	1,278	34.8	78	78.8	165	3.1	882
Highest	6.6	18.1	1,342	34.6	88	73.5	243	3.8	926
Total 15-49	5.5	12.4	5,846	28.9	320	69.6	723	2.8	4,088
50-59	4.1	3.7	667	(26.3)	27	(52.9)	25	4.1	661
Total 15-59	5.3	11.5	6,513	28.7	347	69.0	747	3.0	4,748

Note: Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.
[1] Means are calculated excluding respondents who gave non-numeric responses.

Table 21.2 shows that 6% of men age 15-49 reported having had two or more sexual partners during the 12 months prior to the survey, while 12% reported that they had sexual intercourse with a person who was neither their wife nor lived with them. Among men who had two or more sexual partners in the 12 months prior to the survey, 29% reported using a condom during their last sexual intercourse. Seventy percent of men who had sexual intercourse with a person who was neither their wife nor lived with them used a condom during their last sexual intercourse. Men age 15-49 in Rwanda have had an average of 2.8 sexual partners in their lifetime.

3.15 MATERNAL MORTALITY

Estimates of maternal mortality for the period 0-4 years before the survey are shown in Table 22. Age-specific mortality rates are calculated by dividing the number of maternal deaths by years of exposure. Maternal deaths are defined as any death that occurred during pregnancy, childbirth, or within 2 months after the birth or termination of a pregnancy. Maternal deaths are a relatively rare occurrence, and as such should be interpreted with caution.

There were 32 maternal deaths in the reference period. The maternal mortality rate, which is the annual number of maternal deaths per 1,000 women age 15-49, for the period 2014-15 to 2019-20 is 0.25. Maternal deaths accounted for 14% of all deaths to women age 15-49; in other words, these Rwandan women who died in the 0-4 years preceding the survey died from pregnancy or pregnancy-related causes.

Table 22 Maternal mortality

Direct estimates of maternal mortality rates for the 0-4 years preceding the survey, by five-year age groups, Rwanda DHS 2019-20

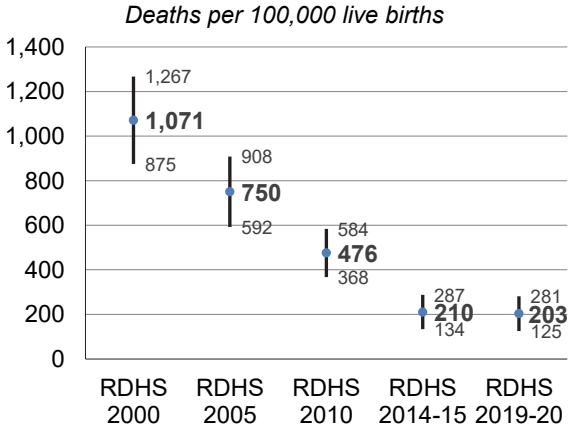
Age	Percentage of female deaths that are maternal	Maternal deaths[1]	Exposure years	Maternal mortality rate[2]
15-19	7.4	1	19,848	0.06
20-24	7.2	2	22,473	0.08
25-29	8.4	3	23,584	0.12
30-34	17.7	8	23,301	0.34
35-39	14.8	7	19,189	0.34
40-44	27.3	8	12,223	0.64
45-49	9.9	3	7,169	0.47
Total 15-49	13.9	32	127,787	0.25

Total fertility rate (TFR)	4.1
General fertility rate (GFR)[3]	121
Maternal mortality ratio (MMR)[4]	203 (125;281)
Lifetime risk of maternal death[5]	0.008

[1] A maternal death is defined as the death of a woman while pregnant or within 42 days of termination of pregnancy, from any cause except accidents or violence
[2] Expressed per 1,000 woman-years of exposure
[3] Age-adjusted rate expressed per 1,000 women age 15-49
[4] Expressed per 100,000 live births; calculated as the age-adjusted maternal mortality rate (shown in Table MM.3) times 100 divided by the age-adjusted general fertility rate
[5] Calculated as $1-(1-MMR)^{TFR}$ where TFR represents the total fertility rate for the 0-4 years preceding the survey

