

Abortion-related complications in Cambodia

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Introduction Although termination of pregnancy (termination) has been legal in the Kingdom of Cambodia since 1997, a number of barriers to safe termination services persist and many women continue to induce their own terminations or seek unsafe services that result in complications requiring 'post-abortion' care.

Objective To describe the complications of miscarriage and failed terminations and document the magnitude of the resulting morbidity in the Cambodian public sector.

Design Cross-sectional descriptive study.

Setting Public sector hospitals and health centres.

Sample Stratified multistage sampling design included all hospitals ($n = 71$), 14% of eligible high-level health centres ($n = 58$) and 22% of eligible low-level health centres ($n = 57$).

Methods Data collectors used a standardised questionnaire to record information on diagnosis, reproductive history and treatment from 629 women seeking care for termination or miscarriage-related complications in study facilities over a 3-week period.

Main outcome measures Annual estimate of cases, clinical symptoms, severity distribution of morbidity, ratio of

complications to live births and incidence of abortion complications for Cambodian public health facilities.

Results In 2005, an estimated 31 579 women with complications of miscarriage or terminations were treated in Cambodian government facilities; 80% of these women sought care at a health centre. Forty percent of all women seeking care for complications either reported or showed strong clinical evidence of prior attempted terminations. Nearly 17% of these women were in the second trimester of pregnancy and 42% of them presented with high severity complications. The annual incidence of termination and miscarriage complications (abortion complications) was 867 per 100 000 women of reproductive age. The projected ratio of complications was 93 per 1000 live births.

Conclusions To reduce maternal morbidity in Cambodia, women must be encouraged to seek safe termination services or seek postabortion care without delay. Additionally, providers need further training, and facilities greater commitment, to provide safe terminations and care for complications of unsafe terminations and miscarriage.

Keywords Abortion, post-abortion care, Cambodia.

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Introduction

Cambodia has one of the most dire maternal health situations in Asia. Since the early 1990s, the nation has struggled to rebuild the public health infrastructure, train new health personnel and renew confidence in government health services destroyed by years of war and genocidal policies. At 472 maternal deaths for every 100 000 live births, the country's maternal mortality ratio is second only to that of Laos (in South-East Asia), ten times higher than neighbouring Thailand and three times higher than Vietnam. Although modern contraceptive use has risen in the past two decades, acceptance remains comparatively low for Asia: only 27% of married women use modern methods compared with 79 and 60%, respectively, of married women in Vietnam and Indonesia.^{1–3}

Significant disparity persists between urban and rural women in contraceptive use and fertility. Fertility is lowest in Phnom Penh (at 2.5 children per woman), while remaining much higher in rural provinces where women in late childbearing years have an average of 5.2 children.¹ Consequently, between 2000 and 2005, 28% of all births were either unwanted or mistimed.¹

Unsafe abortion, or unsafe termination of pregnancy, is known to be a major contributor to maternal mortality and poor maternal health. The World Health Organization (WHO) estimates that unsafe terminations account for 13% of global pregnancy-related deaths,⁴ nearly all of which can be prevented with appropriate training, technology and equitable access to safe termination services. The Cambodian Penal Code was revised in 1997 to allow termination on request

through the 12th week of pregnancy and limited access in the second trimester.⁵ However, provider reluctance to begin termination services in public facilities, unregulated and erratic fees for termination, slow adoption of technical guidance and provider training in high-quality termination services and women's fears of mistreatment by providers all continue to create barriers to safe terminations.^{6–9}

Fuelled by a burgeoning post-war private sector, an increasing demand for education among men and women, and a lack of available and acceptable options for fertility control, a largely unregulated economy for terminations has flourished in Cambodia in recent years.^{8,9} The 1997 legalisation of terminations paved the way for the expansion of quasi-legal termination services as the country began their demographic transition from high to medium fertility, a time of great demand for smaller families. Close proximity to Vietnam, which has one of the world's highest rates of termination, has provided a group of lay midwives and an informal training ground for healthcare providers interested in providing termination services.^{8,9} Today, Cambodian women seek care for unintended pregnancies from both skilled and unskilled healthcare providers, herbalists, drug sellers and all types of traditional medical practitioners. Many of these women will experience complications and seek further post-abortion care (PAC) in government and private health facilities. Descriptive studies in Latin America, Asia, Nigeria and Uganda estimate that this percentage is between 15 and 28% of all women who obtain an unsafe termination, depending largely on accessibility, hospital policies, quality of care and the efficacy and invasiveness of the unsafe termination procedures predominant in the country at a particular time.^{10–14}

In this study, we provide information from a context where termination should be safe and legal, but a lack of regulation and weak implementation of the law has prohibited equitable and widespread access to these services. The goal of this study was to describe treatment of complications, both from attempted termination and miscarriages (spontaneous abortions), and document the magnitude of attempted termination and miscarriage-related morbidity in the Cambodian public health service. An estimate of the annual incidence of all termination and miscarriage (abortion) morbidity and the projected ratio of all related complications in Cambodia's public sector facilities articulate the scope of these government services in relation to the population. Care seeking for complications in hospitals and health centres and documentation of the severity of women's symptoms have been explored for all women seeking termination-related care. Women's own reports of attempted termination are combined with clinical evidence of reported unsafe termination attempts to use as a measure of complications related to unsafe terminations. This study is the first national study of its kind in Cambodia and the first to be conducted in Asia. Data on the incidence of and morbidity due to complications from

attempted terminations and miscarriages will be used as a baseline for national PAC and safe termination programmes as these services are improved and expanded throughout the nation.

Data and methods

Facility sample

The study was conducted in 100% of Cambodia's public hospitals ($n = 71$) with obstetrics and delivery services and in a nationally representative sample of 115 health centres. The sampling strategy is detailed in Figure 1. According to health facility and administrative data collected by the National Institute of Statistics in 2003, the Kingdom of Cambodia maintained 1022 health facilities nationwide (86 hospitals, 887 health centres and 49 health posts).¹⁵ Using this sampling frame, a total of 256 sites did not meet the inclusion criteria of having a midwife or a physician on staff, offering maternity services and offering the Government's Minimum Package of Activities (MPA).¹⁶ The sites that were ineligible for the study included all 49 health posts, 15 hospitals that did not provide obstetric services, and 192 health centres that had no building, did not employ a full-time midwife or physician, did not offer the MPA or did not offer maternity services. The inclusion criteria were met by 695 health centres and 71 hospitals.

