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Population Division

Technical Paper
No. 2017/12

# Who Collects What on the Current Use of Contraception? A Review of Survey Data Available for the Estimation of Contraceptive Prevalence

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*Vladimíra Kantorová, Aisha N. Z. Dasgupta, Philipp Ueffing, Mark Wheldon and Nadia Soerjanto*

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## PREFACE

The Population Division, as part of its contribution to global monitoring of progress on internationally-agreed targets to achieve universal access to sexual and reproductive health, produces data compilations, estimates and projections, and analyses of worldwide family planning levels and trends. As part of this work, the Division publishes the World Contraceptive Use series, that contain data on family planning indicators from nationally representative household surveys, together with metadata summarising key information on the sources. This paper provides a comprehensive and up-to-date inventory of nationally representative household surveys that are used to estimate the levels and trends of contraceptive use amongst women of reproductive age (15-49 years). It summarises the sources of data, populations covered in the surveys, resources that are made available, the manner in which tabulations are presented in reports and contraceptive methods covered. On the basis of this review, the paper identifies a number of potential biases that could influence the estimates of contraceptive prevalence obtained from the surveys referred. Facilitating access to such data supports work on the interpretation and analysis of key family planning indicators and allows for well-documented comparisons of family planning indicators across sources, countries, and over time.

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The Technical Paper series as well as other population information may be accessed on the Population Division's website at www.unpopulation.org. For further information concerning this publication, please contact the Population Division, Department of Economic and Social Affairs, United Nations, New York, 10017, USA, telephone +1-212-963-3209, fax +1-212- 963-2147, email: population@un.org.

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*Vladimíra Kantorová, Aisha N. Z. Dasgupta, Philipp Ueffing, Mark Wheldon and Nadia Soerjanto*

## 1. INTRODUCTION

Contraceptive prevalence is commonly defined as the proportion of women of reproductive age who are currently using, or whose sexual partner is currently using, at least one method of contraception. The indicator is one of the most frequently used indicators in reproductive health research and applied work, and provides an indication of the progress made in family planning programmes. Although the indicator can in principle be estimated from service provision or provider-recorded data,[1] it is most commonly estimated based on women's responses to questions in household surveys. Disparities in family planning indicators can arise from genuine differences in the level of the indicator in case, but also from variations in the household survey design, sampling, population and questionnaire characteristics.

The United Nations Population Division produces several data compilations in this area, including the *World Contraceptive Us*e series published since the 1990s (United Nations, 2017a), the annual *Bayesian model-based national, regional and global estimates and projections of family planning indicators* (United Nations, 2017b), as well as global analyses of contraceptive use: levels and trends (United Nations, 2015, 2017c, 2017d). The United Nations Population Division has recently extended the data compilations of family planning indicators to include all women of reproductive age, disaggregated by marital status and age, in *World Contraceptive Use by Marital Status and Age* (United Nations, 2017e).

These data sets and analytical reports enable stakeholders to monitor progress towards the achievement of target 3.7: ensure universal access to sexual and reproductive health care services, including family planning, by 2030, under Sustainable Development Goal (SDG) 3, "Health", of the 2030 Agenda for Sustainable Development (United Nations, 2015). The United Nations Population Division is the custodian agency for the global monitoring of SDG indicator 3.7.1., the proportion of women who have their need for family planning satisfied with modern methods of contraception, among women of reproductive age (15 to 49 years of age). This indicator is reported annually by the United Nations Population Division as a contribution to the United Nations Statistics Division Global SDG Indicators database (United Nations, 2017f). These data sets can also be used to estimate the number of "additional users" of modern contraceptives, a key indicator in the international initiative Family Planning 2020 (FP2020) to expand access to family planning (Family Planning 2020, 2017),[2] and other monitoring processes.

Nationally-representative household-based surveys are the most widely used source of data to estimate contraceptive prevalence. There is a long tradition of international survey programmes that have included questions on current contraceptive use. The survey series known as the Knowledge, Attitudes and Practice of contraception (or KAP studies) came into use in Asia in the 1950s. The KAP surveys became more widely administered as more countries continued to establish family planning programmes. By 1968, KAP surveys had been conducted or were in process in 67 countries (Morris and others, 1981). Family planning programme administrators and other national and international stakeholders began to realize an additional need for the information on reproductive health, fertility and family planning. The KAP survey was followed by the World Fertility Survey (WFS), which was established in 1972 to improve the comparability of fertility data at an international scale. The Contraceptive Prevalence Surveys (CPS) programme was developed to collect data on the

[1] Coupled with data of the underlying population, either national or local; e.g., within a given "catchment area".

[2] FP2020 is a global partnership that supports the rights of women and girls to decide freely and for themselves, whether, when and how many children they want to have. More information at: https://www.familyplanning2020.org/

programmatic aspects of national programmes, simultaneously supporting the design and evaluation of national family planning programmes.

The more recent Demographic Health Surveys (DHS) established in 1984, are nationally representative household surveys that address family planning needs, including contraceptive prevalence as one of their monitoring and evaluation indicators. The DHS programme, together with the Multiple Indicator Cluster Surveys (MICS) undertaken by the United Nations Children's Fund (UNICEF), have changed the data collection landscape for family planning indicators through the harmonisation of methodologies and indicators. There are a variety of other cross-national survey programmes with different focuses, including the United Nations Economic Commission for Europe Fertility and Family Survey (FFS) of the 1990s and, since 2013, the Performance Monitoring and Accountability 2020 (PMA2020) programme, which uses mobile technology to support rapid-turnaround surveys and also a rich variety of national surveys, which include questions on current contraceptive use.

Previous reviews of survey instruments have shown variability in questionnaires and data collection methods among surveys, but the reviews have been restricted to a subset of survey programmes (Anderson and Cleland, 1984; Carrasco, 1981; Fabic and Choi, 2015; Singh, 1980). Researchers have also explored question order and whether asking women first about their awareness of methods—together with probes—results in higher reported current use of contraception[3] in a subset of survey types (Rossier, Senderowicz and Soura, 2014; Rutenberg and others, 1991; Vaessen, 1981).

This paper provides a comprehensive and up-to-date inventory and assessment of nationally representative household surveys that are the basis for estimates of key family planning indicators amongst women of reproductive age (aged 15 to 49 years) published by the Population Division. In this paper, a summary description of the surveys is provided and it is explained how the data were used to derive standardised and comparable estimates of contraceptive prevalence and other key family planning indicators. The metadata provided include the following: the sources of data; population covered in the surveys; survey resources that were made available; manner in which tabulations were presented in reports; and potential biases that influenced the estimates of contraceptive prevalence obtained from the surveys. Similarities and differences between the surveys and the extent to which questions, estimates and reports of contraceptive prevalence were standardized across time, countries and survey types, were explored.

Five major issues were addressed:

a. What survey resources and data on current use of contraception were available? How the availability of data had changed over time and varied across countries?

b. To what extent was the question on current use of contraceptives comparable across surveys?

c. What was the population of women who were asked about current contraceptive use?

d. What were the challenges in comparability of estimates across different countries and surveys? How could the differences be handled?

e. Did probing women about their knowledge of methods prior to asking about current use, resulted in higher reports of current contraceptive use?

The main purpose of this paper is to facilitate access to survey metadata, summarise key information on the surveys and data points and highlight systematic biases and cross-survey differences such as question order. The paper ultimately seeks to improve the understanding, interpretation and analysis of

[3] Higher than when awareness of contraceptive methods was not asked before asking about current contraceptive use.

family planning indicators, especially when comparing family planning indicators between sources, across countries and over time.

