Unintended Pregnancy, Abortion and Postabortion Care In Assam, India—2015

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Key Points

- An estimated 580,100 abortions occurred in Assam in 2015. These include safe and unsafe abortions, and those taking place both in health facilities and in other settings. The state's abortion rate was 66 terminations per 1,000 women of reproductive age.
- The large majority of abortions (74%, or 427,800) took place in non-facility settings using medical methods of abortion, and 5% (29,900) were performed outside of health facilities using other methods.
- Only 21% of abortions (122,300) occurred in health facilities. Public facilities provided the majority of all facility-based terminations (73%).
- An estimated 588 facilities in Assam provided abortion-related care (induced abortion, postabortion care or both types of services) in 2015; 61% were public and 39% were private. Eighty percent of primary health centres reported offering no abortion-related care.
- The vast majority (94%) of health facility abortions took place in the first trimester of pregnancy (up to 12 weeks' gestation), and 65% occurred at less than 8 weeks' gestation. Most were performed surgically using manual or electric vacuum aspiration (57%) or either dilatation and evacuation or dilatation and curettage (30%).
- Although more than eight in 10 women of reproductive age in Assam live in rural areas, only 45% of facilities that provide any abortion-related services were located in rural areas. All private facilities were located in urban areas, and only 18% of public hospitals that provide abortion-related services—the facilities best equipped to handle severe complications or later-term abortions—were located in rural areas.
- More than half (55%) of pregnancies occurring in Assam in 2015 were unintended. Three-fourths (74%) of these unintended pregnancies ended in an abortion.

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This report is part of a larger study titled Unintended Pregnancy and Abortion in India (UPAI), which was conducted to provide much-needed information on the incidence of induced abortion and pregnancy, as well as access to and quality of safe abortion services, in six Indian states.

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Context of Abortion in India and The State of Assam

Although abortion is legal in India, evidence on how many abortions occur and under what circumstances they are performed is limited. Official incidence statistics come from the Family Welfare Yearbook published by the Ministry of Health and Family Welfare (MoHFW), Government of India; these statistics underestimate abortion incidence because coverage of facility-based services is incomplete and many abortions take place outside of a facility setting.[1] The most recent (and most commonly cited) study to have estimated abortion incidence in India was based on a small sample of facilities and likely underestimated the true magnitude.[2] The data from this study are also now more than 15 years old, and demographic factors that influence abortion and conditions surrounding its provision have changed markedly over this period.[3–5] Until now, the country has lacked a large-scale study of abortion service provision in both public and private health facilities that documents the care provided and its quality, captures nonfacility abortions, and gives reliable estimates of the incidence of abortion and unintended pregnancy.

To fill this gap in data, we undertook a rigorous study, titled Unintended Pregnancy and Abortion in India (UPAI), which employs a modified version of the widely used abortion incidence complications methodology.[6–8] It covers six states of India—Assam, Bihar, Gujarat, Madhya Pradesh, Uttar Pradesh and Tamil Nadu—that together account for about 45% of the country's population and were chosen to represent each region of the country. For each state, the study

- provides representative, in-depth information on the characteristics of abortion-related services (induced abortion and postabortion care) provided by each type of public- and private-sector facility in 2015;
- uses facility-based abortion data from the six states and national data on medical methods of abortion (MMA) sales to estimate abortion incidence; and
- uses abortion incidence data to estimate levels of unintended pregnancy, an important indicator of women's ability to regulate their fertility.

This report focuses on Assam, first providing detailed findings on facility-based abortion and postabortion services in the state, then using these and other data to formulate estimates of the incidence of abortion and unintended pregnancy. In the final section of the report, we offer recommendations to facilitate planning for improvements in the accessibility and provision of safe, high-quality abortion services. Visit https://www.guttmacher.org/report/unintended-pregnancy-abortion-postabortion-care-assam-india-2015 to find more resources produced as part of this study.

Abortion law in India

Induced abortion has been legal in India on a broad range of grounds since the Medical Termination of Pregnancy (MTP) Act was passed in 1971. According to this law, abortion is permitted up to 20 weeks' gestation when it is necessary to save a woman's life or protect her physical or mental health, and in cases of economic or social necessity, rape, contraceptive failure among married couples and fetal anomaly.[9] Pregnancies beyond 20 weeks may be terminated in cases of life endangerment. The MTP Act mandates that abortions take place in safe and hygienic conditions at approved facilities and be performed by certified providers. Providers eligible for certification are limited to obstetrician-gynecologists or doctors with a bachelor of medicine, bachelor of surgery (MBBS) degree who have undergone MTP training.

All public facilities at the primary health centre (PHC) level or higher are approved to provide abortions, as long as they have a certified provider on staff. Facilities lacking the necessary equipment are expected to have referral linkages to higher-level sites. Private facilities, on the other hand, must become registered to provide legal abortion services, a process that entails meeting criteria specified by the MTP Act. Registration is difficult, in part because the District Level Committees responsible for approving private facilities do not exist in some areas and may meet infrequently in others. Several small-scale studies have found that many private facilities that provide abortion services are not approved to do so.[10–13] However, lack of registration does not imply that the abortions being provided in those facilities are unsafe, as unregistered facilities may have qualified, trained staff performing safe abortions.

The MTP Act of 1971 has been amended to address advances in abortion methods, and these and other policy changes have contributed to expanding access to MMA, which, in India, refers primarily to the use of a combined regimen of misoprostol and mifepristone (whether packaged separately or together in a "combipack"). A 2002 amendment permitted the provision

of MMA by abortion-certified doctors in facilities not specifically approved to offer abortions, as long as these facilities have referral linkages to a facility approved to provide abortion (thus facilitating prompt action in case of complications), and a 2003 amendment allowed for the use of MMA for pregnancy terminations up to seven weeks' gestation.*[15–17] The amendments also attempted to improve the process of registering private facilities by speeding it up and shifting responsibility from the state to District Level Committees. In 2008, the combipack, which contains 200 mg of mifepristone and 800 mcg of misoprostol, was approved in India.[18] Amendments to the MTP Act have been proposed that would expand the range of providers legally able to offer early first-trimester abortion to include nurses and auxiliary nurse midwives (ANMs), as well as practitioners trained in Indian systems of medicine with recognized qualifications; allow terminations at a woman's request up to 12 weeks' gestation; allow abortion in cases of contraceptive failure for all women and couples, regardless of marital status; increase the gestational age limit for abortion to 24 weeks for certain vulnerable groups; and remove the gestational age limit for terminations sought because of diagnosed fetal abnormality.[19] At the time of this writing, none of these proposed amendments had been passed.

Policies have also been written to address the use of sex-selective abortions. Cultural norms and discriminatory practices that favor males, including sex-selective abortion, have resulted in an imbalance in the sex ratio in India: As of 2014–2016, there were 848 females per 1,000 males at birth.[20] To ameliorate this imbalance, the government enacted the Pre-Natal Diagnostic Techniques Act in 1994,[21] amended in 2003 to become the Pre-Conception and Pre-Natal Diagnostics Techniques (PCPNDT) Act, which prohibits the misuse of prenatal diagnostic tests for the purpose of sex determination.[22,23] Challenges remain, however, in simultaneously addressing gender-biased sex selection while protecting access to legal abortion services. The Government of India's strict measures to enforce the PCPNDT Act, as well as intense public focus on this issue in recent years, has generated the misperception among women and providers that all abortions are illegal, and has thus led to difficulties in both obtaining and providing safe abortion and postabortion care.[24–26]

In addition, facility-based provision of safe abortion services is hampered, at least in the public sector, by shortages of trained personnel, lack of necessary equipment and frequent transfers of trained providers to unequipped facilities.[27] The 2012–2013 District Level Household and Facility Survey found that in the country as a whole, 26% of district hospitals and 77% of community health centres (CHCs) did not have a gynecologist on staff.[28] In the private sector, as well, providers lack training opportunities to learn how to perform abortions, and trained providers may not work in facilities that are registered to provide the service.[10]

Sexual and reproductive health and abortion in Assam

Abortion and unintended pregnancy are closely linked to contraceptive use and other indicators of women's status, such as marriage, literacy and level of urbanization, all of which may be associated with women's and couples' desire to control the timing of their births and to limit their fertility.

Of the 8.8 million women of reproductive age (15–49 years old) in Assam in 2015,[29] 85% lived in rural areas.[30] Among all people residing in the state in 2011–2012, 32% lived in poverty.[31]

According to data from the 2005–2006 and 2015–2016 National Family Health Surveys (NFHS-3 and NFHS-4, respectively), the proportion of married women of reproductive age in Assam using a modern method of contraception has increased from 27% to 37% (Table 1, page 6).[30,32] However, modern contraceptive use is lower in Assam than in India as a whole (48%).[33] Among married women using modern contraception in Assam, more than half (59%) use oral contraceptives and 26% use female sterilization.

Despite increases in contraceptive use, unmet need for contraception—the proportion of married women who are able to become pregnant and want to prevent pregnancy for at least two years but who are not using contraceptives—has also risen slightly in the past decade, from 11% to 14%.[30,32] Nonetheless, the level of unmet need among women in Assam is similar to the 13% for India as a whole.[33] Unwanted fertility in Assam was also substantial in 2015–2016: On average, women in the state wanted 1.8 children but had 2.2 (the same number of children women in India have on average).[30,33] This gap between wanted and total fertility rates in the state has remained fairly constant over the past decade (0.6 children in 2005–2006 and 0.4 in 2015–2016).[32]

Data on marriage timing show that the median age at first marriage for women aged 20–49 has increased slightly in Assam, from about 18 years in 1998–1999 to 19 years in 2005–2006 (comparable data are not available for 2015–2016 from NFHS-4).[32,35] More recent data does

*In 2010, the MoHFW's Comprehensive Abortion Care Training and Service Delivery Guidelines for providing comprehensive abortion care indicated in a footnote that MMA up to 63 days' gestation is safe.[14] However, amendments to the MTP Act that would reflect this modification are still awaiting passage in Parliament.

TABLE 1

Trends in contraceptive use and fertility preference indicators from National Family Health Surveys, Assam, 1998–1999, 2005–2006 and 2015–2016

Indicator	1998–1999	2005–2006	2015–2016
Contraceptive use among married women 15–49			
% using any method	43.3	56.5	52.4
% using modern methods	26.6	27.0	37.0
% using traditional methods	15.8	29.5	15.4
Unmet need for contraception among married women 15–49	17.0	10.5	14.2
% with unmet need for spacing	7.0	3.5	5.8
% with unmet need for limiting	10.0	7.1	8.4
Fertility rate among women 15–49			
Wanted	1.8	1.8	1.8
Total	2.3	2.4	2.2
Timing of marriage			
Median age at first marriage (in years) among women 20–49	18.3	18.7	*
% never married among women 15–19	75.8	72.7	77.7
% never married among women 20–24	35.4	36.3	31.5
% illiterate among women 15–49	42.2	30.2	28.2
Residence among women 15–49			
% urban	9.3	18.8	15.0
% rural	90.7	81.2	85.0

*NFHS-4 did not provide an estimate because data were missing for some women.
NOTE: Proportions presented in the text, figures and tables may differ slightly because of rounding. SOURCES: references 30,32 and 35.

indicate that early marriage has decreased modestly in the state: Some 22% of women aged 15–19 had ever been married at the time of the 2015–2016 survey, down from 27% in 2005–2006.[30]

An important contributing factor to unintended pregnancy and abortion incidence is the extent to which unmarried young women are sexually active. In recent NFHS studies, fewer than 2% of unmarried women aged 15–24 reported ever having had sex.[30,32] However, studies on this topic are likely to reflect a high level of underreporting, given the strong social sanctions against sexual activity outside of marriage.