A stratified multistage sampling design was used for selection of health centres. First, health centres were categorised into two groups based on the Ministry of Health regulations governing their capacity and expectations to provide termination and PAC services: (1) high-level health centres with a full-time physician or secondary midwife ($n = 416$) and (2) low-level health centres with only a primary midwife ($n = 279$), not allowed by the national guidelines to provide uterine evacuations and expected only to stabilise and refer women to another facility. (A primary midwife is sanctioned to perform a limited scope of maternal health care, while a secondary midwife has a more comprehensive set of skills and is allowed to provide life-saving obstetric care, PAC and early terminations.) High-level health centres have 0–90 beds and are expected to provide some PAC services, low-level health facilities are smaller and more rural, 0–40 beds, and are expected only to stabilise women with complications from miscarriage and attempted terminations and refer them to a referral hospital. Health centres were chosen from the strata using probability proportionate to size (PPS) sampling based on the number of beds in the facility; for example, larger health centres with more beds had a higher probability of being selected into the sample. A total of 68 high-level and 64 low-level health centres were randomly selected as data collection sites using SAS version 8.0.

After selection for participation, ten high-level and seven low-level health centres were dropped from the study because either facilities were too difficult to reach ($n = 7$), providers

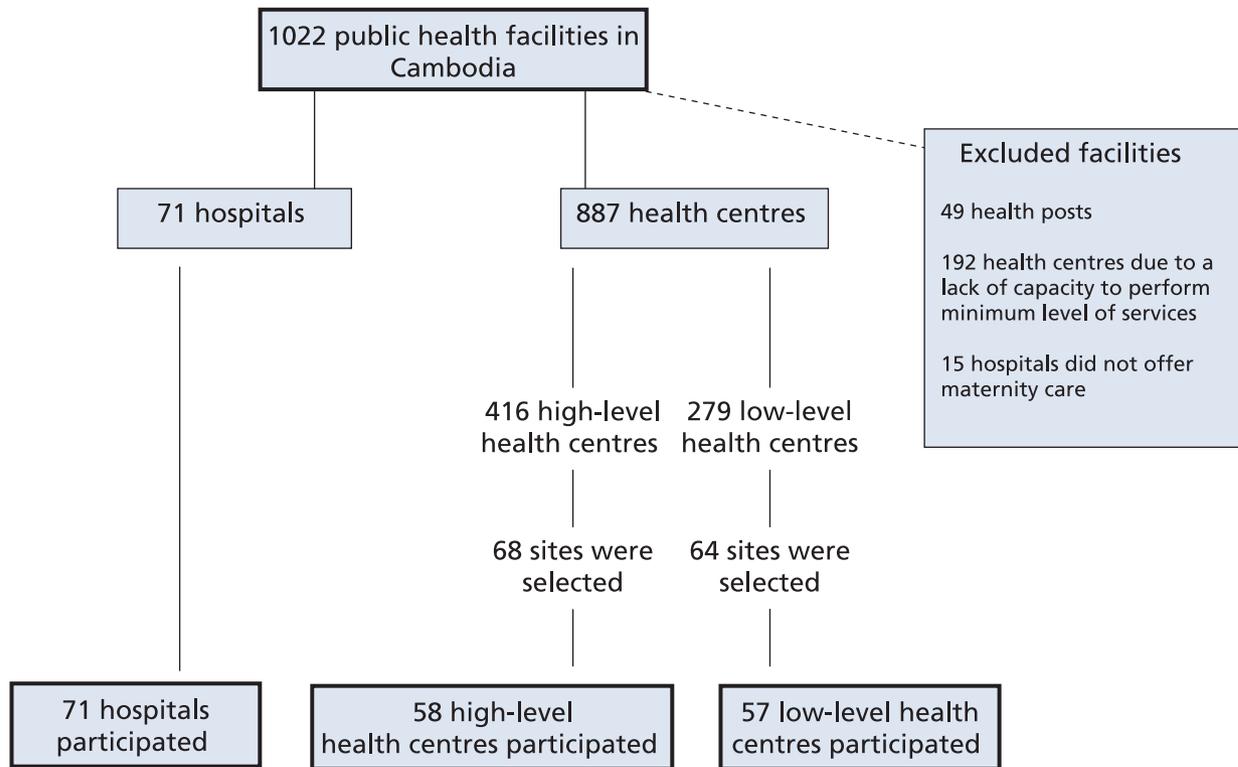


Figure 1. Sampling strategy of national public sector hospitals and health centres.

did not attend data collection training ($n = 8$) or the provider could not or did not return to work after training ($n = 2$). Excluded health centres were not replaced; rather they were treated as nonresponses and appropriately adjusted for in the final weighted analyses. Ultimately, all eligible hospitals ($n = 71$), 14% of all eligible high-level health centres ($n = 58$) and 20% of all eligible low-level health centres ($n = 57$) were included in the study.

Data collection

In June–July of 2005, study coordinators from the National Reproductive Health Programme and the National Institute of Public Health (NIPH) requested that maternal health officers in charge of termination or PAC services from each study facility attend one of four 2-day training sessions. After training, each healthcare provider returned to his or her health facility and recorded information over a period of 21 consecutive days in a standardised data capture form on all requests for termination and all cases of complications requiring further care (WHO International Classification of Disease clinical diagnoses of incomplete, missed, inevitable, complete, spontaneous and septic abortion) of less than 22 weeks of gestation.¹ The form was prepared in English, translated into Khmer and pre-tested. Cases of ectopic pregnancy or threatened abortion were excluded from the study. Data capture forms contained questions associated with standard patient

demographics and reproductive history, symptoms that drew the woman to the facility, clinical management and costs of care. The flow of the data capture form approximated the continuum of care to facilitate efficient completion during or immediately following the woman's care.

Providers were not asked to distinguish between a miscarriage and an attempted termination but were asked to note any physical evidence of attempted termination on each woman's examination. The clinicians were also instructed to ask women if they had 'done anything to induce this abortion' as part of the routine case history taken on admission.

Data were collected over 21 consecutive days during a 5-week period in July–August 2005. Six data collectors supervised the data collecting providers. Each site was visited at least once during the data collection period; supervisors also maintained telephone contact wherever possible. Providers were personally remunerated for participation and facilities received a thermometer and blood pressure cuff. After weighting, case information recorded in these facilities represent the national public sector cases of 'abortion complications' during the study period and, after multiplying by the number of 21-day periods in a calendar year, represent the annual cases managed in Cambodia's public sector.