## 2. METHODS

Questionnaires, microdata-sets documentation, reports, tabulations and other metadata were reviewed for 1,172 nationally representative household surveys for 195 countries or areas (referred to simply as "countries" from here onwards) presented in the 2017 revisions of *World Contraceptive Use* (United Nations, 2017a) and *World Contraceptive Use by Marital Status and Age* (United Nations, 2017e). The data compilation covered surveys since 1950 to the most recent surveys for which the estimates of contraceptive use had been made available as of July 2017. *World Contraceptive Use 2017* (United Nations, 2017a) provided a dataset of family planning indicators for women of reproductive age (from 15 to 49 years) who were married or in a union (referred henceforth to as "married") at the time the data were collected. The data set contained survey-based estimates of the following indicators: contraceptive prevalence (total and by individual methods), the unmet need for family planning (total, spacing and limiting) and the demand for family planning that was satisfied by using modern methods. *World Contraceptive Use by Marital Status and Age 2017* (United Nations, 2017e) provided a dataset of family planning indicators for women of reproductive age disaggregated, where possible, by marital status and age. The indicators were the same as those reported in *World Contraceptive Use 2017*, except that in the data by marital status and age, contraceptive prevalence is not given by individual method.

For analytical purposes, contraceptive methods were classified as either modern or traditional (Annex table A). Modern methods of contraception included female and male sterilization, the intra-uterine device (IUD), the implant, injectables, oral contraceptive pills, male and female condoms, vaginal barrier methods (e.g. diaphragm, cervical cap and spermicidal foam, jelly, cream and sponge), the lactational amenorrhea method (LAM), emergency contraception and other modern methods not reported separately (e.g., the contraceptive patch or the vaginal ring). Traditional methods of contraception included rhythm (e.g., fertility awareness-based methods, periodic abstinence), withdrawal and other traditional methods not reported separately. The Population Division has reclassified LAM from traditional to modern method since the 2016 revision of the *World Contraceptive Use* series, following a technical consultation on the classification of contraceptives (Festin and others, 2016), which necessitated recalculating contraceptive prevalence by modern and traditional method. The classification of LAM as distinct from breastfeeding, based on the available survey documentation, has been particularly challenging and some inconsistencies between surveys remain.

For each of the surveys the following was recorded: survey population for woman's questionnaire; age-group of respondents; whether the questionnaire is publicly available; whether the sources of estimates are available from microdata, special tabulations, tabulations published in the report, or derived from the published tabulation; and whether a question on knowledge or awareness of contraception (with or without probe) precedes the question on current use. Where relevant, apparent biases concerning contraceptive method, population, weighting, questionnaire or other were noted.

Other key information regarding all nationally representative household surveys were noted, such as country ISO code; start and end years; field-work start and end dates; the official name of the survey; and whether the survey is part of an international survey programme.

Data from a wide range of sources and survey programmes had been collected, across many countries and over a long period of time, and the available resources varied considerably. For some surveys, the reports were available in either electronic format or hard copy only. Other surveys made available the complete set of questionnaires, manuals, datasets, documentation and reports. The Population Division collected and systematically stored all these materials.

The following sections describe the range of data sources, number of surveys and countries, time period covered, the number and type of contraceptive methods covered by the survey and the documentation and resources available, including whether there was a publicly available final report and questionnaire. To gauge the influence of awareness questions on reports of current use, results from

the Bayesian hierarchical model for annual estimates of family planning indicators are discussed (United Nations, 2017b).

## 3. RESULTS

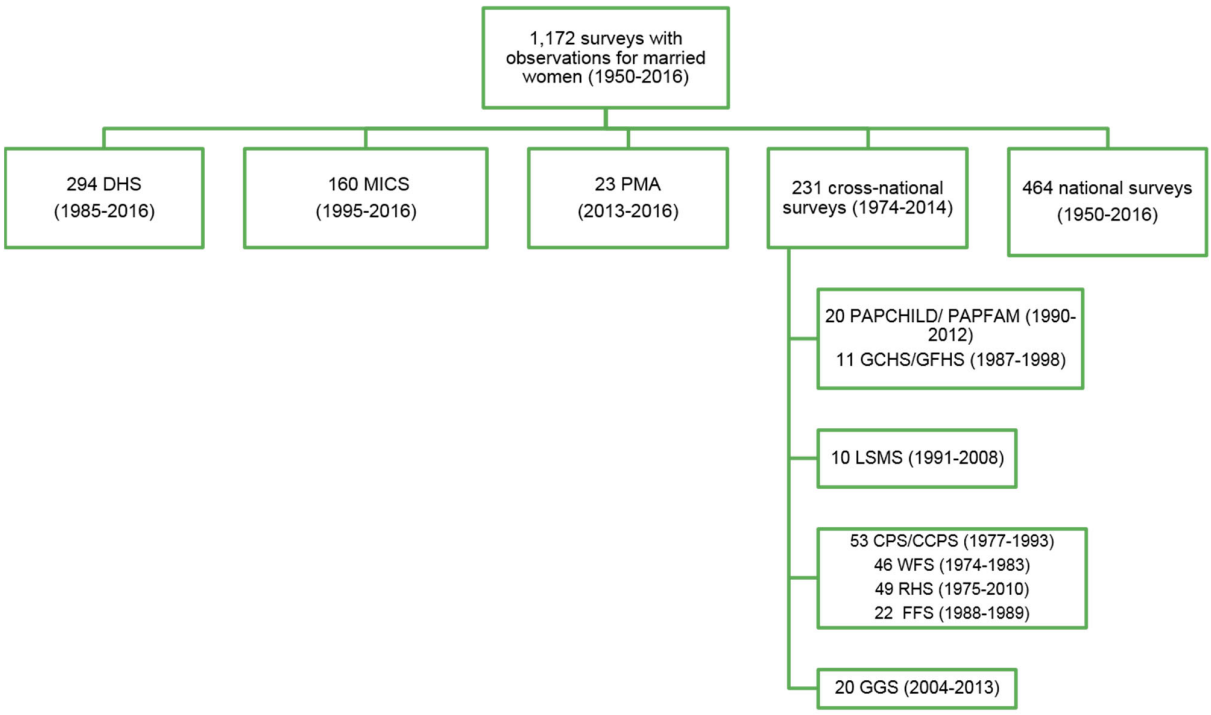
### *A. Inventory of surveys available for the estimation of contraceptive prevalence*

An overview of surveys that provide information on current contraceptive use for married or in-union women from 1950 to 2016 across 195 countries, is provided in figure 1. Of the 1,172 surveys that were included in this study, DHS contributed 294, MICS, 160 and PMA2020, 23 surveys. There were 231 cross-national surveys, including 53 Contraceptive Prevalence Surveys (CPS), 49 Reproductive Health Surveys (RHS), 46 World Fertility Surveys (WFS), 22 FFS, 20 Pan Arab Project for Child Development/Pan Arab Project for Family Health (PAPCHILD/PAPFAM), 20 Gender and Generations Surveys (GGS), 11 Gulf Child Health Surveys/Gulf Family Health Surveys, and 10 Living Standard Measurement Surveys (LSMS). The biggest contributor, yet often overlooked, was the set of 464 national surveys, which were not part of the cross-national survey programmes listed above.