Rising literacy is generally associated with an increase in women's role in decision making regarding matters such as contraceptive use, timing of births and family size. The NFHS also shows that women in Assam made important gains in literacy over the past decade: The proportion of those aged 15–49 who were illiterate dropped from 42% in 1998–1999 to 28% in 2015–2016.[30,35] Further analyses are needed to understand the relationship between gains in literacy in the state and sexual and reproductive health behaviors.

A few previous studies have provided estimates of abortion in Assam, but each has relied on incomplete sources of data. Data from 2014–2015 on the state's incidence of abortion, compiled by the MoHFW, showed 62,446 induced abortions occurred in a 12-month period.[1] In 2012, a study using two indirect estimation techniques (the Mishra-Dilip method and the Shah Committee's method) placed the state's induced abortion incidence higher, at between 141,000 and 151,000 per year.[36] The 2012–2013 Annual Health Survey reported that 6.7% of pregnancies in Assam ended in abortion: 6.5% in rural and 8.1% in urban areas.[37]

In addition to these studies, community-based surveys of women (such as the NFHS) collect some data on abortion but are not a reliable source for estimating its incidence because, in response to the stigma associated with terminating a pregnancy, women typically underreport their abortions in face-to-face interviews, a problem that may be exacerbated if women believe abortion to be illegal. The estimation methodology used in our UPAI study improves on those of previous studies because it does not rely on incomplete official statistics and instead uses direct measurement approaches that are feasible in the current Indian context: survey data from a representative sample of public and private facilities that provide abortions and national data on sales of MMA (see Survey Methodology, page 8).

Although knowing the number of abortions performed is important because it helps us understand the magnitude of this public health issue (and because it allows for indirect estimation of unintended pregnancy), information on how and where abortion occurs is equally important for policy making and planning. Availability of induced abortion services in the government sector is generally very limited in India. Government statistics for 2010 show there were only 46 public and registered private facilities approved for provision in Assam to serve a population of more than eight million women of reproductive age.[38,39] However, this number is an undercount because it excludes

facilities that do not report their services. The Programme Implementation Plan for 2011–2012 reports on targeted efforts that were made to expand the availability of abortion services at all levels of public facilities, resulting in 70% (694) of all government health facilities providing induced abortion.[40] The plan states that induced abortion services, at least in the first trimester, are provided in 35 hospitals (including district and sub-divisional hospitals and one medical college), 108 CHCs and 551 PHCs (including both block PHCs and other PHCs that provide services 24-7). PHCs are critical in that they serve rural areas, and the majority of Assamese women who rely on public-sector services live in these areas.

Survey Methodology

The UPAI study draws in large part on two surveys fielded in 2015 in six Indian states (Assam, Bihar, Gujarat, Madhya Pradesh, Tamil Nadu and Uttar Pradesh): the Health Facilities Survey (HFS), which collected data from a total of 4,001 public and private health care facilities, and the Health Professionals Survey (HPS), which collected data from 552 key informants knowledgeable about abortion in their district or state.* These surveys are described briefly below and in greater detail online (see "supplementary materials" at https://www.thelancet.com/journals/langlo/article/PIIS2214-109X(17)30453-9). Additional data sources are discussed in the Incidence Methodology on page 21.

Health Facilities Survey

All public and private medical colleges in the state were surveyed in the HFS, and other types of facilities were selected using the following stratified random sampling strategy. First, approximately 70% of districts in Assam were randomly selected; within these districts, public and private facilities were identified and sampled. In the public sector, 76% of district hospitals, 69% of sub-divisional hospitals and 19% of community health centres (CHCs) in the selected districts were sampled using lists obtained from the Ministry of Health and Family Welfare. Primary health centres (PHCs) were identified from among those linked administratively to the selected CHCs; ultimately, 8% of all PHCs in Assam were sampled. In addition, all Employees' State Insurance Corporation hospitals listed on government websites were included. Because no comprehensive lists of private and NGO facilities exist, an exercise was conducted in a representative sample of urban and rural areas of the state, with the objective of developing a list of all private and NGO facilities (hospitals, nursing and maternity homes, and clinics) that provide or have the capacity to provide abortion-related services (induced abortion, postabortion care or both). The listing exercise also covered certain public facilities for which no comprehensive lists were available: railway hospitals, Employees' State Insurance Corporation hospitals, military hospitals, municipal hospitals, tea estate hospitals and other urban public facilities (urban health centres and urban family welfare centres). In urban areas, the listing exercise was conducted within a sample of urban wards designed to represent towns and cities of all sizes and to cover approximately 7.5% of Assam's total urban population. In rural areas, the exercise was conducted within the catchment areas of a representative sample of CHCs.

The listing exercise reliably captured facilities currently providing abortion-related services (induced abortion, postabortion care or both); however, it may have unintentionally excluded some private facilities that were not currently providing such services but had the capacity to do so. No NGO facilities providing abortion-related services were identified in Assam. To ensure consistency across states, only data from those private facilities that reported providing abortion-related services were used in the results presented in this report. Thus, although the public-sector sample and study findings represent all public facilities, the private-sector results represent only the subset of facilities that were providing abortion-related care at the time of the survey, in 2015. As a result, this study does not measure the proportion of private facilities that are capable of offering abortion services but do not do so.

In Assam, 19 of 27 districts were sampled for inclusion in the HFS, and interviews were conducted at 145 public facilities, as well as at 32 private facilities that were providing abortion-related services. After applying sample weights, these facilities represent all 1,236 public facilities operating in Assam, including 359 public facilities likely to be offering abortion-related care, as well as the 229 private facilities offering such care. Our results differentiate among facilities according to public or private ownership and type (which generally corresponds to facility capacity).† Although we attempted to capture registration status with our HFS questionnaire, it is likely that we did not get completely accurate reporting on this potentially sensitive subject, either because unregistered providers of abortion feared admitting they were not registered or because respondents were not aware of what it means to be registered.

HFS data were collected at the facility using face-to-face structured interviews with a senior health care professional knowledgeable about the provision of abortion-related services at his or her facility—typically the director or head of the facility or of the obstetrics and gynecology department. In some facilities, the HFS was completed by a doctor, nurse, midwife, facility in-charge or other professional knowledgeable about services at that site. The survey collected information on reproductive health and abortion-related services offered at each facility, including the types of services offered, the number of women who presented for abortion-related care, availability of trained staff, types of postabortion complications treated and facility caseloads.

To qualify for the interview, respondents had to have worked at that facility for at least six months in a capacity in which they would know about the facility's abortion cases. They were asked to estimate the number of induced abortions in the past month and in an average month (to account for seasonality in abortion demand).‡ For these numbers, we relied on estimates, rather than official documentation, because facilities often do not maintain complete records of services provided (for a variety of reasons, including lack of registration, desire to avoid cumbersome reporting requirements under the MTP Act and desire to avoid paying taxes on the abortions they provide). We also asked facilities to provide their statistics on abortion from their log books so that

we could compare their official reports to their estimated numbers, but not all facilities did so. Therefore, we rely on the estimated numbers from the respondents.

Health Professionals Survey

HPS data were collected using face-to-face interviews with a sample of key informants selected from approximately 50% of the districts in each state. Informants were purposively selected based on their knowledge of and exposure to abortion and women's health issues. Eighty-five percent were health care providers, including allopathic doctors and nurses, providers from other systems of medicine and pharmacists; 15% were other knowledgeable professionals, such as health administrators, academicians, activists, policymakers, lawyers and journalists. Informants were drawn from both the public and private sectors and from both rural and urban areas. The HPS collected information on informants' perceptions of the conditions under which induced abortion services and postabortion care are obtained in their district or state, including the types of providers offering services, the types of abortion methods used, types and severity of complications, access to treatment, and variations in the conditions of abortion provision according to women's socioeconomic status and rural or urban location. In Assam, 52 key informants were interviewed.

Footnotes

*Throughout this report, the text and figures show proportions as whole rounded numbers, while the tables show them rounded to one decimal place. Thus, there are occasional slight discrepancies between text, figures and tables (for example, the original value 46.47 would appear as 46 in the text but 46.5 in the tables).

†Public facilities are grouped into hospitals (including rural, district/civil, sub-divisional, municipal, tertiary, railway, tea estate, Employees' State Insurance Corporation and refinery hospitals, and public medical colleges), CHCs (including first referral units and non–first referral units) and PHCs (including those that are and are not open 24-7, and block PHCs). Private facilities are grouped into hospitals (including multispecialty hospitals, specialized hospitals and private medical colleges), nursing and maternity homes, and clinics.

‡We first converted the data to annual caseloads, multiplying caseloads that were reported for the past and average month by 12, and combining these with responses reported for the past and average year. We then took the average of the number of induced abortions reported in the past and average year as the best estimate of the total annual number of pregnancies terminated in each facility. By applying sample weights, we obtained total estimates at the state level, by type of facility and ownership.

Provision of Abortion-Related Services

Women's access to safe, legal abortion-related services depends to a large extent on whether nearby facilities provide such care and what specific types of services are provided. These topics are discussed below, and additional details are available in the fact sheet, "Provision of abortion and postabortion services in Assam, 2015."[41]

In 2015, an estimated 588 facilities in Assam were providing any abortion-related services (induced abortion, postabortion care† or both types of services); 359 facilities (61%) were public and 229 (39%) were private (Table 2). Although 66% of these facilities reported offering both induced abortion and postabortion care, 4% restricted their abortion-related services to the former and 30% to the latter. The majority of public hospitals (96%) and CHCs (82%) offered both abortion and postabortion care, whereas more than half of PHCs (58%) offered only postabortion care. Overall, 96% of facilities providing any abortion-related services offered postabortion care and 70% offered induced abortion.

Forty-five percent of facilities offering abortion-related services in Assam were located in rural areas, although 85% of the state's female population resides in these areas.[30] Fewer than half (45%) of hospitals—the facilities best equipped to handle severe complications or later-term abortions—were located in rural areas. In rural areas, there were no private facilities offering induced abortion or postabortion services (Appendix Table 1). However, in urban areas, 68% of facilities providing induced abortions, and 71% of those offering any abortion-related care, were private.

Among the estimated 1,236 public facilities in Assam in 2015, only 29% reported offering induced abortion, postabortion care or both services, whereas 71% offered neither service (Figure 1, page 11). The proportion providing these services varied widely by facility type: Some 97% of public hospitals, 61% of CHCs and 20% of PHCs provided any abortion-related care. We cannot give this breakdown for private facilities because our list included mainly those providing abortion-related care.

†Unless otherwise specified, the term postabortion care refers to care related to complications of both abortion and miscarriage.

TABLE 2

Number and percentage distributions of facilities offering induced abortion, postabortion care or both, by services offered and location, Assam, 2015

	No. offering any abortion-related services		% distribution by type of service offered				% distribution by location		
Facilities	Unweighted	Weighted	Abortion only	Postabortion care only	Both	Total	Urban	Rural	Total
All	105	588	3.8	30.3	65.9	100.0	54.9	45.1	100.0
Public	73	359	6.2	37.0	56.8	100.0	26.1	73.9	100.0
Hospitals	37	68	2.1	1.9	96.0	100.0	82.4	17.6	100.0
CHCs	17	92	0.0	17.6	82.4	100.0	29.4	70.6	100.0
PHCs	19	199	10.5	57.9	31.6	100.0	5.3	94.7	100.0
Private	32	229	0.0	19.8	80.2	100.0	100.0	0.0	100.0
Hospitals	13	74	0.0	30.6	69.4	100.0	100.0	0.0	100.0
Nursing and maternity homes	18	135	0.0	16.8	83.2	100.0	100.0	0.0	100.0
Clinics	1	20	0.0	0.0	100.0	100.0	100.0	0.0	100.0

NOTES: Postabortion care refers to care for complications resulting from either induced abortion or miscarriage. CHC=community health centre. PHC=primary health centre. Proportions presented in the text, figures and tables may differ slightly because of rounding. SOURCE: Health Facilities Survey.