The study protocol was reviewed and approved by the National Ethics Committee for Health Research for the Kingdom of Cambodia. Client names were recorded on the first

page of the questionnaire until the supervisor verified the case and checked for completeness; identifying information was then removed from the questionnaire and destroyed.

Data analysis

This study applied a methodology similar to other studies using the symptoms of complications from miscarriage or attempted terminations to assess abortion morbidity, case fatality and mortality on a national scale.^{17–23} The methodology was first proposed by a Task Force of the WHO for determination of spontaneous and unsafe abortions.²⁴ The clinical criteria were later tested and adapted by researchers in South Africa who proposed using only women's symptoms, as observed by their providers, to categorise low, moderate and high severity complications (Table 1).¹⁸ The methodology has been used to classify cases using a retrospective medical record review^{10,11,25} and for prospective use by researchers in South Africa,^{17–22} Kenya²³ and now in Cambodia. In South Africa, the study was conducted twice in a 4-year period to document changes in abortion-related morbidity due to legalisation of terminations in the country.^{19,22}

In this study, a combination of observed symptoms and women's self-reports of unsafe terminations have been used to identify a subset of women who had attempted a termination outside of a recognised facility. This group of women either told the healthcare provider that they had 'already done something to terminate their pregnancies' or showed strong clinical evidence of such limited to vaginal evidence of misoprostol, evidence of a foreign body or mechanical injury to the vaginal or cervical area. All women with 'evidence of foreign body in the vaginal or cervical area' were validated after data collection with the provider.

Table 1. Clinical typology for classification of severity of complications after termination or miscarriage*

Low (requires all criteria)	Temperature <37.3°C No clinical signs of infection No system or organ failure No suspicious findings on evacuation
Moderate (requires one or more criteria)	Temperature 37.3–37.9°C Localised peritonitis (tender uterus and discharge) Offensive products of conception
High (requires one or more criteria)	Death Shock Evidence of foreign body or mechanical injury Temperature > 37.9°C Organ or system failure Pulse > 119 beats/minute Generalised peritonitis

*Adopted from Rees et al.¹⁷

A woman who has an unsafe termination, a miscarriage or even a safely performed termination (in rare instances) may suffer from complications. Some women will not seek care, while others may seek care for mild symptoms or to ensure that the miscarriage or termination is complete. In determining severity, women in the low severity category had no adverse or suspicious symptoms other than bleeding. The classification of highly severe cases was conservatively applied and, in some cases, verified with the healthcare providers. All women with a high pulse rate had an additional high severity factor. Thus, all highly severe cases were the result of elevated temperatures, organ failure, shock, death and/or evidence of a foreign body or mechanical injury to the vaginal or cervical area.

Data were entered twice and checked for consistency and completeness at the NIPH in Phnom Penh, using EpiData version 6.0, then imported into SAS 8.0 and Stata 9.1 for further analysis at Ipas, NC, USA. Information on 674 cases was recorded during the study period. Data from 45 cases were excluded because gestational age was either missing ($n = 33$) or greater than 21 weeks ($n = 12$; Table 2). There was no association between case exclusion and type of facility. Forty-two women were missing one or more variables needed to classify severity of their cases. Most of the missing data was for a lack of any indication regarding the possibility of a foreign body inserted in the uterus, vagina or cervix or mechanical injury to the same areas. Severity was imputed by randomly assigning severity level to missing cases at the same proportion as observed in the non-missing cases grouped by low/elevated temperature and gestational age <13/13–21 weeks.

Methods of variance estimation for survey data were used to account for the complex sample design (stratified PPS sampling). Specifically, standard errors (SEs) were obtained using the Taylor-series approximation. Weighted data were used in bivariate analysis, which included chi-square test for categorical variables and analysis of variance for continuous variables. Statistical significance was defined *a priori* as <0.05. The 'national rate of abortion complications' in the public sector and the 'national abortion ratio' were estimated using the weighted study findings and Cambodia population estimates from the most recent national census (1998), specifically, a population estimate of 3 644 327 women aged 15–49 years who produced 340 470 live births during 2005.²⁶

Results

A total of 629 cases of complications from miscarriages and terminations were eligible for analysis (Table 3). After adjustment for sampling design, the largest health centres accounted for 61% (95% CI 53–70) of the cases seen in the public sector, while the remaining cases were encountered in similar proportions in the hospitals (17%, 95% CI 13–22) and low-level health centres (21%, 95% CI 16–29). More than one-third of

Table 2. Comparison of excluded cases and reasons by site, unweighted ($n = 674$)

	Hospitals (unweighted, $n = 343$)	High-level HC (unweighted, $n = 220$)	Low-level HC (unweighted, $n = 111$)
Excluded cases ($n = 45$)			
>21 weeks	10	2	0
Missing gestational age	23	3	7
Imputed cases ($n = 42$)			
Missing information necessary to classify severity	7	21	14

HC, health centres.

all women (35%, 95% CI 24–49) were referred to other health facilities for further treatment.

Women in the sample ranged from 16 to 53 years of age, with a mean age of 31.8 years (SE 0.35) and had 0–10 prior births (median 3, Table 3). More than one-third of the sample reported using contraception at the time of conception (38%, 95% CI 31–45), and a similar proportion stated they had attempted to terminate the pregnancy before presenting for treatment (37%, 95% CI 29–47). Of the women who reported an attempted termination outside of a recognised facility, 48% reported contraceptive use (95% CI 38–57). The mean clinical estimation of gestational age was 9.8 weeks based on bimanual examination. Most women (83%, 95% CI 75–89) presented for treatment during the first trimester of pregnancy, but 17% (95% CI 11–25%) presented in the second trimester (13 or more completed weeks). No statistically significant difference in age, contraceptive use, acknowledgement of attempted termination or length of gestation was found among the women seeking care at the three types of health facilities.

Among women treated at the three types of health facilities, the severity of complications from miscarriages and terminations differed somewhat ($P = 0.07$). A higher proportion of low severity cases were seen at hospitals, while the health centres encountered higher proportions of women with high severity complications. In the health centres overall, women presented with high severity complications more frequently than with low or moderate complications.

