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## CLINICAL ARTICLE

## The severity of abortion complications in Malawi

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## ABSTRACT

**Objective:** To assess the severity of abortion complications in Malawi and to determine associated risk factors. **Methods:** Between July 20 and September 13, 2009, a cross-sectional survey was conducted at 166 facilities providing postabortion care services. Data were collected for all women with an incomplete, inevitable, missed, complete, or septic abortion. Weighted percentages were calculated to obtain national estimates. **Results:** In total, 2067 women met the inclusion criteria. Estimates suggest that 80.9% of women who presented for postabortion care in Malawi in 2009 were married and 64.8% were from rural areas. One-quarter (27.4%) presented with severe or moderate morbidity. Sepsis (13.7%), retained products of conception (12.7%), and fever (12.3%) were the most common complications. The case fatality rate was 387 deaths per 100 000 postabortion care procedures. Women with severe or moderate complications were significantly more likely to be from rural areas than from urban areas; to have reported interfering with their pregnancy; and to be separated, divorced, or widowed than to be single. **Conclusion:** In 2009, many women seeking postabortion care in Malawi presented with complications. Advocacy is needed to influence policies that will allow expanded access to safe abortion services for women of all ages and in all areas.

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## 1. Introduction

Unsafe induced abortions are of major public health significance—in 2008, an estimated 21.6 million unsafe abortions took place worldwide [1]. Almost all unsafe abortions occur in low-income countries, where the incidence is 16 per 1000 women of reproductive age, with a ratio of 17 per 100 live births [1]. The global case fatality rate associated with unsafe abortion is high at 220 deaths per 100 000 unsafe abortions [1]. Indeed, unsafe abortions are one of the three major causes of maternal death globally, accounting for 47 000 deaths annually—13% of all maternal deaths [1].

A recent study [2] estimated that approximately 465 000 induced abortions occur annually in Malawi, with an induced abortion rate of 48 per 1000 women of reproductive age. Approximately 158 000 women receive care for induced and spontaneous abortions in health facilities each year [2]. However, in settings where access to safe abortion is restricted or not available, such as in Malawi, clandestine abortions are often stigmatized and women can delay or avoid seeking medical care for resulting complications [3–5]. A review [6] of nine Malawian hospitals found that abortion complications accounted for

7.0% of maternal deaths. Studies [7,8] conducted at the only referral hospital in southern Malawi found that abortion complications accounted for 68.7% of all gynecologic admissions in 1994 and were responsible for 23.5% of maternal deaths occurring during 1999–2000. A strategic assessment [9] of unsafe abortion in Malawi found that the most important factors contributing to unintended pregnancy and induced abortion included inaccessibility of safe abortion services particularly for poor and young women, and lack of adequate family planning, youth-friendly, and postabortion care services.

The present study was conducted to estimate the severity of abortion complications in Malawi and to determine associated risk factors.

## 2. Materials and methods

A prospective, cross-sectional survey was conducted between July 20 and September 13, 2009, among women seeking postabortion care in Malawi. A single-stage stratified sampling plan was used to select a nationally representative sample of health facilities that provided postabortion care. A list of all licensed, public non-governmental organization (NGO) hospitals, and private hospitals and clinics in Malawi was obtained from the Ministry of Health. Centers that provided postabortion care were identified. Public and NGO hospitals, health centers, and private hospitals were assigned a sample fraction of 1.0, whereas private clinics received a sample fraction of 0.33. Of the 269 selected

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facilities, 166 (61.7%) confirmed they were currently providing post-abortion care services. The main postabortion care provider at each of the 166 facilities was invited to data collector training. A total of 161 (97.0%) facilities participated in the study, including 91 (56.5%) government facilities, 62 (38.5%) NGO facilities (Christian Health Association of Malawi or Banja la Mtsogolo), and 8 (5.0%) private facilities. Further sample details are available elsewhere [2].

All women presenting to a study facility with a diagnosis of incomplete, inevitable, missed, complete, or septic abortion during the 30-day study period were included in the present study. Women presenting to departments other than those where postabortion care services were provided (e.g. intensive care units) were captured if they were diagnosed with an abortion-related complication. The study received ethics approval from the Malawi National Health Sciences Research Committee. Informed consent was not obtained because only de-identified clinical care data were collected.