Among all public and private facilities that offered induced abortion services in 2015, 81% offered both MMA and surgical methods, 3% offered only MMA, and 16% offered only surgical methods (Appendix Table 2). A higher proportion of private facilities (88%) than public facilities (76%) offered both types of methods.

Facilities not offering induced abortion

Among facilities whose abortion-related services were restricted to postabortion care, the reasons reported for not offering induced abortion varied according to whether facilities were public or private. Public facilities offering only postabortion care commonly cited lack of trained staff (67%) and lack of equipment or supplies (32%) as reasons for not offering abortion (not shown). In contrast, private facilities offering only postabortion care most commonly reported lack of registration to provide abortion (50%) or religious or social reasons (50%).

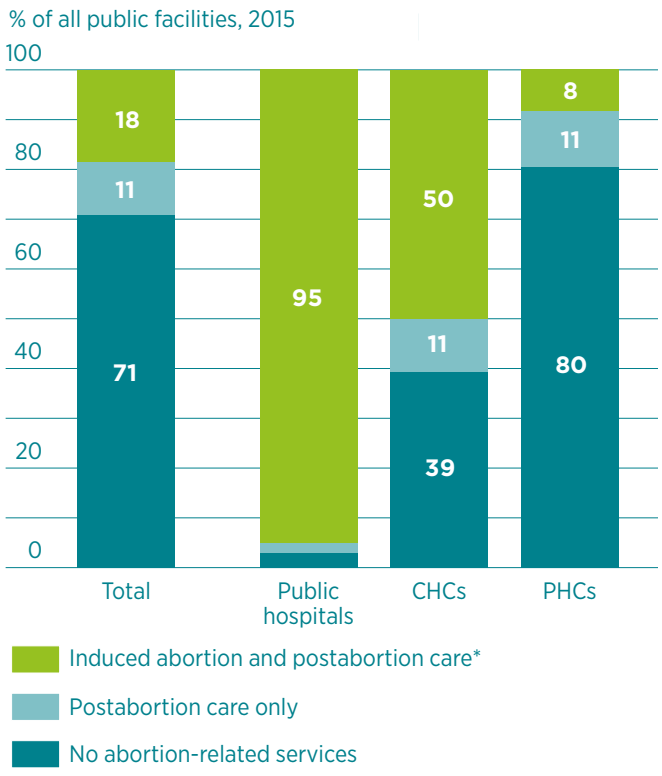
Availability of postabortion care

Because medical complications can occur at any time of day or night, an important indicator of access to post-abortion care is whether a facility is open 24 hours a day, seven days a week. In Assam, among facilities providing postabortion care in 2015, 82% (including all the hospitals and more than 88% of CHCs and private nursing and maternity homes) offered care 24-7 (Appendix Table 3). Seventy-eight percent of the public facilities providing postabortion care offered it around the clock, compared with 87% of such private facilities. Availability of 24-7 post-abortion care was greater among facilities offering these services in urban areas (91%) than in rural areas (70%).

FIGURE 1

PUBLIC PROVISION

Abortion-related services are offered at almost all public hospitals but at fewer lower-level facilities.



*Includes 1–3% of facilities that offer induced abortion but not post-abortion care. NOTES: CHC=community health centre. PHC=primary health centre. Because of rounding, proportions may not add to 100 and may differ slightly from those in the text and tables. SOURCE: Health Facilities Survey.

Induced Abortion Services Provided in Facilities

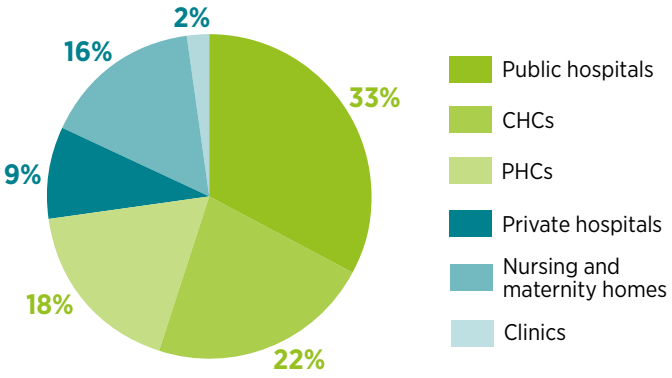
By gathering data from a sample of health facilities providing abortion services, we were able to estimate the total number of facility-based abortions provided in Assam in 2015. Knowing what methods facilities use is an important part of understanding the abortion landscape, as nearly all surgical abortions—as well as a portion of those using MMA—are provided at facilities.

An estimated 122,300 induced abortions were provided in health facilities in Assam in 2015 (Figure 2 and Appendix Table 4). This estimate was derived by summing the weighted number of abortions provided by each facility type that year. (Abortions performed outside of health facilities are discussed later in this report). Seventy-three percent of all facility-based abortions occurred in the public sector: Nearly half (45%) of these were provided in hospitals, 30% in CHCs and 24% in PHCs. Only one-fourth (27%) of facility-based induced abortions in 2015 took place in the private sector. Of these, 61% were provided in nursing and maternity homes, 33% in hospitals and 6% in clinics.

FIGURE 2

SETTINGS OF ABORTION PROVISION

Women who obtain a facility-based abortion in Assam most commonly go to public facilities.



122,300 facility-based abortions, 2015

NOTES: CHC=community health centre. PHC=primary health centre. Proportions presented in the text, figures and tables may differ slightly because of rounding. SOURCE: Health Facilities Survey.

On average, each public hospital provided about 610 induced abortions in 2015; CHCs provided 360 and PHCs provided 260. Private hospitals had a caseload of 210 abortions, while private nursing and maternity homes and clinics had lower average caseloads of 180 and 100, respectively.

About one-third (35%) of induced abortions provided in private-sector facilities in Assam—9% of all facility-based abortions in the state—were performed in private facilities that HFS respondents reported as not being registered to offer that service. Of these, 82% took place in unregistered nursing and maternity homes and 18% in unregistered private clinics.

Timing of abortion and facilities' gestational limits

Nearly all (94%) of the facility-based induced abortions taking place in Assam in 2015 were performed in the first trimester (i.e., the first 12 weeks of gestation): 65% in the first seven weeks of gestation and 29% in weeks 8–12 (Appendix Table 5). Only 6% of abortions provided in facilities occurred beyond 12 weeks. At all types of public and private facilities, 88–100% of induced abortions occurred in the first trimester. This proportion was lowest at public hospitals.

Although abortion is legally permitted up to 20 weeks' gestation in facilities approved for second-trimester abortion, many set earlier gestational limits. Among facilities providing abortion in Assam, 54%—including the large majority of PHCs (75%) and 100% of private clinics—reported offering terminations in the first trimester only (Figure 3, page 13).‡ However, three-fourths of private hospitals and more than half of public hospitals (63%) and private nursing or maternity homes (54%) do offer abortion services beyond the first trimester.

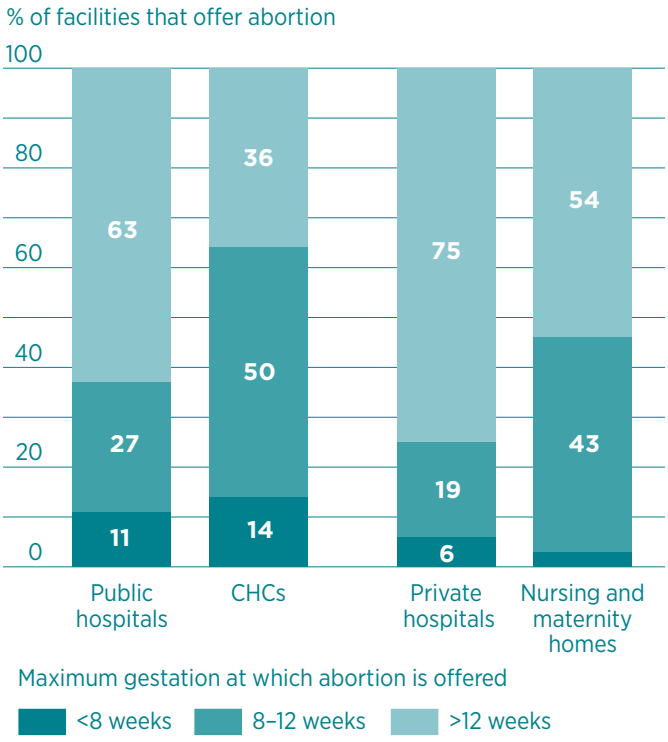
Among facilities offering abortion only in the first trimester, the most commonly cited reasons for not offering second-trimester abortions were lack of blood storage (48%) and lack of trained staff or providers (40%; not shown). The proportions reporting both of these reasons were higher among public facilities than among private facilities, while the proportions reporting lack of space

‡Data based on responses to a question about facility capacity, not on actual cases.

FIGURE 3

GESTATIONAL LIMITS

Large proportions of facilities that provide abortion restrict provision to the first trimester of pregnancy.



NOTES: The first trimester is weeks 0–12. CHC=community health centre. Because of rounding, proportions may not add to 100 and may differ slightly from those in the text and tables. SOURCE: Health Facilities Survey.

were higher at private sites (24%) than public ones (15%). Fear of possible sex-selective abortions was reported among 8% of private facilities and only 1% of public facilities. The proportions citing lack of trained providers or lack of supplies and equipment as reasons for not providing terminations in the second trimester were typically larger among lower-level public facilities (CHCs and PHCs) than among public hospitals.

Abortion methods used in facilities

Among facilities that provide abortion services in Assam, the majority (81%) offered both MMA and surgical abortion. However, facilities offering abortion services often reported using methods that are not in line with best practices. World Health Organization (WHO) guidelines recommend the use of MMA or vacuum aspiration for most abortions; dilatation and evacuation (D&E) is recommended in situations in which the other methods are contraindicated (typically in the second trimester), and dilatation and curettage (D&C) is no longer recommended as an abortion method at any gestation.[42]

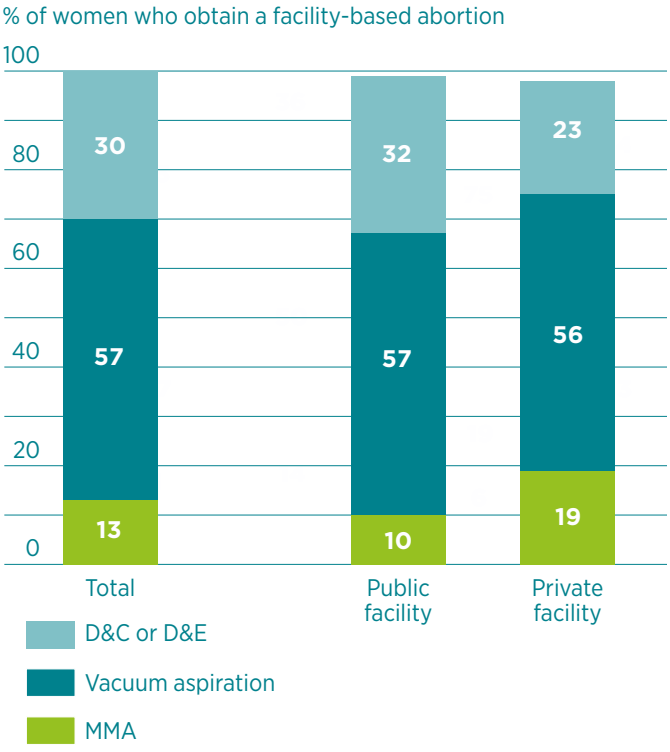
Among abortions occurring in health facilities, just 13% were performed using MMA (Figure 4). The proportion using MMA was highest at private hospitals and clinics: In both types of facilities, this method was used for more than one-third of abortions (Appendix Table 6). Fifty-seven percent of facility-based abortions were performed with either manual or electric vacuum aspiration (MVA or EVA) which are the least invasive surgical methods, and 30% involved more invasive surgical procedures: D&C or D&E. We have grouped these two latter methods together because providers may use D&C as a generic term for surgical abortion; therefore, individual proportions may not be reliable.[§43]

The share of abortions performed using D&C or D&E

FIGURE 4

ABORTION METHODS

More than two-thirds of women in Assam who obtain a facility-based abortion have a surgical procedure.