More than one-third of the 629 women with complications from miscarriages and terminations presented with a temperature $\geq 38^\circ\text{C}$ (36%, 95% CI 28–44) (Table 4). Although not achieving statistical significance, the percentage of cases with elevated temperatures was higher in the health centres than in the hospitals ($P = 0.09$). Only 2% of all women had an elevated pulse rate of greater than or equal to 120 beats per minute. Further clinical estimation of complications was categorised by signs of infection, signs of organ failure and/or suspicious findings upon evacuation of the uterus. There were no diagnoses of generalised peritonitis or tetanus among the women in the study (data not shown). Three-quarters of all women presented for care with no signs of infection. There were significantly fewer women with a tender uterus noted on

examination among women seen in the lowest level health centres ($P = 0.04$). Women presenting with signs of serious infection or organ failure were unusual, the most common being septic shock/sepsis and disseminated intravascular coagulopathy. These women were encountered primarily in the hospital setting. Women in septic shock were more likely to present at hospitals ($P < 0.01$). Most women with bowel injury and uterine perforation were also seen at hospitals. Only one maternal death occurred in a hospital during the study period; therefore, national estimates of abortion-related maternal mortality could not be reliably made.

Signs of mechanical injury to the genitalia were statistically more likely to be noted on examinations of women at hospitals and at low-level health centres ($P = 0.03$). Physical evidence of attempted termination, such as the presence of misoprostol, mechanical injury to the vaginal or intra-abdominal area or a foreign body noted on vaginal examination, was recorded for 8% of women presenting for treatment (Table 3). The distribution of these findings was similar among the health-care settings. 'Offensive' products of conception, products that were retained or showing other signs of infection, were noted in almost one-third of cases in all facilities (31%, 95% CI 24–40). There were no statistically significant differences in cases with offensive products by facility type.

The severity of a woman's complications was not significantly associated with whether she had attempted an induced abortion, based on clinical examination, and/or patient disclosure ($P = 0.36$, Table 3). After adjusting for sampling, 40% of all women either self-reported an attempted termination outside of a recognised facility (38%) or showed strong clinical evidence of a foreign body, mechanical injury or undissolved misoprostol inserted vaginally (6%) or both (3%). Relative to all severity groups, slightly more women in the low severity group (45%, 95% CI 33–58) showed clinical evidence of an unsafe termination or self-reported having attempted to induce the termination before ultimately seeking care for complications. A similar proportion, 40% (95% CI 30–52), of women among the severe cases either reported or showed clinical evidence of an attempted termination.

Based on the number of cases of complications from miscarriages and attempted terminations recorded during the 21-day

Table 3. Case characteristics, clinical symptoms and management outcome by type of facility for complications of miscarriage and terminations (unweighted, $n = 629$)

	Total ($n = 629$)	Hospital ($n = 310$)	HC high ($n = 215$)	HC low ($n = 104$)	<i>P</i> value*
Age, in years					
Mean (95% CI)	31.8 (31.1–32.5)	31.5 (30.5–32.6)	31.7 (30.8–32.6)	32.4 (30.6–34.2)	0.725
Parity					
Median (95% CI)	3 (0–10)	2 (0–10)	3 (0–10)	3 (0–9)	—
	% (95% CI)**	% (95% CI)**	% (95% CI)**	% (95% CI)**	
Reported use of modern contraception at time of conception	38 (31–45)	32 (26–39)	38 (29–48)	41 (28–56)	0.554
Reported termination attempt	37 (29–47)	42 (36–48)	38 (26–53)	31 (18–48)	0.557
Gestational age (weeks)					
<13	83 (75–89)	72 (65–78)	85 (70–93)	89 (79–95)	0.110
13–21	17 (11–25)	28 (22–35)	15 (7–30)	11 (5–21)	
Severity status					
Low	28 (22–35)	42 (33–52)	23 (15–32)	32 (21–45)	0.071
Moderate	30 (23–37)	28 (22–35)	31 (22–43)	26 (16–38)	
High	42 (35–50)	30 (23–37)	46 (35–57)	42 (31–54)	
Temperature (°C)					
<37.3	39 (31–49)	58 (50–66)	35 (23–50)	37 (26–50)	0.089
37.3–37.9	25 (19–32)	20 (15–26)	25 (16–37)	27 (17–39)	
≥38	36 (28–44)	22 (17–28)	39 (28–52)	36 (26–47)	
Pulse					
≥120 beats per minute	2 (1–5)	3 (1–5)	2 (1–6)	4 (1–11)	0.568
Signs of infection					
No signs of infection	75 (66–82)	71 (62–78)	73 (60–83)	83 (69–91)	0.355
Offensive discharge	18 (12–26)	21 (15–30)	17 (9–30)	17 (9–30)	0.787
Tender uterus	13 (7–23)	14 (9–21)	17 (8–33)	3 (1–10)	0.038
Septicaemic shock/sepsis	1 (<1–1)	3 (1–7)	<1 (<1–1)	0	< 0.001
Other (bowel injury, uterine perforation and pelvic abscess)	1 (<1–2)	2 (1–4)	<1 (<1–3)	0	0.272
Localised peritonitis	<1 (<1–1)	1 (<1–3)	0	0	0.326
Signs of organ failure					
No signs of organ failure	96 (93–98)	92 (87–96)	96 (90–99)	98 (94–100)	0.135
Disseminated intravascular coagulation	2 (1–6)	5 (3–9)	2 (1–9)	0	0.233
Hypovolaemic shock	1 (<1–2)	1 (<1–3)	1 (<1–3)	2 (<1–6)	0.676
Renal failure	<1 (<1–2)	1 (<1–3)	<1 (<1–3)	0	0.363
Other (respiratory distress syndrome, central nervous system failure and liver failure)	1 (1–3)	3 (1–8)	1 (<1–3)	1 (<1–6)	0.418
Death	<1 (<1 to <1)	<1 (<1–2)	0	0	0.593
Findings on evacuation					
Offensive products of conception	31 (24–40)	29 (22–37)	35 (24–48)	22 (13–35)	0.212
Evidence of misoprostol	3 (2–6)	7 (4–12)	2 (1–5)	4 (2–11)	0.076
Mechanical injury to vagina, cervix, uterus or intra-abdominal	3 (2–4)	5 (3–9)	1 (<1–4)	5 (2–10)	0.030
Foreign body	2 (1–5)	3 (1–11)	1 (<1–5)	3 (<1–21)	0.382

HC, health centres. Bold text indicates a finding that is statistically significant at the alpha <0.05 level.

*Reported *P* values are associated with χ^2 tests of association for categorical variables and *t*-tests for continuous variables.