The availability of data significantly increased over time (figure 2). While DHS tends to be the most commonly used survey type today, there has been a wealth of data on contraceptive prevalence from other survey programmes and earlier time periods (e.g., national surveys, WFS, RHS, CPS), which is crucial for understanding long-term trends in contraceptive prevalence and cross-country comparison (figure 2). The PMA2020 surveys formed a large proportion of surveys in 2014, 2015 and 2016 due to fast survey results processing and rapid publication of key results.

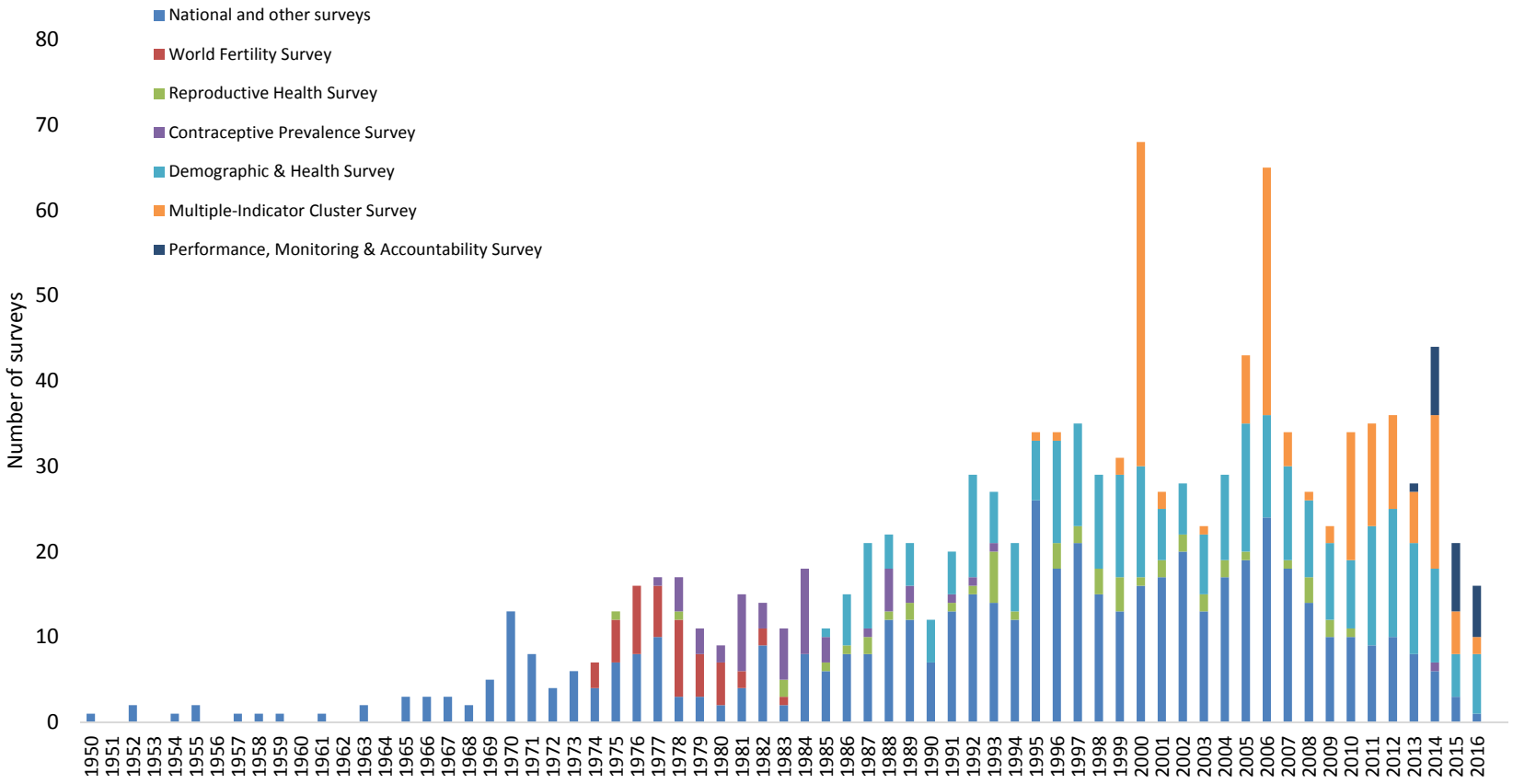
Prior to 1980, there were 57 surveys in Asia, 40 in Europe and Northern America, and 31 in Latin America and the Caribbean, dwarfing the availability of data for Africa and Oceania during that time period (table 1). The availability of estimates of contraceptive prevalence in Africa started to improve from the 1990s with the DHS programme and then the MICS programme from the 2000s. The availability of data for Oceania continued to be low, with a small proportion of countries in Oceania covered. A handful of countries had repeated national surveys that allow in-depth monitoring over a long period of time (Indonesia, Japan, the Philippines, the United Kingdom and the United States of America).

**Figure 1. Surveys with data on contraceptive prevalence among married or in-union women**




*Source*: Calculations based on United Nations 2017a and 2017e.

**Figure 2. Availability of data on contraceptive use by year and survey programme**




*Source:* Calculations based on United Nations 2017a and 2017e.

Table 1. SURVEYS AVAILABLE FOR THE ESTIMATION OF CONTRACEPTIVE PREVALENCE, BY TIME PERIOD AND REGIONS

| | | Time period | | | | | |
|---|---|---|---|---|---|---|---|
| | | *Before 1980* | *1980-1989* | *1990-1999* | *2000-2009* | *2010-2016* | *All time periods* |
| *Africa* | Number of countries covered (N) | 8 | 27 | 44 | 53 | 47 | 54 |
| | Number of surveys (N) | 8 | 36 | 79 | 108 | 102 | 333 |
| | Proportion of countries covered (percentage) | 14.3 | 48.2 | 78.6 | 94.6 | 83.9 | 96.4 |
| *Asia* | Number of countries covered (N) | 21 | 23 | 40 | 41 | 36 | 46 |
| | Number of surveys (N) | 57 | 49 | 97 | 138 | 67 | 408 |
| | Proportion of countries covered (percentage) | 41.2 | 45.1 | 78.4 | 80.4 | 70.6 | 90.2 |
| *Europe and Northern America* | Number of countries covered (N) | 21 | 16 | 33 | 28 | 17 | 41 |
| | Number of surveys (N) | 40 | 19 | 51 | 62 | 22 | 194 |
| | Proportion of countries covered (percentage) | 39.6 | 30.2 | 62.3 | 52.8 | 32.1 | 77.4 |
| *Latin America and the Caribbean* | Number of countries covered (N) | 18 | 29 | 21 | 26 | 21 | 39 |
| | Number of surveys (N) | 31 | 50 | 40 | 52 | 33 | 206 |
| | Proportion of countries covered (percentage) | 39.1 | 63.0 | 45.7 | 56.5 | 45.7 | 84.8 |
| *Oceania* | Number of countries covered (N) | 4 | 3 | 6 | 10 | 4 | 15 |
| | Number of surveys (N) | 4 | 3 | 7 | 12 | 5 | 31 |
| | Proportion of countries covered (percentage) | 16.7 | 12.5 | 25.0 | 41.7 | 16.7 | 62.5 |

*Source:* Calculations based on United Nations 2017a and 2017e.