NOTES: MMA=medical methods of abortion. D&C=dilatation and curettage. D&E=dilatation and evacuation. Because of rounding, proportions may not add to 100 and may differ slightly from those in the text and tables. SOURCE: Health Facilities Survey.

§Providers reported 18% of women obtaining facility-based abortions underwent D&E and 12% underwent D&C.

was slightly higher at public facilities (32%) than at private ones (23%). These methods together were more commonly used than vacuum aspiration at PHCs and private hospitals. Given that only 6% of facility-based abortions occurred after the first trimester, we can infer that, on the whole, providers in Assam are relying on more invasive and riskier abortion techniques than they should be at early gestations.

Barriers to seeking safe abortion services

When asked what barriers women face when seeking safe abortions, HFS respondents reported cost of services (51%), fear of stigma (45%), distance or transportation difficulties (44%), lack of information about safe services (29%) and objections from a family member (23%; not shown). Half (51%) felt that women faced at least three barriers to obtaining a safe abortion. Respondents from public and private facilities generally had similar perceptions of the barriers women faced, though higher proportions of respondents from private facilities reported barriers related to cost and stigma.

Women seeking abortions at health facilities may encounter a different set of barriers, and these are typically related to the facility or staff being unable or unwilling to provide the abortion under some circumstances. In Assam, 69% of facilities that provide abortion reported turning away at least one woman seeking a termination in the year preceding the survey; among this group of facilities, 65% reported that they turned away women for medical reasons and 56% cited capacity-related reasons (provider not available, MMA not available or facility gestational limits exceeded; not shown). In addition, staff at health facilities providing abortion services either may not be well informed about the conditions under which termination is legally permitted or may have social or personal reasons for choosing not to offer it to some women. For example, among the facilities that reported having turned away at least one woman seeking an abortion, 54% did so because women were unmarried or had no children or because the provider considered them to be too young.

Provision of Postabortion Care

When induced by prescription drug or performed surgically by a trained provider under hygienic conditions, abortion is very safe. However, because abortions occur in a variety of settings in Assam—including at registered and unregistered health facilities, as well as outside of the health care system—the safety of the method used and the incidence of complications vary. In the HPS, key informants said that, particularly in rural areas, some women resort to methods such as herbal solutions, homeopathic medication, abdominal massage or pressure, and insertion of solid or sharp objects into the vagina, cervix or uterus.

It is important to assess the extent to which unsafe abortions are occurring, as well as the incidence of complications, but doing so is difficult because unsafe abortion is often clandestine and is not captured in official reporting. Representative estimates from the HFS of the amount of complication-related care provided by health facilities offer a good indicator of the incidence of unsafe abortion, although it is an underestimate because it excludes women who need facility-based care and do not receive it. This underestimate is partly offset because some women or providers may misdiagnose bleeding, which is part of the normal process after a medication abortion, as an abortion complication. These women are included in providers' reports as having had a complication, although their abortion likely would have been completed safely without the additional medical care.

According to 2015 HFS data, 66,600 women in Assam were treated for complications that resulted from either induced abortion or miscarriage (Table 3); this care took place in the estimated 566 public and private facilities providing postabortion care in the state. Of these women, we estimated that 50,700 were treated for complications resulting from abortion, and 15,900 were treated for complications related to miscarriage (discussed in greater detail on page 17). Among all women treated for complications, 54% obtained treatment in public facilities, while the remaining 46% went to private facilities.

On average, each facility providing postabortion care treated 120 women for complications of induced abortion and miscarriage in 2015. The average annual postabortion care caseload was somewhat higher at private facilities (130 women treated per year) than at public facilities (110). Among public facilities, hospitals treated the highest number of cases (17,900), and among private facilities, nursing and maternity homes did so (17,200). These two types of facilities each accounted for about one-fourth of all care for complications in facilities in Assam in 2015.

Types of complications treated

The types of medical problems women presented with help us understand how severe their complications were and what interventions and medical resources they may have needed. Knowing women's diagnosis on admission

TABLE 3

Annual number of women treated for complications of induced abortion or miscarriage and selected measures of provision of care, Assam, 2015

Facilities	Annual no. of cases	Facilities offering care for complications: No.	Average annual no. of cases per facility	% distribution of cases by facility ownership	% distribution of cases by facility type
All	66,600	566	120	100.0	100.0
Public	35,700	337	110	100.0	53.6
Hospitals	17,900	67	270	50.0	26.8
CHCs	9,700	92	110	27.0	14.5
PHCs	8,200	178	50	23.0	12.3
Private	30,900	229	130	100.0	46.4
Hospitals	6,400	74	90	20.7	9.6
Nursing and maternity homes	17,200	135	130	55.5	25.8
Clinics	7,300	20	360	23.8	11.0

NOTES: CHC=community health centre. PHC=primary health centre. Numbers may not add to totals because of rounding. Proportions presented in the text, figures and tables may differ slightly because of rounding. SOURCE: Health Facilities Survey.

also helps to assess the extent to which they actually needed treatment, given the high overall level of MMA use (discussed later in this report) and the potential for normal bleeding to be misdiagnosed as a complication.

Survey respondents were asked to estimate the proportion of women with each of the major types of complications, among all women treated for complications related to either induced abortion or miscarriage in their facility. Because women may experience more than one type of complication, multiple responses were permitted. In Assam, incomplete abortion resulting from MMA was the most commonly reported complication, and HFS respondents estimated that it affected about two-thirds of women obtaining care for complications (Figure 5 and Appendix Table 7). Incomplete abortion from other methods was the second most commonly reported complication type (17%). The third most common diagnosis among these patients was prolonged or abnormal bleeding (15%), which can result from either abortion or miscarriage.

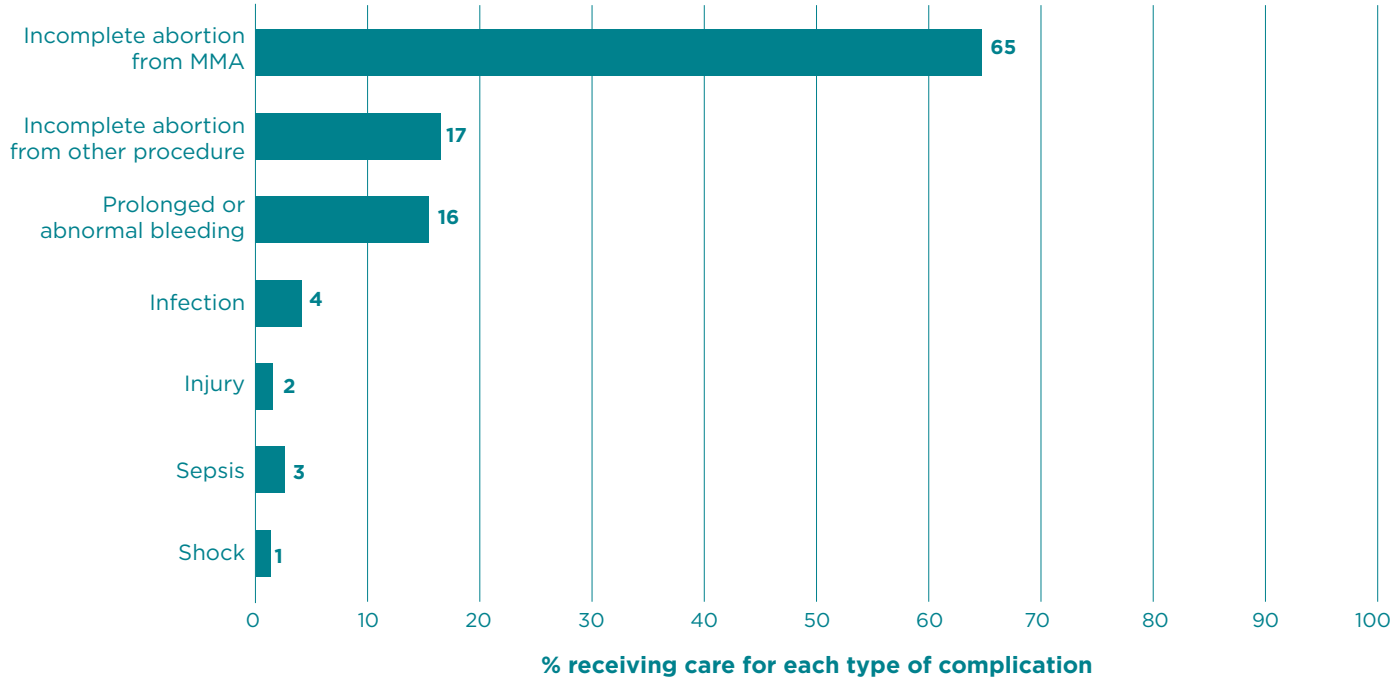
Treatment for incomplete abortion resulting from MMA and prolonged bleeding are likely to be highly overlapping categories, and estimates of the proportion of women treated for these types of complications likely included many cases in which abortions would have been safely completed without need for further intervention, had women been given the correct information and counseling. An unknown proportion of women received needed treatment for incomplete abortion because of incorrect use of this method, but it is likely that this proportion was small, given that MMA using a combination of misoprostol and mifepristone, when administered correctly and within a nine-week gestational limit, is 95–98% effective.[44]

Relatively small proportions of women were estimated to have been treated for severe complications, such as infection of the uterus and surrounding areas, sepsis, shock or physical injuries (e.g., perforation or lacerations)—all of which were assumed to have resulted from induced abortion. However, even these small proportions represent thousands of women in Assam experiencing these severe complications each year. For example, among women treated for complications of induced abortion, an estimated 4% of patients—2,700 women—received care for infection of the uterus or surrounding areas (the most commonly treated severe complication), in 2015. Two percent of patients treated for abortion complications received treatment for physical injury, 3% for sepsis and 1% for shock. It is not possible to estimate precisely how many women were treated for severe complications overall, as

FIGURE 5

COMPLICATIONS OF ABORTION AND MISCARRIAGE

Among women seeking care for complications at facilities, about two-thirds present with incomplete abortion after using MMA.



NOTES: Some women experienced more than one type of complication. MMA=medical methods of abortion. Proportions presented in the text, figures and tables may differ slightly because of rounding. SOURCE: Health Facilities Survey.

there is some overlap among the categories. The majority of these severe cases likely originated among the group of women having nonfacility abortions using methods other than MMA.

Number of women treated for postabortion complications

By applying an indirect approach to estimating the number of women who were treated in health facilities for later-term miscarriages, we were able to estimate the number treated specifically for complications of induced abortion.** Approximately 50,700 women were treated for induced abortion complications in health facilities in Assam in 2015 (Table 4). This means that 9% of all women terminating pregnancies were treated in health facilities for complications, equivalent to an annual rate of 5.8 women treated per 1,000 women aged 15–49. The induced abortion complication treatment rate in Assam is lower than the rates found in other South Asian countries with available data: Pakistan (13.9 per 1,000 in 2012),[7] Nepal (8.2 in 2014)[8] and Bangladesh (6.1 in 2014).[6] Among these four countries, abortion is most restricted in Pakistan, which may contribute to that country's higher complication treatment rate. However, it is important to note that the treatment rate does not necessarily directly correspond to abortion safety. Depending on the context, low treatment rates could represent either low complication rates or insufficient access to postabortion care.