**All percentages and associated 95% CIs have been adjusted for the survey design using weighting.

study period, projections of the annual total number of cases in the public facilities may be estimated, taking into account adjusted sampling weights and design effects. Based on these

projections, 31 579 women with ‘abortion complications’ are treated annually in government health facilities (Table 4). Seventeen percent of cases, or 5222 women (95% CI 2794–7650),

Table 4. Projected annual total number of cases of complications from miscarriage and terminations treated in the public sector by severity category and facility type

	Total (n = 31 579) (95% CI 25 227–37 931)	Hospital (n = 5388) (95% CI 4406–6369)	HC high (n = 19 413) (95% CI 13 464–25 361)	HC low (n = 6778) (95% CI 4778–8779)
Gestational age				
First-trimester complications	26 357 (20 444–32 270)	3876 (3101–4651)	16 431 (10 841–22 021)	6049 (3999–8100)
Second-trimester complications	5222 (2794–7650)	1512 (1051–1973)	2982 (606–5357)	729 (257–1201)
Severity				
Low severity complications	8867 (6327–11 405)	2277 (1475–3079)	4412 (2224–6600)	2177 (1076–3279)
Moderate severity complications	9333 (6368–12 299)	1512 (1111–1913)	6082 (3341–8917)	1739 (809–2670)
High severity complications	13 379 (9776–16 983)	1599 (1243–1955)	8919 (5462–12 375)	2862 (1714–4009)

HC, health centres.

are in the second trimester of pregnancy when they present for care and 13 379 (42%) are high severity complications.

The annual incidence of 'abortion complications' in public sector facilities is 867 per 100 000 women of reproductive age (Table 5). Although there were fewer maternal deaths in Cambodia than in Kenya, where similar research has been conducted, women in this study had a much higher proportion of high severity complications. Of the projected cases in Cambodia, 2.4 per 1000 (95% CI 1.7–3.1 per 1000) will present with low severity complications, 2.6 per 1000 (95% CI 1.8–3.4 per 1000) with moderate severity complications and 3.7 per 1000 (95% CI 2.7–3.6 per 1000) with high severity complications. The projected ratio of complications from miscarriages and attempted terminations to live births is 93. The annual case fatality rate for these complications in government facilities is estimated to be low, only 0.06%.

Discussion

The population observed during the study period was an older population compared with similar studies conducted elsewhere. No woman was younger than 16 years and the mean age of women presenting for treatment was 31.8 years. On average, these women had already been pregnant three times. One-third of the women seeking care reported using modern contraception at the time they became pregnant. This proportion is slightly higher than national contraceptive use reported in the 2005 Cambodia Demographic and Health Survey (CDHS),¹ in which 27% of married women reported using a modern method of family planning. Sixty-seven percent of women in the study did not want to become pregnant in the next several months. The majority cited use of methods, such as oral contraception, condoms or injectable contraceptives. Of the women who reported trying to terminate their pregnancies, more than half, 53%, reported that the pregnancy was a result of a contraceptive failure.

For a woman who is determined to end an unintended pregnancy, an early termination is safer.²⁷ Increased gestational age is a predictor of increased procedural risk,²⁸ particularly in Cambodia where second-trimester services are limited and providers continue to use outdated technology and procedures.²⁹ Seventeen percent of the women treated in this study were beyond the first trimester of pregnancy. As miscarriage is uncommon in the second trimester,²⁸ these women are likely to have had terminations by unsafe procedures, which further increased their risks. In Kenya, researchers found that second-trimester complications, which accounted for over one-third of all cases, had higher odds of being in the moderate or severe categories than first-trimester cases.

Relatively little is known about healthcare seeking behaviours of Cambodians. Some research has documented a lack of confidence in the public sector, particularly at the health centre level, where facilities are notoriously understaffed.^{30,31} However, for many women, location is the most important factor in emergency care. According to the CDHS, rural and urban residents who chose to seek care in the public sector most often used health centres.¹ Despite our prediction that women with more serious complications from miscarriage and attempted terminations would seek care in hospitals, the opposite occurred. Women who presented for care at hospitals were more often suffering from low severity complications, while women at both levels of health centre were more often high severity ($P = 0.071$), seeking care in facilities with the least capacity to manage their cases. The exception to this trend was among women who had been pregnant longer; women in their second trimester of pregnancy more often sought care at hospitals ($P = 0.110$). In addition, women treated in health centres were likely to be older, to report using contraception and to have more children, but they were less likely to report an attempted termination before seeking care. None of these differences achieved statistical significance.

Table 5. Selected contextual variables and results of the South Africa, Kenya and Cambodia 'facility-based abortion morbidity and mortality' studies

	South Africa 2000 ¹⁹	Kenya 2002 ²³	Cambodia 2005
Legal indications for termination	On request through 12 weeks. Some restrictions after 12 weeks	Legal only to save the life of the woman	On request through 12 weeks. Some restrictions after 12 weeks
Women of reproductive age (WRA)*	13 478 000	6 895 000	3 644 327**
Total births	1 106 000	1 088 102	340 470**
Maternal mortality ratio	340	414***	472****
No. of hospitals included	47	143	71
No. of health centres included	0	0	115
Data collection period (days)	21	21	21
Low severity cases (%)	72.4	55.8	28
Moderate severity cases (%)	17.9	16.3	30
High severity cases (%)	9.7	27.9	42
Maternal deaths	1	7	1
Projected annual cases of 'abortion complications'	49 653	20 893	31 579
Annual incidence of 'abortion complications'	362/100 000 WRA	303/100 000 WRA	867/100 000 WRA
Ratio of 'abortion complications'	44/1000 live births	19/1000 live births	93/1000 live births
Case fatality rate (%)	Not presented	0.87	0.06

*Republic of South Africa WRA = 12–49 years and Kenya and Cambodia WRA = 15–49 years.

**International database of the US Census Bureau [www.census.gov/cgi-bin/ipc/idbagg].²⁶

***Central Bureau of Statistics (CBS) (Kenya), Ministry of Health (MOH) (Kenya) and ORC Macro. Kenya Demographic and Health Survey 2003. Calverton, MD: CBS, MOH, and ORC Macro, 2004.

****National Institute of Public Health, National Institute of Statistics [Cambodia] and ORC Macro.¹

It is not possible to determine with certainty why this occurred. This pattern of morbidity may be the result of inequitable access to treatment, with women in less densely populated rural areas seeking care later or perhaps seeking care in the informal system and delaying their entrance to public hospitals. Women in more densely populated urban and peri-urban areas around hospitals may seek care sooner because they have better information on services, transportation and funds to access a hospital. Women seeking care in health centres may be underestimating the severity of their symptoms and subsequently the need for medical attention.