Using a standardized data collection form, the postabortion care providers gathered information about demographic and reproductive history, presenting symptoms, physical examination findings, and clinical management. Typically, the forms were completed immediately after providing care. The forms were identified by a case number only to maintain confidentiality.

To obtain an estimate for the total number of postabortion care cases in 2009, the 30-day caseload data from each facility were multiplied by 12.2 and the resulting numbers were added together. The case fatality rate was calculated per 100 000 postabortion care procedures.

The categories for the severity of abortion complications (Box 1) were adapted from previous studies [10–12]. The definition of sepsis was expanded, with sepsis defined either by a diagnosis of sepsis made by the postabortion care provider or by the presence of abdominal or uterine tenderness, a pelvic abscess, pelvic or generalized peritonitis, uterine perforation, or gangrenous uterus or bowel. Women were categorized into the most severe category of abortion complications for which they displayed a sign or symptom, and required only one sign or symptom to be counted in that category. For example, a case with sepsis and localized peritonitis was categorized as severe.

The analyses were weighted to obtain national estimates for women treated at all health facilities that provide postabortion care in Malawi. The  $\chi^2$  test was used to assess differences in the distribution of outcome variables between health facility types. Normally distributed continuous

**Box 1**  
Severity classification of abortion complications

**Severe**

- Body temperature >37.9 °C
- Organ or system failure
- Generalized peritonitis (inflammation throughout the entire peritoneum)
- Pulse > 119 beats/minute
- Evidence of foreign body or mechanical injury
- Sepsis
- Shock
- Tetanus
- Death

**Moderate**

- Body temperature 37.3 °C–37.9 °C
- Localized peritonitis (inflammation in a localized area of the peritoneum [e.g. through abscesses])
- Retained products of conception

**Mild/no morbidity**

- All other cases

variables were analyzed using the *t* test. Frequencies are reported as un-weighted counts and weighted proportions.

Bivariate associations were calculated, using an outcome of severe or moderate complications compared with no complications.  $P < 0.05$  was considered statistically significant. Variables significantly associated with the outcome were further analyzed using multivariate logistic regression, and removed on the basis of backward elimination. The final model included variables determined to affect the outcome on the basis of a priori knowledge and variables that remained significantly associated with the outcome. The data were analyzed using Stata version 11 (StataCorp, College Station, TX, USA) and Excel version 7 (Microsoft, Redmond, WA, USA).

### 3. Results

Of the 2546 women presenting during the 30-day data collection period, 2067 (81.2%) met the inclusion criteria. Overall, 1811 (87.6%) had an incomplete abortion, 145 (7.0%) had an inevitable abortion, 89 (4.3%) had a complete abortion, 19 (0.9%) had a missed abortion, and 3 (0.1%) had a septic abortion. The number of women seeking postabortion care at health facilities in Malawi annually was estimated at 26 634 (95% confidence interval [CI] 22 596–30 674).

Most of the women sought care in public facilities, with approximately half treated in public hospitals and one-tenth treated in public health centers; the other women were treated in hospitals and health centers run by NGOs or in private facilities (Table 1). Overall, the

**Table 1**  
Sociodemographic and reproductive characteristics of women seeking postabortion care (n = 2067).<sup>a,b</sup>

Characteristic	No. (%) <sup>a</sup>
Age, y	
<18	251 (12.3)
18–24	871 (41.7)
25–29	478 (23.4)
30–34	270 (13.0)
35–51	149 (7.2)
Marital status	
Single	280 (13.8)
Married	1679 (80.9)
Cohabiting	38 (2.0)
Separated/widowed/divorced	60 (2.8)
Education	
None	256 (12.0)
Junior primary	1139 (54.1)
Secondary and higher	644 (32.5)
Place of residence	
Urban/semi-urban	673 (34.0)
Rural	1375 (64.8)
Number of previous pregnancies	
1	509 (24.6)
2	371 (18.1)
3	357 (17.8)
≥4	817 (38.8)
Reported previous spontaneous abortion	
Yes	416 (20.3)
No	1611 (77.8)
Estimated pregnancy duration, wk	
≤12	1339 (65.1)
>12	722 (34.7)
Reported they tried to end the index pregnancy	
Yes	171 (8.4)
No	1883 (91.6)
Type of health facility	
Government facility (primary)	248 (12.0)
Government facility (secondary and tertiary)	1119 (51.5)
NGO facility	667 (32.4)
Private for-profit facility	33 (4.1)

Abbreviation: NGO, non-governmental organization.