As mentioned previously, estimates may include some cases in which normal bleeding associated with MMA was misidentified as a complication. If all cases of postabortion care to treat MMA-related incomplete abortion are assumed to be cases in which the abortion would have gone to completion without further intervention, the treatment rate for induced abortion complications that truly needed facility-based care would be 0.9 per 1,000 women annually, a total of 7,600 women. This rate is purely hypothetical but helps to express the lower limits of the complication rate. The true rate of induced abortion complications requiring treatment is likely to be higher than this hypothetical rate but lower than the overall estimate of 5.8 cases per 1,000 women aged 15–49.

**From clinical studies, we know the proportion of miscarriages that are not fetal losses but that occur in the second trimester (i.e., at 13–22 weeks' gestation). Women experiencing these types of miscarriages need postabortion care, but not all of them are able to get it, and those women are not are not captured in the HFS. To account for this, we estimated the probability of getting care for a second-trimester miscarriage as equal to the probability of delivering in a facility. The resulting estimated number of women seeking care for complications related to late-term miscarriages was then subtracted from the total number of women seeking care for complications to obtain the number of women treated for abortion complications.

TABLE 4

Selected measures of treatment for complications of induced abortion and miscarriage, Assam, 2015

	Weighted no. of women treated for complications of:		Among women who had an induced abortion	
Complications treated	Abortion and miscarriage	Abortion only	% treated for complications	Treatment rate (cases per 1,000 women aged 15–49)
All (maximum estimate)	66,600	50,700	9	5.8
Related to MMA	43,100	43,100	7	4.9
Not related to MMA (minimum estimate)	23,500	7,600	1	0.9

NOTES: MMA=medical methods of abortion. MMA-related complications are based on Health Facilities Survey respondents' estimates of the proportion of all complications cases treated in their facility that were due to incomplete abortion from MMA. Estimates of complications not related to MMA are the total number of patients treated for complications of abortion or miscarriage minus those treated for MMA-related complications. The number of induced abortion complications not related to MMA (7,600) serves as a best estimate of the number of patients who had induced abortion complications that truly needed treatment (in many cases, women treated for symptoms of incomplete MMA may not have needed treatment in a facility). Numbers may not add to totals because of rounding. Proportions presented in the text, figures and tables may differ slightly because of rounding. SOURCES: Health Facilities Survey and indirect calculations.

Incidence of Induced Abortion and Unintended Pregnancy

Abortion incidence is an important indicator of women's need for safe termination services, and it sheds light on women's contraceptive behavior and their experience of unintended pregnancy. The UPAI study provides a comprehensive estimate that reflects the full range of methods and providers that women use in Assam. In addition to estimating public- and private-sector abortion provision in health facilities, it estimates abortions in the informal sector, capturing those undertaken via MMA provided by chemists and informal vendors, those performed by untrained providers and those induced by women on their own (see Incidence Methodology, page 21). Our estimation methodology relies on health sector information whenever possible to avoid the high level of stigma-related underreporting that generally occurs in household surveys that directly ask women about their abortions.[45,46] More detailed information on our estimation methodology is available online (see "supplementary materials" at https://www.thelancet.com/journals/langlo/article/PIIS2214-109X(17)30453-9).

Abortion incidence

We estimated the number of induced abortions in Assam in 2015 to be 580,100 and the abortion rate to be 66 abortions per 1,000 women of reproductive age (Table 5). The rate for Assam is higher than the rates for all five of the other states included in the UPAI study: Tamil Nadu (33),[47] Gujarat (48),[48] Bihar (49),[49] Madhya Pradesh (57)[50] and Uttar Pradesh (61).[51]

In Assam, roughly 122,300 induced abortions in 2015—21% of abortions in the state—took place in facilities. As stated previously, the vast majority of these (87%) were performed using surgical methods and 13% using MMA. Most facility-based abortions took place in public facilities (89,800 or 73%) and the remaining 27% in private facilities.

MMA obtained outside of the formal health system accounted for an estimated 427,800 induced abortions—the majority (74%) of all induced abortions in Assam in 2015—and they occurred at a rate of 49 per 1,000 women of reproductive age. These MMA users purchased the drugs directly from chemists or informal vendors, either without a prescription or with a prescription from a private physician who did not work at a facility covered by the HFS.

Another 29,900 abortions in 2015 were not performed in facilities and did not use MMA. These procedures, which represent 5% of all induced abortions in Assam, likely encompass the most unsafe methods performed by quacks and other untrained providers and

TABLE 5

Number, percentage distribution and rate of abortions by method and source, Assam, 2015

Method and source	Weighted no. of abortions	% distribution	No. per 1,000 women aged 15–49
Facility-based abortion	**122,300**	**21.1**	**14.0**
Surgical	106,900	18.4	12.2
Public	80,400	13.9	na
Private	26,400	4.6	na
NGO	0	na	na
MMA	15,400	2.7	1.8
Public	9,400	1.6	na
Private	6,100	1.0	na
NGO	0	na	na
Nonfacility abortion using MMA	**427,800**	**73.8**	**48.8**
Nonfacility abortion using other methods	**29,900**	**5.2**	**3.4**
Total	**580,100**	**100.0**	**66.2**
Low estimate	518,300	na	59.1
High estimate	646,000	na	73.7

NOTES: The number of women aged 15–49 in 2015 is based on projections of the rate of growth between the 2001 and the 2011 population censuses. na=not applicable. Surgical abortion=dilatation and curettage, dilatation and evacuation, and vacuum aspiration. MMA=medical methods of abortion. Numbers may not add to totals because of rounding. Proportions presented in the text, figures and tables may differ slightly because of rounding. SOURCE: See Incidence Methodology.

by pregnant women themselves. They may also include some surgical abortions performed by trained professionals outside of the facilities covered by the HFS.

Characteristics of women having an abortion

Because the HFS was not designed to capture information on the characteristics of women having abortions, we rely on 2015–2016 survey data from the NFHS-4 to ascertain the profile of this group. Among the 6,295 women aged 15–49 in Assam who reported that their last pregnancy was in the three years before the survey, only 383 reported that that pregnancy ended in abortion (data not shown). This translates into an implausibly low 6.1% of all pregnancies ending in abortion and a rate of fewer than one abortion per 1,000 women each year. As noted previously, these data are problematic because women tend to underreport their abortions when interviewed. In addition, pregnancy data in the NFHS-4 is almost exclusively for married women, in part due to stigma surrounding sexual activity among unmarried women. Given the apparent high level of underreporting, women who report having an abortion may not accurately represent all women having abortions. Nevertheless, we do not have reason to believe that some women are more likely than others to underreport abortion, so household survey data remain a useful source of information on the demographic and socioeconomic characteristics of the small group of women who reported having had an abortion in this survey.

Among women in Assam who reported having had an abortion in the past three years, 84% lived in rural areas (Appendix Table 9). Twenty-nine percent were categorized as belonging to the socioeconomically disadvantaged castes collectively designated Other Backward Class. These proportions reflect the distribution of Assam's general population of reproductive-age women by residence and caste.

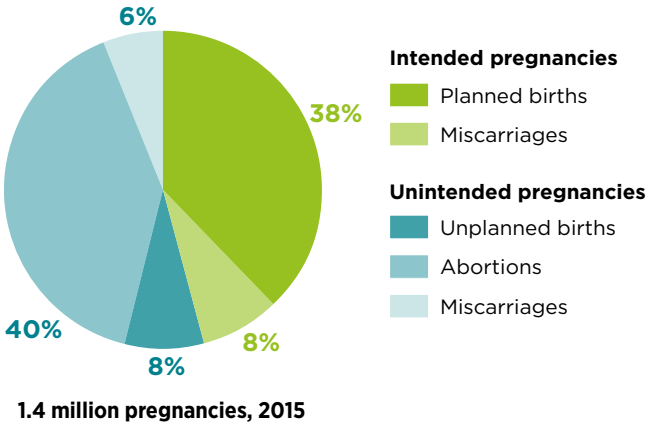
Nearly all women who reported having had an abortion were already mothers at the time of the survey. Roughly half (45%) had one child, and 49% had two or more children. About two-thirds (63%) had been married for more than six years. By age-group, the greatest proportion of women having an abortion were 25–29 years old (31%), followed by those aged 30–34 (27%).

Among women who reported having had an abortion, 13% had no schooling, 11% had 1–5 years of schooling, 60% had 6–11 years, and 16% had 12 or more years. These women were more educated than the general population of women of reproductive age, 23% of whom had no schooling.

FIGURE 6

PREGNANCY INTENTION STATUS

Fewer than half of pregnancies in Assam are intended.



NOTE: Proportions presented in the text, figures and tables may differ slightly because of rounding. SOURCE: See Incidence Methodology.

Incidence of unintended pregnancy

Unintended pregnancy is the precursor to most induced abortions and a key indicator of the need for modern contraception and for the services and information that support effective use. Unintended pregnancies may indicate that women are not using a method, are using the method

TABLE 6

Number, rate and percentage distribution of pregnancies and their outcomes by intention status, Assam, 2015

Pregnancy intention status and outcomes	No.	No. per 1,000 women aged 15–49*	% distribution
Intended	**648,100**	**74.0**	**45.3**
Planned births	540,100	61.6	37.8
Miscarriages	108,000	12.3	7.6
Unintended	**782,100**	**89.3**	**54.7**
Unplanned births	120,000	13.7	8.4
Abortions	580,100	66.2	40.6
Miscarriages	82,000	9.4	5.7
Total	**1,430,200**	**163.2**	**100.0**

*Denominator is 8,762,698 women aged 15–49. NOTE: Proportions presented in the text, figures and tables may differ slightly because of rounding. SOURCE: See Incidence Methodology.

inconsistently or incorrectly, or are using a relatively ineffective traditional method. Understanding the level of unintended pregnancy in Assam helps us ascertain the extent to which women need contraceptive and abortion services.

We determined there were approximately 1.4 million pregnancies in Assam in 2015. Of these, 45%—or 648,100—were intended, and the remaining 55%—or 782,100—were unintended (Figure 6, page 19). Three-fourths (74%) of unintended pregnancies ended in an abortion.

Assam's total pregnancy rate was 163 pregnancies per 1,000 women of reproductive age (Table 6, page 19). The intended pregnancy rate was 74, and the unintended pregnancy rate was 89. As previously noted, the abortion rate for the state was 66 per 1,000 women of reproductive age. There were 62 planned births and 14 unplanned births per 1,000 women aged 15–49.

The high level of unintended pregnancy highlights the need for improved voluntary and comprehensive contraceptive services for all women of reproductive age—as part of the continuum of care, including in the context of postabortion and postpartum services—to prevent and address unintended pregnancy and unplanned childbearing.

Incidence Methodology

Incidence of Abortion

The methodology used by the UPAI study draws heavily on the abortion incidence complications methodology (AICM), an established method for indirectly estimating abortion incidence in countries where safe and unsafe abortion are prevalent but where official statistics are unavailable or highly incomplete.[52] However, because abortion is broadly legal in India and because drug sales data are available there, our study was able to collect more direct data on abortion provision than has been available in most countries in which the methodology has been used, and we were able to minimize the proportion of abortions that were estimated by indirect methods. We modified the AICM for India by measuring each of three main components of total abortions separately: (1) facility-based abortions, (2) MMA using medications purchased outside of health facilities without the supervision of a facility provider and (3) abortions occurring outside of health facilities that used methods other than MMA. Data available to measure the first two components are good-quality direct estimates, which, when available, are preferred to indirect estimates. The calculations of the abortion incidence estimates are detailed in Appendix Table 8. In addition to showing the medium estimates presented in the text, the table shows the low and the high estimates, which represent the results based on various sensitivity analyses conducted.