### *B. Availability of survey documentation*

Some surveys were comprehensively documented, for example those in the DHS programme, which made publicly available the field guide, questionnaires, the microdata, the final report and other reports and resources. For other surveys, particularly the older ones, these resources were missing. The questionnaire was needed to assess who was asked the question on current contraceptive use, the methods asked, the order of questions, and presence of the question on knowledge of contraceptive methods. The questionnaire had been found for only 64 per cent of surveys reviewed (table 2). Final reports were available for 71.9 per cent of the surveys reviewed. In cases where there was no final report, the World Contraceptive Use data set included information from secondary sources (19.2 per cent), or other resources such as preliminary reports or special tabulations (8.9 per cent) (table 2).

Given that DHS and MICS contributed a significant number of surveys, these programmes had a major impact in making the survey documentation more readily available. As seen in figure 2, the availability of data on contraceptive use saw a steady increase after the DHS and MICS programmes were launched. Of the surveys prior to 1980, questionnaires were obtained for only 22.9 per cent of them. After the mid-1980s, a time around which the first round of DHS surveys were undertaken, access to documentation improved significantly and the proportion of surveys with available questionnaires increased to 72.3 per cent of the surveys conducted in the 2000s. Availability of questionnaires was most limited for national surveys, particularly in developing countries in Africa and Asia.

Table 2. RESOURCES AND DOCUMENTATION AVAILABLE FOR SURVEYS, BY TIME PERIOD

| | Time period | | | | | |
|---|---|---|---|---|---|---|
| | *Before 1980* | *1980-1989* | *1990-1999* | *2000-2009* | *2010-2016* | *All time periods* |
| | | | *Number* | | | |
| Number of surveys | 140 | 157 | 274 | 372 | 229 | 1,172 |
| Questionnaire available | 32 | 80 | 170 | 269 | 201 | 752 |
| Final report | 50 | 111 | 206 | 302 | 174 | 843 |
| Other report documentation | 4 | 6 | 2 | 40 | 52 | 104 |
| Secondary source | 86 | 40 | 66 | 30 | 3 | 225 |
| | | | *Percentage* | | | |
| Proportion of surveys with a questionnaire available | 22.9 | 51.0 | 62.0 | 72.3 | 87.8 | 64.2 |
| Proportion of surveys with a final report | 35.7 | 70.7 | 75.2 | 81.2 | 76.0 | 71.9 |
| Proportion of surveys with other report documentation | 2.9 | 3.8 | 0.7 | 10.8 | 22.7 | 8.9 |
| Proportion of surveys covered by a secondary source | 61.4 | 25.5 | 24.1 | 8.1 | 1.3 | 19.2 |

*Source:* Own calculations based on the review of documentation available.

NOTE: Other report documentation include surveys with special tabulations, preliminary reports, key indicators report, or executive summaries.

### *C. Questions on current contraceptive use*

Surveys typically asked women of reproductive age a question such as “Are you or your partner currently doing something or using any method to delay or avoid getting pregnant?”. If “yes”, the respondent was asked what method she or her partner was using. However, there was variability among

questionnaires on how this question was asked. The definition of "current use" also varied, which could impact the estimate of contraceptive prevalence. For example, "current use" was defined as use within the month preceding the date of interview for the Thailand Contraceptive Prevalence Surveys of 1978, 1981 and 1984, the Fertility and Family Surveys asked about contraceptive use within the last four weeks, and current use was ascertained by asking whether women used a contraceptive method in the last 30 days in the Paraguay 1998 Encuesta Nacional de Salud Materno Infantil and the Honduras 1981 Encuesta Nacional de Prevalencia del Uso de Anticonceptivos. Other surveys such as the Anguilla 2003 Reproductive Health Survey, Yugoslavia 1970 Fertility Survey and Denmark 1970 and 1975 Fertility Surveys, asked about contraceptive use in the past two months. A couple of surveys looked at longer periods of time, such as contraceptive use in the past six months in the Canada 2006 Contraceptive Studies or twelve months in the Belgium 2001 and 2004 Enquête de Santé. When the specific period of contraceptive use was included in the question on current contraceptive use, the data compilations included this information in a note (United Nations, 2017a and 2017e). More commonly, however, what time period constituted the current use of contraception is left unspecified in the question and therefore subject to the respondent's interpretation.

Even the surveys belonging to same cross-country survey programme might have differences in the current use question. For example, in the Gender and Generations Surveys, some of the surveys asked whether respondents were "currently doing something to prevent pregnancy" or doing something "at this time", and other surveys asked whether respondents used something "during the last four weeks".

A couple of surveys asked about the contraceptive use at last sex, for example, the Sweden 1996 National Survey on Sexual Behavior and Uruguay 2004 Encuesta Nacional sobre Reproducción Biologica y Social de la Poblacion. The data compilations included this information in a note and data points were included in the input file for model-based estimates, but were assigned a bias (Alkema and others, 2013; United Nations, 2017b).

Some surveys did not provide adequate information on the current use of contraceptives; for instance, the Italy 1979 Fertility Survey, asked about contraceptive use since the last pregnancy and the Czech Republic 1970 Marriage Reproduction Survey and the 1977 Czechoslovak Fertility Survey combined in one question both current and past use.[4] The surveys that only asked questions on whether respondents ever used a contraceptive method were not included in the data compilations (United Nations, 2017a and 2017e).

### *D. Structure of questionnaire*

Variations in the structure of women's questionnaires and the position of questions on contraceptive use can influence and potentially bias responses. There were diverse examples of the position of the "contraception" questions in questionnaires. For instance, in the Tunisia 2011 Multiple Indicator Cluster Survey, questions on contraceptive behaviour were placed late in the questionnaire, after the characteristics of the woman, and the modules for marriage, infant mortality, birth history, fertility intentions of last pregnancy, health of mothers and neonate, and postnatal health. If the woman or interviewer was experiencing questionnaire fatigue, one or both may try to speed up the interview, possibly leading to measurement errors (information not collected or wrong information provided) in the module on contraception. There were cases such as the Suriname 2010 Multiple Indicator Cluster Survey, where questions on contraceptive behaviour were placed before the questions on marital status. This could make unmarried women feel more comfortable to report that they are using contraception if they have not yet declared to the interviewer that they are unmarried.

Some surveys preceded the current-use question with reassurance to the respondent about the confidentiality of their response. The section on contraceptive use in the Afghanistan 2000 Multiple Indicator Cluster Survey began with "Now I am going to change topics. I would like to talk with you

[4] These surveys were included in the data compilations since they represented the oldest surveys reporting contraceptive use in respective countries; however, the estimates of contraceptive use from these surveys were not included in the input file for model-based estimates (United Nations, 2017b).

about another subject—family planning—and your reproductive health. I know this is a difficult subject to talk about, but it is important that we obtain this information. Of course, the information you supply will remain strictly confidential. You will never be identified with the answers to these questions". Surveys that did not include a similar statement, particularly in contexts in which contraceptive use was a sensitive matter, might underestimate use.

In some surveys, questions on knowledge or awareness of methods, or ever-use of contraception, were asked before the question on current use. Additionally, there might be probes, for instance, where each method was described to the woman as a prompt, before asking her if she had heard of that method. The purpose of asking questions around knowledge of contraception was to assess the success of family planning communication strategies and to better understand the extent to which women were aware and knowledgeable of different methods, as an indicator in its own right. Additionally, including prompts might be a way to signal to women which methods, particularly traditional methods, were considered as methods to be reported and so women might more likely to accurately respond to subsequent questions on current use.