Although they may pay dearly, Cambodians are more likely to seek health care in the private sector, where 37% of previous terminations took place rather than in the public sector where only 11% of terminations were reported to have occurred.^{1,30} In a 1998 study on health care seeking cost and behaviours, 60% of women who had delivered did not choose public facilities as their preferred location for delivery, stating reasons, such as distance, cost, lack of drugs and inconsistency in keeping with Khmer tradition.³¹ Despite the legality of termination, many women attempted terminations at home or in unauthorised facilities before seeking PAC. Of these, nearly 40% went to drug sellers, a common source of health-care information and medication. Although oral misoprostol administration was probably used in some cases, only 3% of

women presented with vaginal evidence of the drug, a gastric ulcer medication available and well known for inducing uterine contractions. It is possible that women using misoprostol consulted with a healthcare provider to determine the correct regimen, but we did not request this information. Seeking care or information from a non-medical professional or even at a nearby health centre may be a necessity for many women, but misinformation is probably responsible for at least a part of the high level of morbidity seen in this study.

After combining all women with strong clinical evidence of an attempted termination (vaginal evidence of misoprostol, mechanical injury or presence of a foreign body) with women who reported terminations at home or outside of an authorised facility, more than one-third (40%) of women showed strong clinical evidence or reported a termination attempt prior to seeking PAC services in the government sector. It is likely that the terminations women received before presenting to the public facilities in the study were 'unsafe' or 'procedures for terminating an unwanted pregnancy either by persons lacking the necessary skills or in an environment lacking the minimal medical standards, or both'.⁴ This finding is consistent with Demographic and Health Survey (DHS) findings in which 45% of Cambodian women who reported having a termination in the past 5 years told interviewers that they had performed so in a home rather than a health facility.¹

Four of ten women reporting or showing evidence of prior induction attempts presented with severe complications. Unsafe terminations affected women regardless of healthcare setting, underscoring that unsafe termination is not strictly a rural or urban phenomenon.

Only one death due to abortion-related complications was recorded during the study period. Women seen at hospitals and high-level health centres were among the most medically complicated (e.g. presenting with organ failure or perforations); yet, we cannot be certain that all the most serious cases ever made it to hospitals or clinics, given the remoteness of some Cambodian villages.

Table 5 highlights some important differences in the results of three of the studies using this methodology.^{17–23} The Cambodian and South African laws are similar in content and legality for termination of pregnancy; however, the Kenyan law is much more restrictive, allowing women to have terminations only to save their lives. The annual incidence of ‘abortion complications’ (892/100 000 women of reproductive age) and the ratio of complications from miscarriages and attempted terminations (87/1000 live births) were highest in Cambodia compared with South Africa and Kenya. Higher figures reported in Cambodia can be partially attributed to the inclusion of health centres and poorer access to hospitals in these areas, whereas the South African and Kenyan studies only collected data in hospitals. After adjustment for sampling, Cambodian health centres contributed just more than 80% of the cases. Mortality was highest in Kenya. The number of hospital deaths in Kenya was higher than those found in both South Africa and Cambodia where only one death was reported in each country, resulting in a higher case fatality rate in Kenya.

Researchers in South Africa have found that mortality levels and severe morbidity have decreased after introduction of legal termination in that country in 1996.^{19,22} Overall, in South Africa, researchers did not find fewer cases of abortion complications between 1994 and 2000, but they report that the severity of the complications diminished. Authors in South Africa propose that this change is likely the result of increased community awareness, use of manual vacuum aspiration and use of misoprostol.^{19–22,32}

The use of pharmaceuticals from neighbouring countries and/or traditional methods to induce a termination seems to be well known among Cambodian women,^{6–9} perhaps causing women to delay seeking timely PAC. However, we know little about the safety and efficacy of what women were using. The resultant morbidity in Cambodia produced a distinctly different severity distribution among the cases; more Cambodian cases were serious, 42% versus 28% in Kenya and 10% in South Africa.

An important difference in the study designs among these three countries was the decision to collect data from health centres in Cambodia. Regardless of a facility’s or provider’s

capacity to provide PAC, it is clear that women will seek care at every level of the health system. Although women were less likely to present at the lowest level health centres for abortion complications, 86% of the facilities in the study encountered at least one case during the study period. Many large Cambodian health centres in the study have benefited from a long-standing initiative of the government and non-governmental organisations to improve PAC. It seems likely that women are seeking care in these facilities because of increased confidence in the performance and quality of the PAC services offered there. The low-level rural facilities are often excluded from these programmes and have been asked only to stabilise PAC patients and refer them to another facility. An uncomplicated ‘incomplete abortion’, whether from attempted termination or miscarriage, may be easily managed in a health centre; left untreated, this simple case can rapidly become an emergency.

While there has been no formal documentation of seasonal variation in pregnancy or PAC, seasonality of these events would affect national estimates. Although every effort was made to capture every case of complication from termination and miscarriage, healthcare providers may have missed cases and some women may have been reluctant to disclose a termination attempt, resulting in some underestimation.

On a national level, we did not capture cases treated in private sector facilities or did we attempt to determine the percentage of women who did not present at a health facility for PAC. Previous studies conducted elsewhere have used interviews with healthcare experts to estimate these proportions and propose national data.^{11–14,27} These results are generalisable only to public sector health facilities. However, this study design has distinct advantages over population-based survey methods, requiring women to recall and disclose the details and timing of past terminations to interviewers.³³ This study indicates that women’s disclosure may improve when these data are collected by a healthcare provider, in a health facility and in an environment where termination is legal, during the course of their care. They may also have been more likely to reveal this information to their medical provider, as opposed to an interviewer, because it was directly related to their medical history and subsequent treatment. In all circumstances, it seems unlikely that the methods used in this study could overestimate the number of termination and miscarriage complications in the country.

In accordance with the study protocol, data capture forms with missing gestational ages (34 cases) and cases of pregnancies older than 21 weeks (12 cases) were excluded, although it seems likely that some of these pregnancies were less than 22 weeks of gestation. Inclusion of these cases would have resulted in higher national case estimates.