Facility-based abortions. As explained in the Survey Methodology, induced abortions (both surgical and medical) obtained at public and private facilities were captured by the HFS.

Nonfacility MMA. We obtained the number of combipacks (combined mifepristone and misoprostol) and mifepristone-only pills sold in the state in 2015 in the for-profit sector from IMS Health (whose data come from private facility provision and for-profit sales). We used only data from 2015, but we examined earlier years and found there was little difference in the number of combipacks sold in the preceding three years. We did not include misoprostol-only sales because that drug has uses other than inducing abortion, and it was not possible to estimate the quantity used specifically to induce abortions. The broad availability of the combipack implies that use of misoprostol alone to induce abortion is likely to be relatively low. However, if misoprostol is still used by a small proportion of women, abortion incidence will be slightly underestimated.

We applied the following adjustments to the for-profit MMA drug sales data to arrive at the corresponding number of abortions performed using the method.

- We adjusted the mifepristone-only data to account for the fact that women may use more than one mifepristone pill to induce an abortion.[53] We assumed that 80% of women who purchase mifepristone alone (i.e., not in a combipack) take one 200-mg pill, 10% take two and 10% take three.[43]
- We averaged the for-profit sales data among groups of states because some states are focal points for distribution to other states, and sales of MMA in each state do not necessarily reflect use in that state. For-profit sales of MMA drugs in Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura and West Bengal were combined, and an average number of MMA packets per 1,000 women of reproductive age was calculated and applied to Assam's population to estimate the for-profit sales of MMA drugs likely to be used in the state.
- We also reduced the sales in Assam to account for MMA packets suspected to have been sold via the black market to Bangladesh.[54] Some 30,000 packets of MMA annually are thought to be exported illegally to Bangladesh from neighboring Indian states; 10% of these (3,000 packets) are estimated to have come from Assam.[55–57]
- IMS Health reports that their drug sales are 95% complete,[58] so we inflated these numbers by 5% to account for the missing data.

We then summed MMA distributed by nonprofits and the adjusted total sold in for-profit venues, and made the following adjustments:

- On the basis of available studies, we reduced the total by 10% to account for the proportion of MMA drugs likely lost to wastage.[59,60]
- To avoid double-counting women who attempted an abortion using MMA before obtaining a facility-based abortion, we reduced the sales by an additional 5% of facility-based abortions.[61]

Finally, we subtracted MMA provided in private facilities and those given as prescriptions from public facilities to obtain the number of abortions using MMA provided in nonfacility settings in 2015. This was necessary because MMA administered in public facilities (i.e., provided directly by the doctor and not via prescription) is supplied through government tenders and is not included in for-profit or nonprofit drug sales data.

Nonfacility abortions using methods other than MMA. There are no direct sources of information on the number of abortions occurring outside of facilities that use methods other than MMA, so we estimated these indirectly. Two community-based studies conducted in 2009 provide estimates of the proportion of all women having abortions who do so outside of a facility using a method other than MMA: 8% in Maharashtra and 6% in Rajasthan.[45,46] The proportion of women seeking these types of abortions is expected to have declined with the steady rise in MMA use since those studies took place. We therefore adjusted the average

of the estimates from these two studies downward to account for rising MMA use and estimated the proportion in 2015 to be 5% (a drop of approximately 30% over these six years).

Sensitivity analysis and estimate ranges. Because we made several assumptions that introduced a degree of uncertainty to our estimates of both MMA and other abortions occurring outside of facilities, we performed sensitivity analyses around these key assumptions. On the basis of available literature and expert opinions, we established low and high parameters for each assumption described above. In addition, using the sample design of the HFS, we calculated standard errors around the number of facility-based abortions to create confidence intervals around the HFS estimates. Using the results of the sensitivity analysis, combined with the low and high confidence intervals, we estimated a range around the total number of abortions.

Incidence of unintended pregnancy and total pregnancy

To calculate unintended pregnancies by state, we summed the numbers of induced abortions, miscarriages attributable to unintended pregnancies, and unplanned births. The number of unintended pregnancies that end in a miscarriage is based on the biological pattern of pregnancy loss and is estimated to be 20% of unplanned live births plus 10% of induced abortions.[62,63] The number of unplanned births is determined by multiplying the number of births[64] by the proportion of the total fertility rate (TFR) that is unwanted (both the TFR and wanted TFR rates come from the 2015–2016 NFHS-4).[30] In Assam, the TFR is 2.2 and the wanted TFR is 1.8, which means that an estimated 18% of births in the state are unplanned. The number of intended pregnancies was calculated by summing planned births and miscarriages from intended pregnancies (estimated to equal 20% of planned live births). The sum of all live births, abortions and miscarriages (from intended and unintended pregnancies) yields the total number of pregnancies.

Calculating abortion rates

The abortion rate is defined as the number of abortions per 1,000 women aged 15–49 in a given year. This study provides the estimated number of abortions for 2015, and the number of women of reproductive age was estimated using projections based on the rate of population growth between the 2001 and 2011 India Censuses, assuming the age distribution remained stable between 2011 and 2015.[29]

Conclusions and Recommendations

Some of the UPAI study findings are encouraging and provide evidence of gains in regard to the provision of abortion services in Assam. For example, most facilities that provide abortion care offer both MMA and surgical abortion, indicating these facilities can tailor care to each case. In addition, the large majority of facilities that offer abortion-related care also report providing contraceptive services,[41] thus contributing vitally to women's continuum of sexual and reproductive health care. However, our findings also highlight several areas of women's sexual and reproductive health urgently needing attention in Assam. The incidence of abortion and related indicators—including high levels of abortion complications—reflect the need for thorough review of the state's ability to meet the needs for safe abortion services and postabortion care. In addition, substantial level of unintended pregnancy indicates an urgent need to improve contraceptive services.

Moreover, high rates of unintended pregnancy and abortions not only are indicative of women's inadequate access to and ineffective use of modern contraceptives, they also stem from gender inequity—in families and in society more broadly—that restricts women's access to information and services, and that may compromise their ability to negotiate contraceptive use when they do not desire a pregnancy. Despite recent trends toward increased age at first marriage, early marriage remains common in India; women and girls continue to face gender discrimination; and access to sexual and reproductive health services, including safe abortion, is limited. Addressing the root cause of son preference and other forms of gender discrimination is critically important and should be pursued hand in hand with efforts to improve access to safe abortion services.

Below, we make recommendations aimed at increasing and improving the provision of abortion-related and contraceptive services. We also address the need to improve collection of data on abortion going forward.

Expanding services

Our data reveal several areas in which services must be expanded to meet women's needs.

Coverage and location of services. Only 45% of all health facilities offering any abortion-related services are located in rural areas, where 85% of Assam's population of women of reproductive age resides. Thus, access to both induced abortion care and services to treat postabortion complications is extremely limited for rural women, particularly those who are poor.

PHCs are the first—and often the only—point of contact poor and rural women have with the health system. Yet only 8% offer induced abortion and just 18% offer postabortion care. This highlights the need to expand service provision by trained providers at PHCs to include both early abortion using MMA and care for abortion complications. Another way to improve access to abortion services in underserved areas is to implement a job rotation system whereby trained providers can work in hard-to-reach areas on a temporary basis to ensure that coverage is both available and consistent.

Addressing major barriers to abortion provision. Although nearly all public hospitals (95%) provide abortion, only half of CHCs do. One of the key reasons reported in the HFS for why public health facilities do not provide abortion is the lack of equipment and supplies. Adequate funding should be allocated through state Programme Implementation Plans to provide these items on a regular basis and ensure they reach the facilities, and the budgeting system should be simplified to facilitate its accurate use.

A major barrier among private facilities is the lack of registration to provide abortion and the difficulties involved in obtaining such approval.[65,66] Steps are needed to ensure that the District Level Committees responsible for site approval are in place and functional. In addition, accelerated registration should be implemented for private facilities seeking approval to provide abortion using MMA only. Other strategies to streamline the process include setting up online application options, as has been done in Uttar Pradesh.[67] Lack of trained providers, another major barrier to provision for both public and private facilities, is discussed below.

Provision of free or affordable services. Nearly half of women obtaining abortions do so outside of the public sector, where they presumably pay out of pocket for services. However, the costs associated with private-sector care are likely a barrier or a burden for many women. It is important to conduct research that collects women's own views on the accessibility and acceptability of current abortion-related services and their reasons for seeking care

outside of the public sector. Simultaneously, the health system should work to ensure that free or low-cost abortion services in this sector are confidential, youth friendly and nonjudgmental.

Provision beyond the first trimester. Fewer than half of facilities that provide abortions offer them in the second trimester, and although these abortions are less frequently requested than earlier terminations, their availability is vital. The most vulnerable women—including those who are poor, young, unmarried or widowed, and those who are victims of sexual violence—may be most likely to experience delays in seeking abortion services due to transportation issues, social taboos and lack of agency.[68,69] These women, along with those who develop severe health complications or who discover fetal anomalies, are the most likely to be negatively affected by the lack of access to procedures at later gestations. Special efforts should be made to ensure that an adequate distribution of public- and private-sector facilities offer second-trimester abortion services.

Also threatening women's access to safe abortion generally, and second-trimester abortion specifically, is the country's reaction to the adverse sex ratio. The government's response, as part of implementation of the PCPNDT Act, has been to restrict abortion services and strictly regulate and monitor providers. Providers have reported that unannounced inspections and harassment by authorities have prompted them to stop providing abortions, especially in the second trimester.[70] Increased communication between those implementing the law and community-level stakeholders is needed to clarify that not all second-trimester abortions are for the purpose of sex selection, to communicate that women are legally entitled under certain circumstances to second-trimester abortion, and to dispel misconceptions about the legal status of abortion. The MoHFW issued guidance in 2015 for ensuring access to abortion services and addressing gender-biased sex selection, and these guidelines should be fully implemented at the district and provider levels.[71]

Training providers and staff

HFS data indicate that abortion provision in Assam suffers from a lack of qualified providers, and training may be inadequate for those currently providing services. Lack of trained staff is the primary reason public facilities gave for not offering induced abortion services. Expanding the number of qualified, certified abortion providers will require improving access to training and certification for allopathic doctors (those holding MBBS degrees) working in both the public and private sectors. Approving the proposed amendment to the MTP Act that would allow nurses and ANMs, as well as practitioners trained in Indian systems of medicine with recognized qualifications, to provide MMA would further help address this shortfall in providers.

Second, lack of training is likely a major reason for the overuse of invasive surgical abortion techniques (particularly during the first trimester) observed in the HFS and other sources.[72] Providers should be routinely updated on WHO and national guidelines for abortion provision. In addition, they should be trained (or retrained, as necessary) in recommended techniques, especially MMA and vacuum aspiration.

Third, staff at health facilities sometimes turn away women seeking abortions for reasons that do not accurately reflect legal restrictions or the facility's capacity to provide abortion. Providers who deny services because they perceive a patient as being too young or because she is not married or does not have family members' consent may be acting on bias rather than following guidelines. Regular efforts should be made to ensure that health care providers and other facility staff do not impose unnecessary limitations on abortion provision.

Lastly, social stigma related to abortion creates a barrier to the use of safe services, even where they are offered. This barrier is likely to negatively affect certain vulnerable groups more than other women; unmarried women, for instance, likely face strong stigma because of taboos against premarital sexual activity.[72] Health care providers can help to protect their clients from the potential social costs of seeking an abortion by offering private and confidential services. This calls for training of public-sector staff involved in providing abortions services on so-called soft skills, such as respecting women's privacy and maintaining nonjudgmental attitudes. Accredited social health activists (ASHAs) and ANMs should be priority recipients of such training because they are often the first point of contact for women seeking abortion. In addition, facilities can work to increase the confidentiality of health care visits, including by conducting consultations behind privacy screens, and adopting protocols for speaking to women about sensitive or taboo issues to reassure them that their identity is being protected.