Before the 1980s, at least 32.9 per cent of surveys included a "knowledge" question in the contraception module and at least 25.7 per cent included a knowledge question with a probe (table 3). However, relatively few questionnaires were available for older surveys, which made assessing the presence or absence of specific questions harder. As a result, for a high proportion of surveys conducted before 1980 (65.7 per cent), it was not known if knowledge questions were included in the questionnaire. In 2010-2016, 57.6 per cent of surveys included a knowledge question and 56.3 per cent included the knowledge question with a probe (presence of the knowledge question is not known in 7.9 per cent of surveys for this time period). There were differences by survey type. For DHS surveys, it was standard to have the question on knowledge precede the question on current use. For MICS surveys, the knowledge question was usually absent in earlier survey rounds, but it became more common over time.

TABLE 3. NUMBER OF SURVEYS THAT INCLUDE QUESTIONS ON KNOWLEDGE/AWARENESS OF CONTRACEPTIVE METHODS, BY TIME PERIOD

| | Time period | | | | |
|---|---|---|---|---|---|
| | *Before 1980* | *1980-1989* | *1990-1999* | *2000-2009* | *2010-2016* |
| | | | *Number* | | |
| Number of surveys (N) | 140 | 157 | 274 | 372 | 229 |
| Surveys with knowledge question (N) | 46 | 93 | 158 | 172 | 132 |
| Surveys with a probe on the knowledge question (N) | 36 | 83 | 138 | 149 | 129 |
| Surveys with no knowledge question (N) | 2 | 7 | 39 | 124 | 79 |
| Surveys with unknown status of knowledge question (N) | 92 | 57 | 77 | 76 | 18 |
| | | | *Percentage* | | |
| Proportion of surveys with a knowledge question (per cent) | 32.9 | 59.2 | 57.7 | 46.2 | 57.6 |
| Proportion of surveys with a knowledge question with a probe (per cent) | 25.7 | 52.9 | 50.4 | 40.1 | 56.3 |
| Proportion of surveys with no knowledge question (per cent) | 1.4 | 4.5 | 14.2 | 33.3 | 34.5 |
| Proportion of surveys with unknown status of knowledge question (per cent) | 65.7 | 36.3 | 28.1 | 20.4 | 7.9 |

*Source:* Calculations based on the review of questionnaires and other documentation available.

*E. Populations covered: marital status*

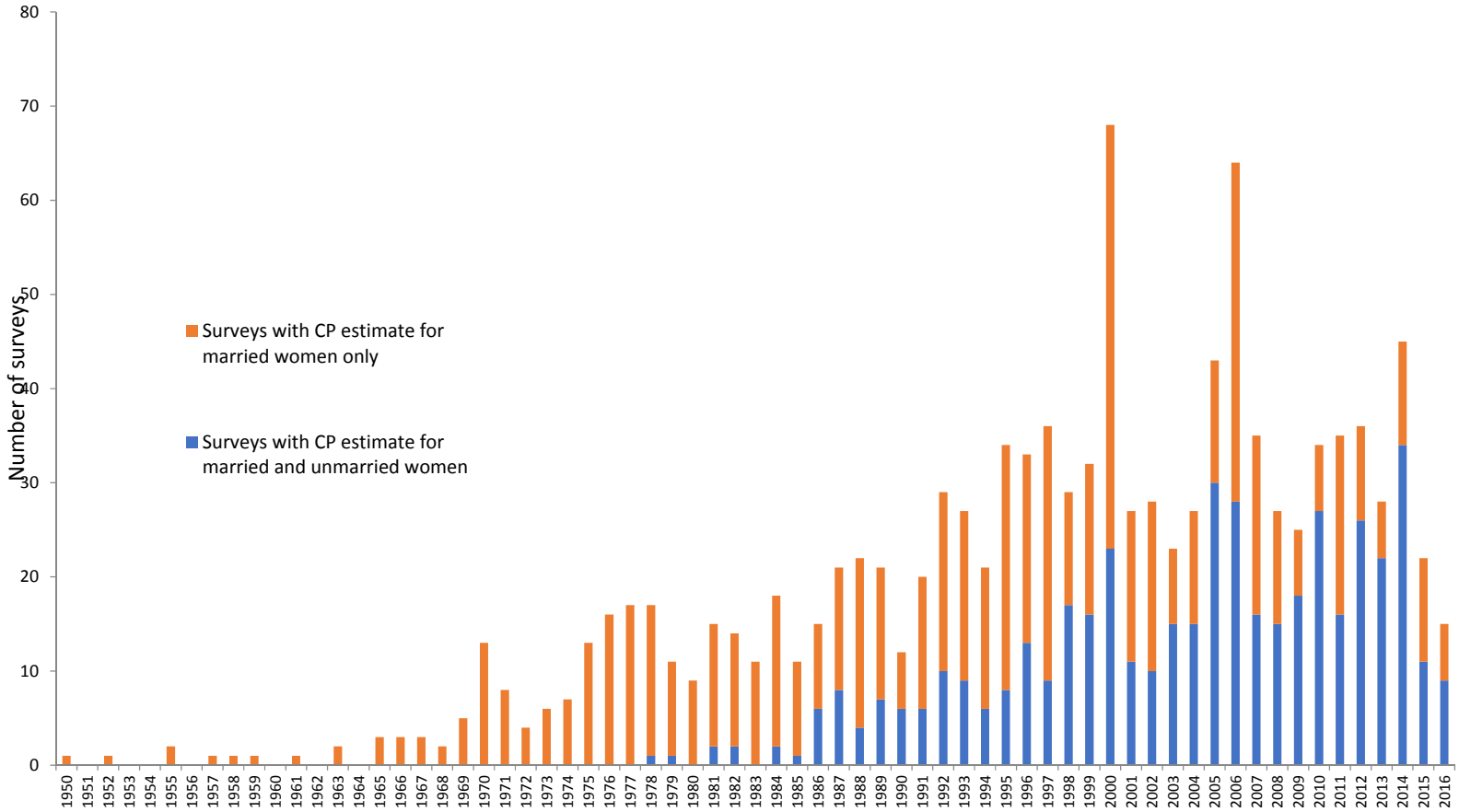
There were broad regional commonalities in the survey population of the women's questionnaire. Surveys conducted in Northern Africa, Southern Asia, South-eastern Asia and Western Asia tended to include only ever-married women as their survey population, including contexts in which it was culturally unacceptable to discuss matters relating to sexual and reproductive behaviour with never-married women. However, more recent rounds of surveys expanded the population coverage to include all women of reproductive age (e.g., the recent DHS in India and Indonesia), suggesting a growing recognition that it is important to include unmarried women in monitoring progress towards universal access to reproductive health-care services. Indeed, the number of surveys providing data on contraceptive prevalence for unmarried women increased over time (figure 3), although there were still recent surveys, which did not include never-married women in the women's questionnaire (e.g., the most recent DHS in Bangladesh and Egypt).

An overview of data availability by marital status, time period and region, is provided in figure 4. The first row (green) for each group of countries refers to the entire observation period; each cell contains the percentage of countries with 0, 1, 2, 3, 4 or 5+ observations (i.e., data points). Similarly, subsequent rows (blue) show the percentage of countries by number of observations in different periods. The coloured shading displays the percentage of countries in each cell. The number in parenthesis by the label of the group of countries refers to the total number of countries within that group. Of the 195 countries with observations for married women (right panel), 56 per cent had 5 or more observations. By contrast, of the 134 countries with observations for unmarried women (left panel), only 34 per cent had 5 or more observations.