The maternal mortality ratio (MMR), obtained by dividing the age-standardized maternal mortality rate by the age-standardized general fertility rate, is often considered a more useful measure of maternal mortality since it measures the obstetric risk associated with each live birth. Table 22 shows that the maternal mortality ratio for Rwanda for the period 2014-15 to 2019-20 is 203 deaths per 100,000 live births (or alternatively, 2.03 deaths per 1,000 live births). The maternal mortality ratio can be converted to an estimate of the lifetime risk of dying from maternal causes: 0.008 or, in other words, a risk of dying of 1 in 125. Figure 10 shows the trend in MMR for the period of 0-4 years preceding the survey, according to RDHS surveys in 2000, 2005, 2010, 2014-15, and 2019-20.

Figure 10 **Maternal mortality ratios for the period of 0-4 years prior to the survey, RDHSs 2000, 2005, 2010, 2014-15, and 2019-20**



REFERENCES

Bradley, S. E. K., T. N. Croft, J. D. Fishel, and C. F. Westoff. 2012. *Revising unmet need for family planning.* DHS Analytical Studies No. 25. Calverton, Maryland, USA: ICF International.

Centers for Disease Control and Prevention (CDC). 1998. "Recommendations to prevent and control iron deficiency in the United States." *Morbidity and Mortality Weekly Report* 47(RR-3): 1-29.

Institut National de la Statistique du Rwanda (INSR) and ORC Macro. 2006. *Rwanda Demographic and Health Survey 2005.* Calverton, Maryland, U.S.A.: INSR and ORC Macro.

Ministry of Health (MOH) [Rwanda], National Institute of Statistics of Rwanda (NISR), and ICF Macro. 2009. *Rwanda Interim Demographic and Health Survey 2007-08.* Calverton, Maryland, USA.: MOH, NISR, and ICF Macro.

National Institute of Statistics of Rwanda (NISR) [Rwanda], Ministry of Health (MOH) [Rwanda], and ICF International. 2012. *Rwanda Demographic and Health Survey 2010*. Calverton, Maryland, USA: NISR, MOH, and ICF International.

National Institute of Statistics of Rwanda (NISR), Ministry of Finance and Economic Planning (MINECOFIN) [Rwanda], 2014. *Rwanda Fourth Population and Housing Census 2012*. Kigali, Rwanda.

Office National de la Population (ONAPO) [Rwanda] and Macro International Inc. 2001. *Enquête Démographique et de Santé Rwanda 2000*. Kigali, Rwanda and Calverton, Maryland, U.S.A.: ONAPO and Macro International Inc.

Pan American Health Organization (PAHO). 2002. *Guiding principles for complementary feeding of the breastfed child*. Washington, DC: PAHO.

United Nations Development Programme (UNDP). 2007. *Measuring human development: a primer*. New York: UNDP.

Van Lerberghe, W., and V. De Brouwere. 2001. Of blind alleys and things that have worked: history's lessons on reducing maternal mortality. In: De Brouwere, V., and W. Van Lerberghe, eds. *Safe motherhood strategies: a recent review of the evidence.* Antwerp: ITG Press:7-33.

Williams, B. G., J. O. Lloyd-Smith, E. Gouws, C. Hankins, W. M. Getz, J. Hargrove, I. de Zoysa, C. Dye, and B. Auvert. 2006. "The potential impact of male circumcision on HIV in sub-Saharan Africa." *PLoS Med* 3(7): e262.

World Health Organization (WHO) Multicentre Growth Reference Study Group. 2006. *WHO child growth standards: length/height-for-age, weight-for-age, weight-for-length, weight-for-height and body mass index-for-age: methods and development*. Geneva: WHO.

World Health Organization (WHO). 2003. *World health report 2003*. Geneva: WHO.

World Health Organization (WHO). 2006. *Standards for maternal and neonatal care.* Geneva: WHO.