Educating the public about induced abortion

Providers report that some women seeking abortion may have gaps in their understanding about the circumstances under which it is permitted and where to obtain safe and legal services. Reaching communities with social awareness programs will require working on multiple fronts and engaging a variety of community-based groups. Strategies could include the following:

- Educating providers in order to counteract misinformation about the legal status of abortion.[72]

- Orienting ASHAs and ANMs on abortion-related information. Although these health workers do not perform abortions, they are in frequent touch with the community and have the opportunity to inform women who want to terminate a pregnancy on the law and where to obtain safe services.
- Displaying information at public health facilities that educates visitors about the legality of abortion, safe methods of abortion, and the risks involved in using unsafe methods, going to unqualified providers or using MMA incorrectly.
- Including information about abortion during all types of sexual and reproductive health visits. This would help to reach the large proportions of women who have an institutional delivery and make prenatal care visits, as well as those obtaining contraceptive counseling.
- Actively disseminating the Government of India's mass media campaign Making Abortion Safer, which was aired on television channels nationally.[73] Efforts could be made to tailor its messages to specific target audiences.
- Offering culturally sensitive sexuality education—both in and out of school settings—to ensure that young people are provided with age-appropriate and accurate information related to all aspects of their sexual and reproductive lives, including information about contraception and abortion.

Improving MMA services

MMA is safe and highly effective when the correct regimen is followed, and increased provision of this method, both in health facilities and in nonfacility settings, has improved access to abortion care. It has also likely reduced severe abortion-related morbidity: Available data on MMA drug distribution indicate that its use has been replacing the use of traditional and less safe methods of abortion.[74] Continuing to expand MMA provision would likely lead to further reductions in abortion morbidity.

At the same time, the implication in the HFS data that normal bleeding associated with MMA is sometimes misdiagnosed as a complication suggests that women who obtain MMA outside of facilities may be inadequately informed about the method or may have been given incorrect advice to seek treatment in facilities as soon as bleeding begins. In addition, the safety and effectiveness of MMA depend to some extent on the quality of the information given and the user's adherence to the protocol.

Some strategies to facilitate proper use of MMA include ensuring combipacks have clear and simple instructions in multiple languages, as well as pictorial instructions for women with low literacy. The inserts should describe the regimen and expected symptoms, and should indicate where to go in case of complications. In addition, it may be beneficial to set up a telephone helpline to provide information to users, to ensure that women who use MMA in a nonfacility setting can do so safely. The helpline number could be printed prominently on MMA packaging and displayed at pharmacies.

Because the great majority of abortions in Assam—three out of every four—use MMA obtained outside of a health facility, there is a particular need to find out more about the women who obtain MMA this way, their reasons for not using facility-based services, the type of provider they go to and their knowledge of the regimen (e.g., awareness of protocols and normal bleeding). In addition, we need to know more about the extent to which women who seek treatment for complications after taking MMA outside of a facility experience complications that require treatment and the costs they incur.

Improving access to and quality of postabortion care services

Many of the strategies that will improve abortion services will have the added benefit of improving postabortion care. For instance, increased training in abortion techniques will also bolster the provider skills needed for postabortion care; training about abortion law, countering stigma and providing confidential services will improve providers' abilities to give high-quality care to patients experiencing abortion complications; and strategies to increase public-sector provision of abortion and postabortion care will go hand in hand.

Other steps can be taken to specifically address the need for improved postabortion care. HFS data show that most complications reported in 2015 were relatively minor, such as bleeding and other non–life-threatening complications resulting from use of MMA without professional guidance. With proper training, relatively low-level medical staff can address these types of complications, and specialized training of a wide provider base in treating these complications would greatly increase access to treatment. In addition, a small but notable proportion of women experience severe complications, so providers should also be trained in best practices for treating infection, sepsis, shock and physical injuries caused by unsafe abortion.

Ensuring availability and correct use of contraceptives

Levels of unmet need for contraception in Assam are similar to those in India as a whole, and unintended pregnancy and unplanned childbearing persist in the state. Using this evidence, the state should continue to promote access to contraception but also take additional steps to ensure women and couples are able to meet their fertility goals,

including by offering a range of contraceptive methods and improving counseling on how to use them correctly and consistently. The Government of India already recognizes this need and has included it in its postabortion family planning guidelines.[75] The rollout of these guidelines should be prioritized to strengthen women's access to postabortion contraceptive care.

Although nearly all facilities reported in the HFS that they offer contraceptives to abortion clients and postabortion care patients,[41] uptake of modern methods is still very low. This may signal an unmet need for reversible modern contraception for women who want to delay childbearing. It is important to ensure comprehensive, high-quality contraceptive counseling that addresses women's concerns about use and helps them find the method that best suits them. Failure to provide contraceptive counseling to this segment of the population is a missed opportunity to help women prevent subsequent unintended pregnancies and abortions.

Improving data collection

To obtain a more complete picture of abortion and postabortion care—and thus improve the government's ability to address gaps in and barriers to abortion-related services—the MoHFW needs to expand its data collection. Doing so will require making sure the Health Management Information System more comprehensively captures abortion-related services provided in public and registered private facilities. Improving the process for registering private health facilities that provide only MMA and meet requirements for providing this service would create a formal channel for such facilities to report the services they provide, improving the overall coverage of official abortion statistics. Both public and private providers would need to be sensitized about the importance of keeping records on abortion data for reporting to the MoHFW and how to do so correctly and confidentially.

Mechanisms should also be put in place to periodically monitor the quality of abortion services at all levels of public and private facilities. Improving the documentation of abortion service statistics would allow the government to understand on a consistent basis the quality and scope of the services being provided and to gauge the need for improvement or expansion.

The way forward

Improving and expanding abortion and postabortion care is an important step toward bettering overall measures of sexual and reproductive health in Assam. Greater sexual and reproductive health, in turn, improves the status of women and the well-being of individuals, families and communities. Action must be taken on multiple fronts. Our study's findings provide support for an array of policy and program actions, and for current and ongoing efforts to increase access to and quality of abortion-related services. In addition, our estimates of unintended pregnancy highlight the need for comprehensive contraceptive services—as part of the continuum of care for all women of reproductive age and, specifically, as part of postabortion and postpartum services—to prevent and address unintended pregnancy and unplanned childbearing. Whatever steps are taken must include and prioritize the needs of disadvantaged groups, including poor and rural women, ensuring that no groups are left behind.

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Appendix Tables

APPENDIX TABLE 1

Percentage distribution of public and private facilities offering abortion-related services, according to urban or rural location, Assam, 2015

	Offering induced abortion			Offering postabortion care			Offering any abortion-related services		
Facilities	**Total**	**Urban**	**Rural**	**Total**	**Urban**	**Rural**	**Total**	**Urban**	**Rural**
All	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Public	55.2	32.1	100.0	59.5	28.7	100.0	61.1	29.0	100.0
Private	44.8	67.9	0.0	40.5	71.3	0.0	38.9	71.0	0.0
No. (weighted)	410	271	139	566	321	244	588	323	265
Public	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Hospitals	29.6	63.1	8.6	19.8	59.4	4.9	19.0	60.0	4.5
CHCs	33.4	24.8	38.7	27.2	29.2	26.5	25.5	28.8	24.4
PHCs	37.1	12.1	52.7	52.9	11.4	68.6	55.5	11.2	71.1
No. (weighted)	226	87	139	337	92	244	359	94	265
Private	**100.0**	**100.0**	**0.0**	**100.0**	**100.0**	**0.0**	**100.0**	**100.0**	**0.0**
Hospitals	27.9	27.9	0.0	32.3	32.3	0.0	32.3	32.3	0.0
Nursing and maternity homes	61.0	61.0	0.0	58.8	58.8	0.0	58.8	58.8	0.0
Clinics	11.1	11.1	0.0	8.9	8.9	0.0	8.9	8.9	0.0
No. (weighted)	184	184	0	229	229	0	229	229	0

Notes: Postabortion care refers to care for complications resulting from either induced abortion or miscarriage. CHC=community health centre. PHC=primary health centre. Proportions presented in the text, figures and tables may differ slightly because of rounding. *Source:* Health Facilities Survey.

APPENDIX TABLE 2

Among facilities providing induced abortion, percentage distribution by method offered and facility type, Assam, 2015

Facilities	Weighted no. offering abortion	% distribution of facilities by method category			
		Only MMA	Only surgical abortion	Both MMA and surgical abortion	Total
All	**410**	**2.6**	**16.3**	**81.2**	**100.0**
Public	**226**	**4.6**	**19.4**	**75.9**	**100.0**
Hospitals	67	0.0	10.2	89.8	100.0
CHCs	75	0.0	21.4	78.6	100.0
PHCs	84	12.5	25.0	62.5	100.0
Private	**184**	**0.0**	**12.4**	**87.6**	**100.0**
Hospitals	51	0.0	0.0	100.0	100.0
Nursing and maternity homes	112	0.0	20.3	79.7	100.0
Clinics	20	0.0	0.0	100.0	100.0

Notes: MMA=medical methods of abortion. Surgical abortion=dilatation and curettage, dilatation and evacuation, and vacuum aspiration. CHC=community health centre. PHC=primary health centre. Proportions presented in the text, figures and tables may differ slightly because of rounding. *Source:* Health Facilities Survey.

APPENDIX TABLE 3

Number of facilities providing postabortion care and proportion offering these services 24 hours a day, seven days a week, by facility type and location, Assam, 2015

Facilities	Weighted no. of facilities offering PAC	% of facilities offering PAC that offer it 24-7
ALL	**566**	**81.7**
OWNERSHIP		
Public	**337**	**78.1**
Hospitals	67	100.0
CHCs	92	88.2
PHCs	178	64.7
Private	**229**	**87.0**
Hospitals	74	100.0
Nursing and maternity homes	135	93.1
Clinics	20	0.0
LOCATION		
Urban	**321**	**90.7**
Public	92	100.0
Private	229	87.0
Rural	**244**	**69.9**
Public	244	69.9
Private	0	0.0

Notes: PAC=postabortion care; refers to care for complications resulting from either induced abortion or miscarriage. CHC=community health centre. PHC=primary health centre. Proportions presented in the text, figures and tables may differ slightly because of rounding. *Source:* Health Facilities Survey.

APPENDIX TABLE 4

Weighted total number of facility-based abortions, average annual number of abortions provided by facilities and percentage distribution of abortions, by facility type, Assam, 2015

Facilities	Annual no. of facility-based abortions	No. of facilities offering abortion	Average annual no. of abortion cases per facility	% distribution of abortions by facility type	
				Within ownership categories	Overall
All	**122,300**	**410**	**300**	**100.0**	**100.0**
Public	**89,800**	**226**	**400**	**100.0**	**73.4**
Hospitals	40,500	67	610	45.1	33.1
CHCs	27,300	75	360	30.5	22.4
PHCs	21,900	84	260	24.4	17.9
Private	**32,500**	**184**	**180**	**100.0**	**26.6**
Hospitals	10,700	51	210	32.9	8.7
Nursing and maternity homes	19,700	112	180	60.7	16.1
Clinics	2,100	20	100	6.4	1.7
Private registered	**21,000**	**120**	**170**	**100.0**	**17.2**
Hospitals	10,700	48	220	50.7	8.7
Nursing and maternity homes	10,400	72	140	49.3	8.5
Clinics	0	0	0	0.0	0.0
Private unregistered	**11,500**	**63**	**180**	**100.0**	**9.4**
Hospitals	20	3	10	0.2	0.0
Nursing and maternity homes	9,400	40	240	81.7	7.7
Clinics	2,100	20	100	18.1	1.7

Notes: CHC=community health centre. PHC=primary health centre. Numbers may not add to totals because of rounding. Values lower than 50 have been rounded to the tens. Proportions presented in the text, figures and tables may differ slightly because of rounding. *Source:* Health Facilities Survey.