Finally, although referral to another facility was an outcome, we did not attempt to follow women through the course of their care. It is possible that a woman seeking care for the treatment of complications may have been referred to

another facility to complete her treatment. We chose to treat each entrance into a health facility as a discrete case with its own implications. Women referred to another facility may have chosen not to go, gone to a facility not included in the study, gone to a private or traditional practitioner or presented for care at another public study facility. As such, it is possible the caseload estimates of complications from attempted terminations and miscarriages are a slight overestimation; future studies using this methodology should attempt to obtain valid information on progression of referral cases.

Conclusions

Eight of ten Cambodian women seeking services after an attempted termination or miscarriage in the government sector seek care in health centres rather than in hospitals; yet, almost half of smaller health centres and many large health centres still refer women to other facilities for routine PAC. Large health centres appear to be the first choice for women seeking any termination or PAC services. Improving health centre capacity to provide this essential care must be a national priority.

It is clear that safe termination services should be more widely available, as women seek such care wherever they can. This study shows that abortion law reform is not enough; it must be followed with concerted efforts to expand safe termination services. More than one-third (40%) of PAC clients either reported or showed strong clinical evidence of attempted termination that was probably unsafe or at least uninformed. Further investigation is needed to better understand the kinds of advice and interventions for termination suggested by both medical and nonbiomedical practitioners.

The Cambodian health sector is faced with an urgent need to increase the availability of second-trimester termination services. Very few facilities are capable of providing the recommended evacuation procedures for safe second-trimester terminations.²⁹ Yet, 17% of women face increased risks because they did not resolve their unintended pregnancy until the second trimester. Training in second-trimester procedures and wider use and availability of mifepristone and misoprostol to facilitate this care could have a great impact on access to appropriate care in the first and second trimester of pregnancy. Seeking information and treatment from inefficient or unsafe providers has probably resulted in needless delays in care and morbidity among these women.

More than one-third of women reported using contraception at the time of conception. Failure to ensure that they can prevent a future unwanted pregnancy puts their lives and health at continued risk. Better availability and accessibility of the full range of contraceptive methods may improve contraceptive acceptance in PAC wards. Emphasis should be given to expansion of more effective methods, including long-term methods, and on ensuring provision of postabortion contraceptive services at the location of care.

To reduce morbidity after termination or miscarriage in Cambodia, it is imperative that measures are taken to encourage women to seek abortion-related care early and at appropriate healthcare facilities, while also raising the capability of health centres to provide safe terminations and PAC. It is necessary to educate and inform women of their safe, legal and affordable reproductive choices should they face an unintended pregnancy. Finally, ensuring that all women are counselled and offered contraception so that they may effectively control their own reproductive lives is both a health and human rights imperative.

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References

- 1 National Institute of Public Health, National Institute of Statistics [Cambodia] and ORC Macro. *Cambodia Demographic and Health Survey 2005*. Phnom Penh, Cambodia and Calverton, MD: National Institute of Public Health, National Institute of Statistics and ORC Macro; 2006.
- 2 Committee for Population, Family and Children [Vietnam], and ORC Macro. *Vietnam Demographic and Health Survey 2002*. Calverton, MD: Committee for Population, Family and Children and ORC Macro; 2003; [www.measuredhs.com/pubs/pdf/FR139/00FrontMatter00.pdf]. Accessed 23 March 2007.
- 3 Badan Pusat Statistik – Statistics Indonesia (BPS) and ORC Macro. *Indonesia Demographic and Health Survey 2002-3*. Calverton, MD: BPS and ORC Macro; 2003.
- 4 World Health Organization. *Safe Abortion: Technical and Policy Guidance for Health Systems*. Geneva, Switzerland: World Health Organization; 2003.
- 5 Reproductive and Child Health Alliance. *Unpublished translation of the Cambodian Abortion Law*. Phnom Penh, Cambodia: RACHA; 1997.
- 6 Long C, Rathavy T, Lan C, Sareoun O, Sileap K. *Safe Motherhood Situation Analysis of Cambodia*. Phnom Penh, Cambodia: National Maternal and Child Health Centre of the Ministry of Health, 1997.
- 7 Long C, Ren N. Abortion in Cambodia country report. Proceedings of Expanding Access: Advancing the Role of Midlevel Providers in Menstrual Regulation and Elective Abortion Care; 2001 Dec 2–6; Pilanesberg National Park, South Africa. Chapel Hill, NC: Ipas, 2001. [www.ipasihcar.net/expacc/reports/CambCR.html]. Accessed 28 June 2006.
- 8 Lester F. *Abortion in Cambodia: An Overview of the Current Situation (Preliminary Findings)*. Berkeley, CA: University of California, Berkeley School of Public Health; 2002; [www.un.org.kh/unfpa/about/documents/abortion.pdf]. Accessed 12 April 2006.
- 9 Lester F. *Threads of a common cloth: abortion and human rights in Cambodia [Master's thesis]*. Berkeley, CA: University of California at Berkeley/San Francisco Joint Medical Program; 2003.
- 10 Singh S, Wulf D. The likelihood of induced abortion among women hospitalized for abortion complications in four Latin American countries. *Int Fam Plan Perspect* 1993;19:134–41.
- 11 Singh S, Wulf D. Estimated levels of induced abortion in six Latin American countries. *Int Fam Plan Perspect* 1994;20:4–13.
- 12 Singh S, Prada E, Mirembe F, Kiggundu C. The incidence of induced abortion in Uganda. *Int Fam Plan Perspect* 2005;31:183–91.