<sup>a</sup> Absolute numbers are unweighted, whereas percentages are weighted to indicate care at all facilities providing postabortion care in Malawi.

<sup>b</sup> Some data are missing for most characteristics.

estimated mean number of women treated at each study facility per year was 160, ranging from 291 women at public hospitals to 31 women at private hospitals. Private clinics reported serving a high proportion of women, with an average of 173 postabortion care clients per clinic annually (data not shown).

Sociodemographic and reproductive health profiles indicated that most women were married and from rural areas (Table 1). The mean age was  $25.5 \pm 6.8$  years. Two-thirds were in their first trimester of pregnancy (Table 1). A previous pregnancy was reported by 2054 (74.7%); median gravidity was 3 (range 0–18). One-fifth of participants reported a past experience of spontaneous abortion, and 467 (22.6%) reported using some form of contraception to prevent the current pregnancy.

Overall, 564 (27.4%) women presented with one or more signs of complications. Sepsis was the most common presenting clinical manifestation, followed by retained products of conception and fever (Table 2). Elevated temperature, pulse, and shock were the only signs that showed a significant differential distribution by type and level of health facility ( $P < 0.05$ ) (Table 2).

Although a history of interference with pregnancy was only reported by 171 women (8.4%), the providers believed that 253 women (12.6%) had interfered with the pregnancy. The providers noted some sign of mechanical injury to the vagina, cervix, or uterus on physical examination in 111 women (5.5%). Among the 171 who admitted attempting to interrupt the pregnancy, mechanical injury was noted in only 40 (2.0%).

On the basis of the signs and symptoms at presentation, 1053 women (72.3%; 95% CI 70.7%–74.6%) presented with mild morbidity, 138 (6.7%; 95% CI 5.6%–7.8%) with moderate morbidity, and 426 (20.7%; 95% CI 18.9%–22.5%) with severe morbidity. Of 1856 women (90.1%) who were treated with uterine evacuation, 1045 (55.4%) underwent manual vacuum aspiration, 768 (43.0%) underwent dilation and curettage, and 25 (1.3%) received medications, primarily misoprostol. Pain medication was provided to 1694 women (89.8%). The receipt of antibiotics and blood or blood products differed significantly between the severity categories and was most likely among women with severe complications ( $P < 0.05$ ) (Table 3). Although 1132 women (56.3%) were managed as outpatients, those with severe complications were significantly more likely to stay in the health facility for more than 12 hours than were those with mild or no complications ( $P < 0.05$ ) (Table 3).

Significant differences were seen in the distribution of the severity of postabortion complications throughout Malawi and in the subsequent provision of postabortion care. Public facilities and private clinics are estimated to have seen 20.2% (95% CI 18.5%–22.1%) of the women with severe complications, 6.6% (95% CI 5.6%–7.8%) of the women with moderate complications, and 73.2% (95% CI 71.2%–75.1%) of the women with mild or no complications. Very few women were treated at private hospitals, and 60.0% of those who were treated in these centers were estimated to have had severe complications ( $P < 0.05$ ). Pain medication was most frequently provided to 95.0% (95% CI 93.5%–96.2%) of women in public hospitals, 92.7% (95% CI 89.3%–95.0%) of those in NGO hospitals, and 75.1% (95% CI 68.7%–80.6%) of those in public health facilities ( $P < 0.05$ ). Blood or blood products were also given to 5.7% (95% CI 4.5%–7.3%) of women in public hospitals, 8.6% (95% CI 6.1%–12.0%) of those in NGO hospitals, and none of those in private hospitals ( $P < 0.05$ ).