There were 42 developed countries with estimates of contraceptive prevalence for married women, but only 29 with estimates for unmarried women. In Africa, 45 countries had estimates for unmarried women compared to 54 countries with estimates for married/in-union women. Countries in Africa also had the largest proportions of observations on contraceptive prevalence for unmarried women, with 47 per cent having five or more observations and another 18 per cent having four observations. Countries in Latin America and the Caribbean also had fairly good data coverage. Of the 39 countries with observations for married women, 51 per cent had 5 or more observations. Another 26 countries had observations for unmarried women, of which 46 per cent had 5 or more observations. Forty-six countries in Asia had married-women estimates, but only 25 countries had estimates for unmarried women and, of these, 36 per cent had only one observation. Countries in Oceania had the least data available for both married and unmarried women—with a limited number of countries covered and few observations for each country. In terms of trends in data availability, the shading in figure 5 suggests that the number of observations available within each region is improving over time, for both married and unmarried women. This is particularly the case for unmarried women in Asia. Prior to 1990, 92 per cent of countries had no observations for unmarried women, while in the most recent period, this proportion had fallen to 32 per cent.

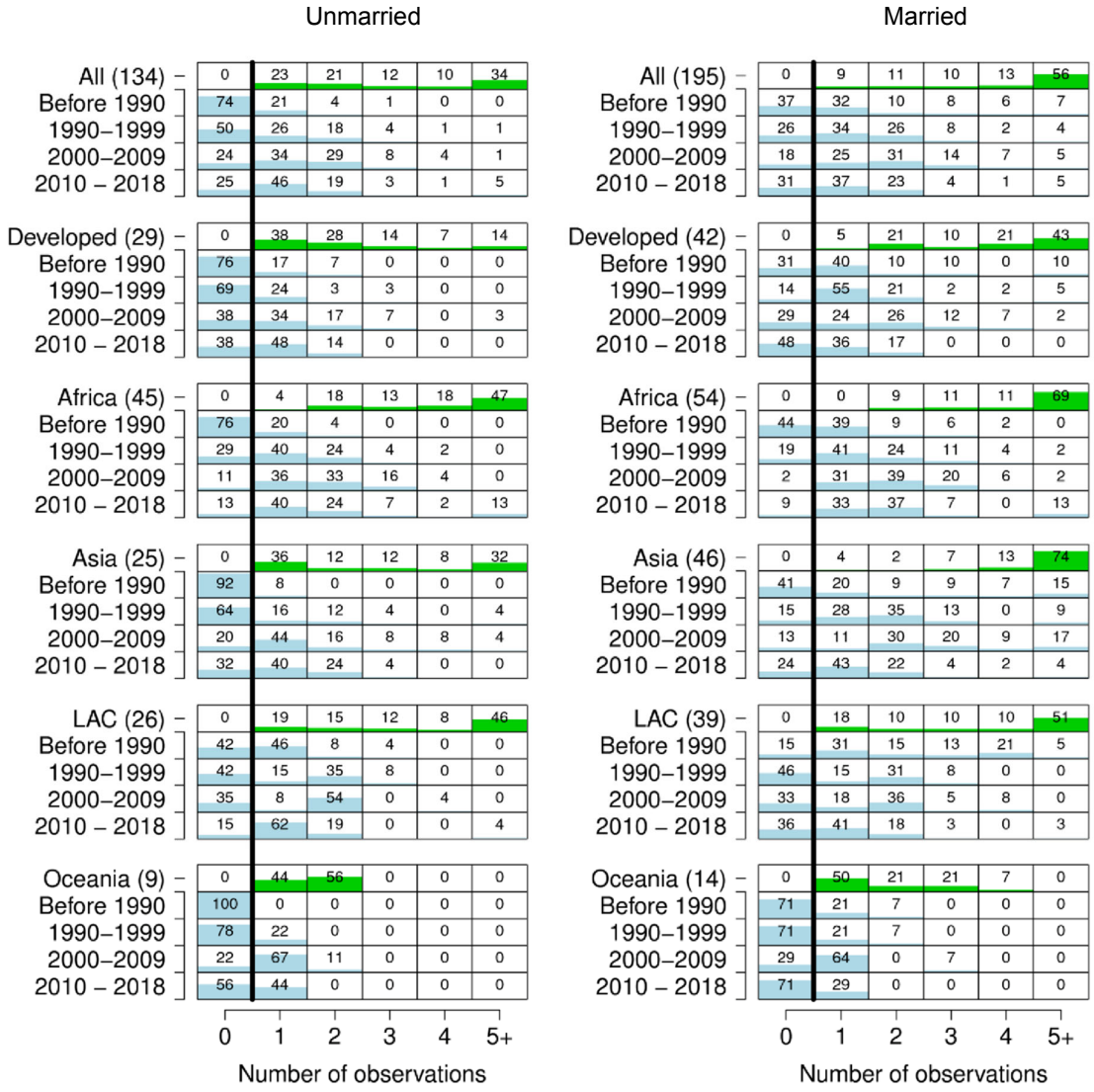
Figure 5 presents the countries by the number of observations of contraceptive prevalence for unmarried women. It is important to note that there were no observations from nationally-representative data on contraceptive prevalence for unmarried women in China. In China, only ever-married women were asked about contraceptive use, even in light of growing evidence from studies (though not nationally-representative) that sexual activity and contraceptive use among unmarried women was increasingly common (Li and Newcomer, 1996; Li and others, 2013). Considering the large size of China's population, this constitutes a significant data gap.

**Figure 3. Surveys with data on contraceptive prevalence for unmarried women by year**




*Source:* Calculations based on United Nations 2017a and 2017e.

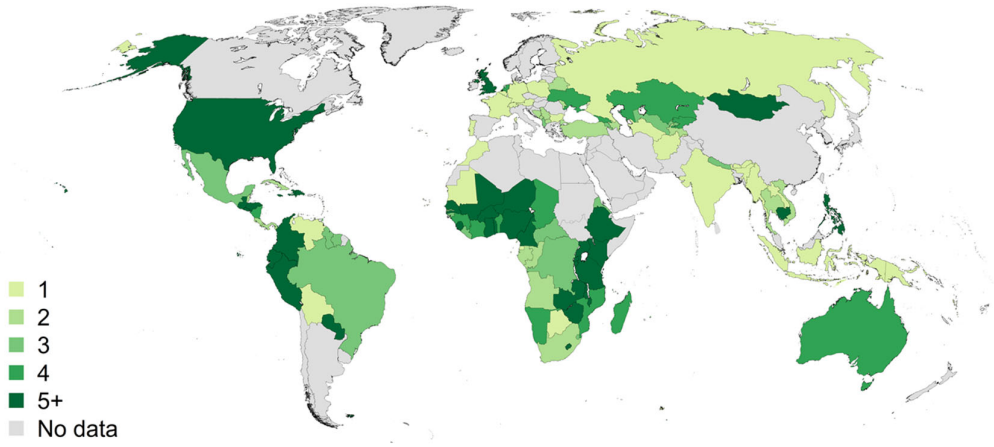
**Figure 4. Distribution of countries with 0, 1, 2, 3, 4 or 5+ observations of contraceptive prevalence among unmarried women (left panel) and married women (right panel), by groups of countries and time periods (percentage)**




*Source:* Calculations based on United Nations, 2017e.