APPENDIX TABLE 5

Percentage distribution of facility-based abortions by gestational duration and by trimester, according to facility type, Assam, 2015

Facilities	Annual no. of facility-based abortions	% distribution by gestational duration					% distribution by trimester		
		<8 weeks	8–12 weeks	13–20 weeks	>20 weeks	Total	First	Second	Total
All	**122,300**	**65.1**	**28.6**	**6.3**	**0.0**	**100.0**	**93.7**	**6.3**	**100.0**
Public	**89,800**	**60.8**	**31.6**	**7.6**	**0.0**	**100.0**	**92.4**	**7.6**	**100.0**
Hospitals	40,500	53.6	34.9	11.6	0.0	100.0	88.4	11.6	100.0
CHCs	27,300	64.2	29.9	5.9	0.0	100.0	94.1	5.9	100.0
PHCs	21,900	70.0	27.7	2.4	0.0	100.0	97.6	2.4	100.0
Private	**32,500**	**77.1**	**20.3**	**2.6**	**0.0**	**100.0**	**97.4**	**2.6**	**100.0**
Hospitals	10,700	69.8	27.7	2.6	0.0	100.0	97.4	2.6	100.0
Nursing and maternity homes	19,700	87.1	10.1	2.8	0.0	100.0	97.2	2.8	100.0
Clinics	2,100	20.0	80.0	0.0	0.0	100.0	100.0	0.0	100.0
Private registered	**21,000**	**74.9**	**23.2**	**1.9**	**0.0**	**100.0**	**98.1**	**1.9**	**100.0**
Hospitals	10,700	69.8	27.7	2.6	0.0	100.0	97.4	2.6	100.0
Nursing and maternity homes	10,400	80.1	18.7	1.2	0.0	100.0	98.8	1.2	100.0
Clinics	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Private unregistered	**11,500**	**81.2**	**15.0**	**3.8**	**0.0**	**100.0**	**96.2**	**3.8**	**100.0**
Hospitals	20	66.7	33.3	0.0	0.0	100.0	100.0	0.0	100.0
Nursing and maternity homes	9,400	94.8	0.5	4.6	0.0	100.0	95.4	4.6	100.0
Clinics	2,100	20.0	80.0	0.0	0.0	100.0	100.0	0.0	100.0

Notes: CHC=community health centre. PHC=primary health centre. Numbers may not add to totals because of rounding. Values lower than 50 have been rounded to the tens. Proportions presented in the text, figures and tables may differ slightly because of rounding. *Source:* Health Facilities Survey.

APPENDIX TABLE 6

Percentage distribution of facility-based abortions by method, according to facility type, Assam, 2015

Facilities	Annual no. of facility-based abortions	% distributions of abortions by method					
			Surgical				
		MMA	All	MVA	EVA	D&C or D&E	Total
All	**122,300**	**12.6**	**87.4**	**19.2**	**37.4**	**29.9**	**100.0**
Public	**89,800**	**10.4**	**89.6**	**21.2**	**35.5**	**32.3**	**100.0**
Hospitals	40,500	15.6	84.4	18.9	39.4	25.0	100.0
CHCs	27,300	6.8	93.2	35.5	30.4	27.2	100.0
PHCs	21,900	5.5	94.5	7.5	34.7	52.4	100.0
Private	**32,500**	**18.6**	**81.4**	**13.8**	**42.5**	**23.3**	**100.0**
Hospitals	10,700	34.4	65.6	1.4	22.2	39.0	100.0
Nursing and maternity homes	19,700	7.9	92.1	21.9	54.8	14.1	100.0
Clinics	2,100	40.0	60.0	0.0	30.0	30.0	100.0
Private registered	**21,000**	**19.5**	**80.5**	**0.7**	**49.2**	**27.9**	**100.0**
Hospitals	10,700	34.4	65.6	1.4	22.0	39.1	100.0
Nursing and maternity homes	10,400	4.1	95.9	0.0	77.1	16.4	100.0
Clinics	0	0.0	0.0	0.0	0.0	0.0	0.0
Private unregistered	**11,500**	**17.2**	**82.8**	**37.8**	**30.2**	**14.9**	**100.0**
Hospitals	20	0.0	100.0	0.0	100.0	0.0	100.0
Nursing and maternity homes	9,400	12.1	87.9	46.2	30.1	11.6	100.0
Clinics	2,100	40.0	60.0	0.0	30.0	30.0	100.0

Notes: MMA=medical methods of abortion. MVA=manual vacuum aspiration. EVA=electric vacuum aspiration. D&C=dilatation and curettage. D&E=dilatation and evacuation. CHC=community health centre. PHC=primary health centre. Numbers may not add to totals because of rounding. Values lower than 50 have been rounded to the tens. Proportions presented in the text, figures and tables may differ slightly because of rounding. *Source:* Health Facilities Survey.

APPENDIX TABLE 7

Weighted total number of treated cases of complications related to induced abortion or miscarriage, and proportion of cases by complication diagnosis, Assam, 2015

		% of cases, by type of complication						
Facilities	Annual no. of complication cases	Incomplete abortion from MMA	Incomplete abortion from any other method	Prolonged or abnormal bleeding	Infection of the uterus/ surrounding areas	Injury/ perforation/ laceration	Sepsis	Shock
All	66,600	64.7	16.5	15.5	4.1	1.6	2.6	1.3
Public	35,700	56.8	17.8	21.4	5.4	1.9	3.6	1.9
Private	30,900	73.8	15.0	8.7	2.6	1.2	1.5	0.5

Notes: More than one type of complication may be reported per case. Proportions presented in the text, figures and tables may differ slightly because of rounding. *Source:* Health Facilities Survey.

APPENDIX TABLE 8

Profile of married women aged 15–49* and of those who had an abortion in the three years preceding the survey, Assam, 2015–2016

	All women 15–49			Women 15–49 who had an abortion		
Characteristic	% distribution	Weighted no.	Unweighted no.	% distribution	Weighted no.	Unweighted no.
Residence						
Urban	15.0	4,264	3,811	16.1	67	61
Rural	85.0	24,183	24,636	83.9	349	378
Caste/tribe						
Scheduled caste	11.1	3,153	3,071	12.6	52	51
Scheduled tribe	13.0	3,705	5,153	22.1	92	123
Other Backward Class	27.9	7,926	7,682	28.6	119	127
Other/none	48.0	13,663	12,541	36.2	150	135
Age-group						
<20	16.5	4,693	4,671	3.5	15	16
20–24	17.4	4,960	4,963	24.2	100	108
25–29	17.0	4,839	4,871	30.7	128	136
30–34	13.9	3,960	3,964	27.3	113	114
≥35	35.1	9,995	9,978	14.4	60	65
Births						
0	30.2	8,583	8,525	6.1	25	29
1	18.9	5,374	5,346	44.7	186	186
2	21.2	6,030	6,054	28.2	117	126
≥3	29.7	8,460	8,522	21.1	88	98
Marital duration (in years)						
0–2	12.2	2,516	2,568	10.0	41	47
3–5	13.6	2,802	2,835	27.3	113	119
6–15	36.9	7,582	7,649	50.8	210	220
≥16	37.3	7,662	7,600	11.9	49	51
Education (in years)						
0	23.0	6,536	6,598	13.2	55	59
1–5	13.7	3,909	3,841	11.0	46	48
6–11	48.2	13,722	13,840	59.9	249	261
≥12	15.1	4,281	4,168	15.9	66	71
Total	**100.0**	**28,447**	**28,447**	**100.0**	**416**	**439**

*Three unmarried women were included in the survey. They were excluded from the "marital duration" measure. *Note:* Proportions presented in the text, figures and tables may differ slightly because of rounding. *Source:* reference 30.

APPENDIX TABLE 9

Calculations for the medium, low and high estimates from the sensitivity analysis of the total incidence and rate of induced abortion, Assam, 2015

Data inputs	Medium	Low	High
Total for-profit MMA sales (after applying grouped rates)*	**310,200**	**300,000**	**321,800**
No. of combipacks and mifepristone pills sold in for-profit setting†	337,600	330,000	347,100
Reduced to account for illegal export to Bangladesh‡	60,900	76,100	45,700
Grouped states MMA rate§	35.40	34.24	36.73
Total nonprofit MMA sales**	**184,300**	**184,300**	**184,300**
Total adjusted sum of for-profit and nonprofit MMA sales	**438,900**	**413,300**	**467,800**
Adjustment to account for wastage††	49,450	48,430	50,610
Adjustment to exclude women who used MMA unsuccessfully outside a facility and then had a facility-based abortion‡‡	6,100	8,000	2,900
TOTAL NONFACILITY MMA	**427,800**	**402,200**	**456,700**
Adjustment to exclude MMA in private and NGO facilities (from HFS and NGO service statistics) from adjusted total sales	6,100	6,100	6,100
Adjustment to exclude MMA given by prescription in public facilities from adjusted total sales	5,100	5,100	5,100
TOTAL FACILITY-BASED ABORTIONS (MMA AND SURGICAL)	**122,300**	**100,600**	**144,000**
TOTAL NONFACILITY ABORTIONS USING METHODS OTHER THAN MMA§§	**29,900**	**15,500**	**45,200**
TOTAL INDUCED ABORTIONS	**580,100**	**518,300**	**646,000**
Induced abortion rate (abortions per 1,000 women aged 15–49)	66.20	59.15	73.72

*For-profit drug sales come from IMS Health. The estimated total count for each state was increased by 5% to account for incomplete coverage (applied to low, medium and high estimates). †Medium estimate assumes (based on expert opinion and literature) that 80% of women using MMA to induce abortion use one mifepristone pill, 10% use two and 10% use three; low estimate assumes ratio of 70%/15%/15%; high estimate assumes ratio of 90%/5%/5%. ‡Medium estimate reduces for-profit MMA sales in Assam and West Bengal by 10% of illegal MMA in border divisions of Bangladesh, to account for black market export, based on expert opinion of in-country abortion researchers and 2014 Bangladesh HFS results. Low estimate assumes a reduction by 13%; high estimate assumes a reduction by 7%. §Assam was grouped with Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura and West Bengal, and we calculated a rate (for-profit MMA sales per 1,000 women aged 15–49) for the group of states. The group rate was then applied to population numbers of each state in the group to obtain the number of for-profit MMA sales in each state. **Data primarily from Marie Stopes International and DKT International. Count is comprehensive, with no range around the medium estimate. ††On the basis of available literature sources, we estimate drug wastage to reduce the number of MMA drugs by 10% (medium estimate), 13% (low) or 7% (high). ‡‡On the basis of a study of abortion seekers in two states, we estimate the proportion of all facility-based abortion clients who attempted an MMA outside a facility before obtaining an abortion in a facility to be 5% (medium estimate), 8% (low) or 2% (high). §§On the basis of community-based studies in two states and national data on the increase in MMA sales between 2009 and 2015, we estimate the proportion of abortions in this category to be 5% (medium estimate), 3% (low) or 7% (high). *Notes:* See Incidence Methodology and online methodology ("supplementary materials" at https://www.thelancet.com/journals/langlo/article/PIIS2214-109X(17)30453-9/fulltext) for sources and more details. Calculations based on a projected 2015 female population aged 15–49 of 8,762,698 from Census data. MMA=medical methods of abortion. Numbers may not add to totals because of rounding.

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