Eight women included in the present study died on arrival at the facility or after admission as a result of abortion complications, giving an estimated 98 maternal deaths annually. Of the women who died, five presented for care in the first trimester and the other three presented in the second trimester; all were categorized as having severe complications, with organ or system failure noted in four. The case fatality rate was estimated at 387 deaths per 100 000 postabortion care procedures. Therefore, approximately 0.4% of all women who receive postabortion treatment in health facilities in Malawi die.

Bivariate analysis revealed that women categorized as having severe or moderate complications were more likely to have a rural residence, be separated/divorced/widowed, to present after the first trimester, and to report to the provider that she had interfered with the index pregnancy ( $P < 0.05$ ). Women who were married and had a higher number of pregnancies and deliveries were significantly more likely to have no or mild morbidity than were single, nulliparous women ( $P < 0.05$ ).

In the multivariate logistic regression model (Table 4), the associations between rural residence, marital status, and reported interference with the pregnancy remained significant, with weaker associations found for education level and pregnancy duration. After controlling for age, education, pregnancy duration, and total number of deliveries, women with severe or moderate complications were 1.51 (95% CI 1.16–1.96) times more likely to be from a rural area than from an

**Table 2**  
Presenting symptoms and signs among women seeking postabortion care by type of facility.<sup>a</sup>

Presenting sign/symptom	Government hospitals (n = 1119)	Government health centers (n = 248)	NGO health facilities (n = 667)	Private health facilities (n = 33)	Total (n = 2067)
Temperature <sup>b</sup>					
Normal	889 (79.5)	215 (86.7)	560 (83.6)	30 (92.1)	1694 (82.2)
Pyrexia <sup>c</sup>	133 (10.5)	26 (11.9)	91 (14.0)	3 (7.8)	253 (12.3)
Missing	97 (2.4)	7 (8.7)	16 (2.0)	0	120 (5.4)
Pulse <sup>b,d</sup>					
Normal	959 (85.7)	231 (93.2)	640 (95.9)	33 (100.0)	1863 (90.5)
High <sup>e</sup>	29 (2.6)	3 (1.2)	12 (1.8)	0	44 (2.1)
Retained products of conception	140 (12.5)	29 (11.7)	87 (13.3)	6 (13.5)	262 (12.7)
Foreign body or injury	49 (4.4)	12 (4.8)	48 (7.2)	2 (6.8)	111 (5.4)
Localized peritonitis or tender uterus	33 (3.0)	19 (7.7)	28 (4.2)	2 (6.8)	82 (4.1)
Sepsis	152 (13.6)	27 (10.9)	94 (14.4)	7 (16.8)	280 (13.7)
Shock <sup>b</sup>	15 (1.3)	10 (4.0)	13 (2.1)	0	38 (1.8)
Generalized peritonitis, uterine perforation, or gangrenous uterus	4 (0.4)	1 (0.4)	1 (0.2)	0	6 (0.3)
Organ failure	8 (1.0)	3 (1.2)	5 (0.8)	0	16 (0.1)
One or more signs of infection or complication	283 (25.3)	67 (27.1)	205 (31.3)	9 (23.6)	564 (27.4)
Death	6 (0.5)	0	2 (0.3)	0	8 (0.4)

Abbreviation: NGO, nongovernmental organization.

<sup>a</sup> Values are given as number (percentage). Absolute numbers are unweighted while percentages are weighted to indicate care at all facilities providing postabortion care in Malawi.

<sup>b</sup>  $P < 0.05$  for the comparison with facility types/levels.

<sup>c</sup> Body temperature  $\geq 37.3$  °C.

<sup>d</sup> Data missing for 160 women.

<sup>e</sup> Pulse  $> 119$  beats per minute.