NOTE: The first row (green) for each group of countries refers to the entire observation period; each cell contains the percentage of countries with 0, 1, 2, 3, 4 or 5+ observations. Similarly, subsequent rows (blue) show the percentage of countries by number of observations in the period before 1990, from 1990 to 1999, from 2000 to 2009 and from 2010 to the most recent survey, respectively. The coloured shading visualizes the percentage of countries in each cell. The number with the subgroup refers to the total number of countries within that subgroup. "LAC" refers to Latin America and the Caribbean. "Observations" refer to specific data points, namely data on contraceptive prevalence (all methods) available for each group of countries during the specified period of time.

**Figure 5. Distribution of surveys with data on contraceptive prevalence for unmarried women, by number of observations in each country**




The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations. Dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties. Final boundary between the Republic of Sudan and the Republic of South Sudan has not yet been determined.

*Source:* Calculations based on 2017e.

### *F. Populations covered: age range*

The majority of the surveys (854 out of 1,172) reviewed in this paper recorded and reported contraceptive prevalence for women aged 15 to 49 years, the standard reproductive age range. The remainder reported data for women in non-standard age groups (table 4). Examples of contraceptive estimates for non-standard age ranges included those from Contraceptive Prevalence Surveys in Bangladesh from the 1970s and 1980s (ages 10 to 49 years) and Australia 2001-2002 Study of Health and Relationships (ages 16 to 59 years, reflected in "other age range"). The Gender and Generations Surveys in several European countries reported estimates for women in various age ranges, such as 18 to 49, or 21 to 49 years. Examples of open age ranges include "15+", "18+", or "<50". Survey-based estimates of contraceptive prevalence for varying age ranges resulted in inconsistencies between the estimates, since contraceptive use among women of the youngest and oldest reproductive ages were often substantially different than other reproductive ages. Therefore, adjustments for differences in age ranges were included in the Bayesian model of estimates and projections of family planning indicators (Alkema and others, 2013; United Nations, 2017b).

TABLE 4. REPORTS OF CONTRACEPTIVE PREVALENCE BY AGES COVERED

| Age range | *Number* | *Percentage* |
|---|---|---|
| 10-49 | 11 | 0.9 |
| 12-49 | 7 | 0.6 |
| 15-44 | 132 | 11.3 |
| 15-49 | 854 | 72.9 |
| 15-50 | 5 | 0.4 |
| 16-49 | 20 | 1.7 |
| 18-44 | 15 | 1.3 |
| 18-45 | 8 | 0.7 |
| 18-49 | 20 | 1.7 |
| 20-44 | 11 | 0.9 |
| 20-49 | 27 | 2.3 |
| Other age range | 29 | 2.5 |
| Open ended age range | 30 | 2.6 |
| Unknown | 3 | 0.3 |
| Total | 1,172 | 100.0 |

*Source:* United Nations 2017a.

### *G. Contraceptive methods*

A total of 73 contraceptive methods had been reported and reviewed across the 1,172 surveys included in this review. In some cases, the same method was reported in different ways (e.g., "Norplant" is a brand of implants), in other cases multiple methods were grouped together in tabulations (e.g., "Female sterilization or IUD" and "Withdrawal or abstinence"). Surveys also varied in their classification of modern versus traditional methods. In *World Contraceptive Use 2017*, the Population Division standardised the methods and the classification of modern versus traditional, as outlined in the Annex table.

For presentation in *World Contraceptive Use*, the Population Division groups related methods together, starting from the long list of 73 methods recorded in its internal database. For example, the traditional methods "incantations", "jamu or majun", "ju-ju beads" only appeared in one survey each and were combined into "other traditional methods". The contraceptive ring is a new method, which has only started to be recorded in surveys in some countries since 2005 (Austria, Belgium, Canada, Malaysia, Switzerland and the United States of America). The contraceptive ring was included in "other modern methods". The standard days method (SDM) was increasingly being reported in surveys. Of the 45 surveys that asked women about this method, 40 had a prevalence of SDM lower than 0.5 per cent, and the highest was 0.9 per cent, demonstrating that it is still a rarely used method. Additionally, for many surveys, the documentation and reported tabulations did not provide enough information to differentiate SDM from other Fertility Awareness Based methods and, therefore, the Population Division places SDM in the category of "Rhythm" methods. Undoubtedly, additional contraceptive methods will appear in surveys in the future, as new methods emerge.

The frequency and proportion of all surveys that report specific contraceptive methods is presented in table 5. Since before 1990, there was little or no change in the proportion of surveys that report a tabulation of the modern methods IUD (consistently greater than 90 per cent), the pill (greater than 93 per cent), male condom (greater than 91 per cent) and the traditional methods rhythm and withdrawal (consistently greater than 74 per cent of surveys). There was a general decline in the proportion of surveys reporting vaginal barrier methods, as these were replaced by other methods.

There was an increase in the proportion of surveys reporting female sterilization (from 72.9 per cent before 1990 to 93.5 per cent in 2010-2016), male sterilization (from 39.7 per cent before 1990 to 62.3 per cent in 2010-2016) and injectable (from 54.9 per cent to 90.7 per cent, respectively). Injectables were included as a contraceptive method in surveys in Central America and South America (e.g.,

Nicaragua, Paraguay and Peru) since the 1970s, but were only included in the United Kingdom and the United States of America in the mid-2000s. Injectables were still absent from surveys conducted in some countries such as Japan and Norway.

Other methods were non-existent or very rarely reported in surveys before 1990, but were commonly included in surveys in the period 2010-2016 such as implants (from 3.1 per cent before 1990 to 81.9 per cent in 2010-2016), the female condom (from 0.7 per cent to 48.8 per cent), lactational amenorrhea method (LAM) (from 1.0 per cent to 60.5 per cent) and emergency contraception, which was absent from all surveys before 1990, but was included in 17.2 per cent of the surveys in the period 2010-2016. Emergency contraception was commonly included in DHS and PMA2020 surveys.

In terms of contraceptive prevalence, some of these new methods continued to be rarely used. For example, the highest reported proportion of women using emergency contraception was 2.7 per cent in the Estonia 2004 Gender and Generations Survey. There was a lot of interest, particularly in Africa, in female condoms as a female-controlled contraceptive method, which provided protection against HIV and STI infections, but the maximum reported proportion of women using female condoms was just 1.0 per cent in the United Kingdom 2008-2009 Omnibus Survey. Implants and LAM on the other hand, became significant contributors to the method-mix, with several surveys reporting over 10 per cent of women using either method.

TABLE 5. REPORTING OF CONTRACEPTIVE METHODS IN SURVEYS, BY TIME PERIOD

| | Before 1990 | | 1990-1999 | | 2000-2009 | | 2010-2016 | |
|---|---|---|---|---|---|---|---|---|
| *Methods* | *Number of surveys* | *Proportion of all surveys in the period* | *Number of surveys* | *Proportion of all surveys in the period* | *Number of surveys* | *Proportion of all surveys in the period* | *Number of surveys* | *Proportion of all surveys in the period* |
| Female sterilisation | 215 | 72.9 | 220 | 80.6 | 319 | 86.9 | 201 | 93.5 |
| Male sterilisation | 117 | 39.7 | 146 | 53.5 | 218 | 59.4 | 134 | 62.3 |
| IUD | 277 | 93.9 | 254 | 93.0 | 334 | 91.0 | 201 | 93.5 |
| Implant | 9 | 3.1 | 68 | 24.9 | 171 | 46.6 | 176 | 81.9 |
| Injectable | 162 | 54.9 | 193 | 70.7 | 294 | 80.1 | 195 | 90.7 |
| Pill | 277 | 93.9 | 262 | 96.0 | 347 | 94.6 | 207 | 96.3 |
| Male condom | 277 | 93.9 | 251 | 91.9 | 343 | 93.5 | 207 | 96.3 |
| Female condom | 2 | 0.7 | 5 | 1.8 | 85 | 23.1 | 105 | 48.8 |
| Vaginal barrier methods | 200 | 67.8 | 153 | 56.0 | 202 | 55.0 | 102 | 47.4 |
| Lactational amenorrhea method (LAM) | 3 | 1.0 | 8 | 2.9 | 163 | 44.4 | 130 | 60.5 |
| Emergency contraception | 0 | 0.0 | 1 | 0.4 | 37 | 10.1 | 37 | 17.2 |
| Rhythm | 228 | 77.3 | 210 | 76.9 | 303 | 82.6 | 185 | 86.0 |
| Withdrawal | 219 | 74.2 | 204 | 74.7 | 299 | 81.5 | 176 | 81.9 |
| *Total surveys in period* | *295* | | *273* | | *367* | | *215* | |

*Source*: United Nations 2017a.