- 13 Singh S, Prada E, Kestler E. Induced abortion and unintended pregnancy in Guatemala. *Int Fam Plan Perspect* 2006 32:136–45.
- 14 Alan Guttmacher Institute. *Sharing Responsibility: Women, Society and Abortion Worldwide*. New York, NY: The Guttmacher Institute, 1999.
- 15 National Institute of Statistics, UNFPA and World Food Program. *Administrative and Health Facility Mapping 2004*. Phnom Penh, Cambodia: NIS, UNFPA and WFP, 2005.
- 16 Ministry of Health. *Minimum Package of Activities—Guidelines for Health Centres for 2004-7 (Version 1)*. Phnom Penh, Cambodia: Ministry of Health, 2003.
- 17 Rees H, Katzenellenbogen J, Shabodien R, Jewkes R, Fawcus S, McIntyre J, et al. The epidemiology of incomplete abortion in South Africa. *S Afr Med J* 1997;87:432–7.
- 18 Jewkes RK, Fawcus S, Rees H, Lombard CJ, Katzenellenbogen J. Methodological issues in the South African incomplete abortion study. *Stud Fam Plann* 1997;28:228–34.
- 19 Jewkes R, Brown H, Dickson-Tetteh K, Levin J, Rees H. Prevalence of morbidity associated with abortion before and after legalization in South Africa. *BMJ* 2002;324:1252–3.
- 20 Brown HC, Jewkes R, Levin J, Dickson-Tetteh K, Rees H. Management of incomplete abortion in South African public hospitals. *BJOG* 2003; 110:371–7.
- 21 Jewkes R, Rees H, Dickson K, Brown H, Levin J. The impact of age on the epidemiology of incomplete abortions in South Africa after legislative change. *BJOG* 2005;112:355–9.
- 22 Jewkes R, Rees H. Dramatic decline in abortion mortality due to the Choice on Termination of Pregnancy Act. *S Afr Med J* 2005;95:250.
- 23 Gebreselassie H, Gallo MF, Monyo A, Johnson BR. The magnitude of abortion complications in Kenya. *BJOG* 2005;111:1–7.
- 24 Figa-Talamanca I, Sinnathuray TA, Yusof K, Chee Fong CK, Palan VT, Adee N, et al. Illegal abortion: an attempt to assess its cost to the health services and its incidence in the community. *Int J Health Serv* 1986;16:375–89.
- 25 Huntington D, Nawar L, Hassan EO, Youssef H, Abdel-Tawab N. The post-abortion caseload in Egyptian hospitals: a descriptive study. *Int Fam Plan Perspect* 1998;24:25–31.
- 26 International database of the US Census Bureau. [www.census.gov/cgi-bin/ipc/idbagg]. Accessed 30 May 2007.
- 27 Boonstra HD, Gold RB, Richards CL, Finer LB. *Abortion in Women's Lives*. New York, NY: Guttmacher Institute, 2006.
- 28 Grimes DA, Benson J, Singh S, Romero M, Okonofua FE, Shah IH. Unsafe abortion: the preventable pandemic. *Lancet* 2006;368: 1908–19.
- 29 Rathavy T, Fetters T, Sherman J, Vonthanak S, Vannat S, Phirun L, et al. "Ready or Not?" A National Needs Assessment of Abortion Services in Cambodia. Chapel Hill, NC: Ipas, 2007.
- 30 Huff-Rouselle M, Pickering H. Crossing the public-private sector divide with reproductive health in Cambodia: out-patient services in a local NGO and the national MCH clinic. *Int J Health Plann Manage* 2001;16: 33–46.
- 31 National Public Health Research Institute, World Health Organization, GTZ. *The Demand for Health Care in Cambodia: Concepts for Future Research*. Phnom Penh, Cambodia: Ministry of Health, 1998.
- 32 Jewkes RK, Gumede T, Westaway MS, Dickson K, Brown H, Rees H. Why are women still aborting outside designated facilities in metropolitan South Africa? *BJOG* 2005;112:1236–42.
- 33 Rossier C. Estimating induced abortion rates: a review. *Stud Fam Plann* 2003;34:87–102.

Editor's Commentary

The terminology of early pregnancy bleeding is in transition—away from abortion and towards termination, miscarriage and loss. It used to be uncomplicated; abortions could be induced or spontaneous, missed, threatened, inevitable, incomplete or complete. Everyone in the medical profession knew what the terms meant and no one complained. The fact that the term 'abortion' (from the Latin 'ab' *away* and 'oriti' *to be born*) encompasses a wide spectrum of tragedies—from recurrent miscarriages in a 40-year old nulliparous woman to termination of an unwanted pregnancy in a 14-year old—mattered little. Indeed, it was even convenient in situations where illegal induced abortions are common, as it allowed women to be described according to their presenting symptoms rather than their unknown aetiology. And so the abortion terminology, which dates back to 1540, remains the usual medical terminology for gynaecologists through much of the world. Both ICD-10 and World Health Organisation (WHO) continue to use the terms.

And yet, the term abortion in popular culture has become synonymous with deliberate termination of pregnancy, and for most of the 20th century, the term 'miscarriage' has been used instead to refer to a spontaneous abortion. It is only in medical terminology that the use of the term abortion has persisted. And many young gynaecologists, myself included, will have experienced this clash of cultures when a woman has reacted angrily to her early pregnancy bleeding being referred to as 'an abortion'. And so, in clinical practice, abortion is often used in medical circles, while the supposedly gentler term of miscarriage is used when talking to women.

But changes are afoot. *BJOG* has had a policy of preferring the more patient-centred terminology (miscarriage, termination of pregnancy, retained products of conception) for several decades, and an expert group from the European Society for Human Reproduction and Embryology have also called for change (R. Farquharson *et al. Hum Reprod* 2005;20:3008–11). Indeed, documents coming out of the WHO also increasingly use the term miscarriage to refer to spontaneous abortion, and there are suggestions that in time they may too change, together with the ICD classification.

Those in favour of change argue that it is inappropriate to have separate terminologies for medical and public use. It is seen as elitist, a barrier to effective communication and prone to causing offence. Furthermore, the blurring of boundaries between

induced and spontaneous abortions is often confusing as we found when editing this paper by Fetters *et al.* The general term abortion in low-resource settings is often used to describe unsafe induced abortion when it really also covers spontaneous abortions. And so it ends up being unclear whether the abortions referred to are induced, spontaneous or both.

The argument against change is both linguistic and political. Linguistic in the sense that the only single term that encompasses both induced and spontaneous abortion is abortion. This is often needed in places where it is not possible to differentiate the two clinically, as is so often the case in sites where induced abortion is illegal. Adapting it means having to use the term 'miscarriage and termination', which often sounds clumsy and unnecessarily complicated. But there is a political angle here as well. Some 'prochoice' activists are suspicious that the proposal to change the language is an attempt to stigmatise the term abortion, and those undergoing and providing termination services together with it. Termination of pregnancy, they argue, is best seen within the continuum of abortion and as an extension of normal biological process that affects 15% of all pregnancies.

Readers will need to make up their own mind. *BJOG* made a policy decision to adopt the new terminology under the editorship of David Paintin in the 1980s, and readers of this article will note how the authors have patiently adopted our suggested changes (except for the title in which the term abortion was retained after much debate). For some, this may appear odd, but we suspect that for most, it will make the article clearer, especially for those nonmedical readers who are increasingly part of the readership. ■

A Weeks