### *H. Identifying and estimating biases*

To account for variations of sampled populations that were different from married women of reproductive age, the Bayesian model of estimates and projections of family planning indicators (Alkema and others, 2013; United Nations, 2017b) included a number of "perturbation parameters". For example, if the population used for the calculation of the indicator was defined as sexually active rather than married/in-union women, or if the age range was different from the standard ages 15-49 years, the model provided the estimated values of the perturbation parameters in order to interpret the impact of the differently sampled populations (Alkema and others, 2013). The Bayesian model of estimates and projections of family planning indicators also included estimation of parameters for four types of misclassification biases identified as having potential influence on the estimation of contraceptive use. The estimated misclassification bias parameters referred to the estimated proportion of women who were misclassified from current use (modern or traditional) to non-use due to four different factors, as follows.

Information from all surveys were systematically coded on:

- Exclusion of female/male sterilization from modern method use (six surveys, e.g., Denmark 1975 Fertility Survey)
- Inclusion of sterilization for non-contraceptive reasons in modern method use (23 surveys, including some GGS and FFS surveys and two national surveys in France - 2000 Enquête Cohorte Contraception and 2005 Enquête du Baromètre Santé).
- Inclusion of folk methods in traditional method use (154 surveys, e.g., Bolivia 1998 Demographic and Health Survey)
- Absence of probing questions about knowledge of methods prior to being asked about current use (299 surveys, e.g., the Malawi 2013-2014 Multiple Indicator Cluster Survey).

The bias parameters were included in the Bayesian model to account for these four types of misclassification errors (further details on the methodology can be found in Alkema and others, 2013). However, at the time that the model was developed in 2013, the fourth bias (absence of probing questions about knowledge of methods) was only reported for the data source MICS. The review and the data compilation on this bias had been completed for all surveys in *World Contraceptive Use by Marital Status and Age (2017)*. Consequently, the Bayesian model examined whether an absence of probing questions about knowledge of methods generated a misclassification bias in the estimation of contraceptive prevalence trends in the married/in-union women model and the impact of such misclassification. In surveys that had an absence of probing questions on knowledge of methods, between 12 and 23 per cent (median = 17 per cent) of the women who use traditional methods were misclassified as having unmet need. However, the absolute impact on traditional use was minimal, primarily because the estimated levels of traditional method use were small. These findings demonstrate how variations across survey designs and questionnaires could have an impact on reports of contraceptive use. In this case, the absence of probing questions resulted in lower estimates of traditional use as reported by the survey.

## CONCLUSIONS

There is a considerable mass of data and an impressive breadth of contraceptive prevalence estimates across countries, time and survey programmes. Data availability and the publication of survey documentation have generally improved over time. To be able to monitor progress towards targets, track change over time and compare pertinent indicators between countries and over time, standardised and harmonised survey methodologies (e.g., survey population, age), questionnaires (e.g., structure, framing of question on current use and presence of probes to questions on knowledge/awareness of methods), definitions and metrics are necessary. Where methodologies and definitions were inconsistent between surveys, statistical methods could handle some of these potential biases. Using

model-based estimates published annually by the Population Division (United Nations, 2017b), this analysis showed that a significant proportion of traditional method users were misclassified as having unmet need, because of an absence of probing questions on knowledge of contraceptive methods, resulting in under-reporting of current use. This demonstrates the impact of variability in questionnaires on reports of contraceptive use.

It is important to keep in mind some general limitations of surveys, for example, whether the survey population was truly representative of the population of the country. The self-reporting of contraceptive use poses further challenges, some of which were not investigated in this analysis, given the absence of relevant information. Contraceptive use is a sensitive issue in some cultures. A woman who is uncomfortable talking to a stranger about this issue is likely to underreport use in face-to-face interviews, particularly if she is not married or if there are other household members present during the interview. The gender and age of the interviewer may also affect the response of the woman. Evidence from a mixed-methods follow-up study nested within the Ghana 2014 DHS demonstrated substantial underreporting of contraceptive use, particularly of traditional methods (Staveteig, 2016). A separate qualitative study in Ghana showed that surveys such as DHS were not very well suited to measuring combinations of methods and mosaics of method combinations (Marston and others, 2017). Conversely, evidence from Malawi where contraceptive prevalence estimates from a survey were compared with estimates from provider-recorded data for the same study population, revealed that women over-reported use of modern methods, particularly injectables (Dasgupta, Zaba and Crampin, 2015). In this example, women who were "late" getting their repeat injection and thus not technically using, still self-identified as being an injectable user, demonstrating that the current-use question is left to be interpreted by the respondent, which creates variability in responses. These are just some examples of the measurement errors that may be present in surveys collecting data on current use. Nevertheless, until routine data systems are strengthened and national service provision data are complete, surveys will continue to be excellent sources of current-use estimates for many countries.

Understanding current use and unmet needs for family planning among unmarried women can be of critical assistance in identifying possible areas for programmatic expansion. In many surveys, unmarried women of reproductive age had not been included or asked about current use of contraceptives. And even where they were, the data was not always presented in the reports. As a result, programmes are at risk of leaving unmarried women behind if it is not known that this demographic has family planning needs. With the renewed efforts to report family planning indicators for all women, it is recommended that survey designers include unmarried women in surveys where possible, ask all women about current contraceptive use and tabulate results disaggregated by marital status. This analysis has documented an increase in the number of surveys that ask unmarried women about current use. Further work needs to be done to evaluate the quality of information on contraceptive use among unmarried women as reported in household-based surveys. Similarly, it is recommended that family planning indicators be reported by method, cover at least the ages 15-49 years and be disaggregated by age, at minimum for five-year age groups. It is also recommended that survey designers provide access to micro-data sets, such that users are able to produce their own disaggregated statistics.

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## APPENDIX

TABLE A. CLASSIFICATION OF CONTRACEPTIVE METHODS USED IN DATA COMPILATIONS BY THE UNITED NATIONS POPULATION DIVISION

| ***Classification*** | ***Methods*** |
|---|---|
| **Modern methods of contraception** | Include female and male sterilization, the intra-uterine device (IUD), the implant, injectables, oral contraceptive pills, male and female condoms, vaginal barrier methods (e.g. the diaphragm, cervical cap and spermicidal foam, jelly, cream and sponge), the lactational amenorrhea method (LAM), emergency contraception and other modern methods (e.g., the contraceptive patch or vaginal ring). |
| **Traditional methods of contraception** | Include rhythm (e.g., fertility awareness-based methods, periodic abstinence), withdrawal and other traditional methods. |