**Table 3**  
Type of clinical management received and length of facility stay among women seeking postabortion care by complications severity.<sup>a</sup>

Postabortion care	Total (n = 2076)	Mild complications (n = 1053)	Moderate complications (n = 138)	Severe complications (n = 426)
Evacuation procedure				
Evacuation and curettage/dilation and curettage <sup>b</sup>	43.0 (40.1–45.1)	40.3 (37.7–42.9)	42.3 (34.1–51.0)	53.3 (48.1–58.4)
Manual vacuum aspiration	55.4 (53.3–57.6)	57.7 (55.1–60.3)	57.0 (48.3–65.2)	46.4 (41.4–51.6)
Cytotec/misoprostol	1.3 (0.9–1.9)	1.6 (1.1–2.4)	7.5 (0.1–5.2)	0.3 (0.1–2.0)
Treatment given				
Pain medication	89.8 (88.4–91.1)	90.0 (88.2–91.5)	93.0 (89.9–96.9)	88.3 (84.8–91.1)
Antibiotics <sup>b</sup>	34.1 (32.0–36.2)	21.5 (19.3–23.8)	38.0 (30.1–46.5)	78.7 (74.4–82.5)
Blood or blood products <sup>b</sup>	4.4 (3.6–5.5)	2.6 (1.9–3.5)	5.1 (2.4–10.3)	10.5 (7.9–13.9)
Length of stay <sup>b</sup>				
≤12 h	56.3 (54.3–58.3)	59.6 (57.2–62.0)	50.1 (41.7–58.4)	46.4 (41.7–51.3)
>12 h	43.7 (41.8–45.7)	40.4 (38.0–42.8)	50.0 (41.6–58.3)	53.6 (48.7–58.3)

<sup>a</sup> Values are given as weighted percentage (95% confidence interval).<sup>b</sup>  $P < 0.05$  for the comparison between severity categories.

urban area, 2.85 (95% CI 1.99–4.08) times more likely to have reported interfering with their pregnancy, and 2.18 (95% CI 1.12–4.27) times more likely to be separated, divorced, or widowed than to be single. Married women were less likely than were single women to have severe or moderate complications (Table 4).

#### 4. Discussion

The present study has shown that approximately one in five women seeking postabortion care in Malawi presented with severe complications

**Table 4**  
Multivariate analysis of factors associated with having severe or moderate abortion complications among women receiving postabortion care.<sup>a</sup>

Characteristic	Crude OR (95% CI)	Adjusted OR (95% CI)
Place of residence		
Urban/semi-urban	1.00 (ref)	1.00 (ref)
Rural	1.4 (1.30–2.05)	1.51 (1.16–1.96)
Marital status		
Single	1.00 (ref)	1.00 (ref)
Married	0.65 (0.49–0.86)	0.65 (0.44–0.95)
Cohabiting	0.56 (0.25–1.26)	0.55 (0.24–1.29)
Separated/widowed/divorced	2.52 (1.42–4.48)	2.18 (1.12–4.27)
Total number of pregnancies		
1	1.00 (ref)	— <sup>b</sup>
2	0.59 (0.43–0.82)	— <sup>b</sup>
3	0.86 (0.63–1.18)	— <sup>b</sup>
≥4	1.01 (0.79–1.29)	— <sup>b</sup>
Total number of deliveries		
0	1.00 (ref)	1.00 (ref)
1	0.65 (0.48–0.88)	0.76 (0.53–1.10)
≥2	0.99 (0.79–1.24)	1.17 (0.81–1.68)
Education		
None	1.00 (ref)	1.00 (ref)
Primary	0.79 (0.59–1.06)	0.82 (0.59–1.13)
Secondary and higher	0.64 (0.46–0.88)	0.69 (0.46–1.03)
Pregnancy duration, wk		
≤12	1.00 (ref)	1.00 (ref)
>12	1.39 (1.14–1.70)	1.29 (1.04–1.61)
Reported history of interference with pregnancy		
No	1.00 (ref)	1.00 (ref)
Yes	3.16 (2.28–4.37)	2.85 (1.99–4.08)
Age, y		
<18	0.74 (0.54–1.01)	0.89 (0.60–1.31)
18–24	0.72 (0.51–1.02)	0.84 (0.58–1.22)
25–29	0.76 (0.52–1.12)	0.76 (0.51–1.14)
30–34	1.09 (0.69–1.71)	1.02 (0.58–1.78)
35–51	1.00 (ref)	1.00 (ref)

Abbreviations: OR, odds ratio; CI, confidence interval.

<sup>a</sup> Missing values: residence,  $n = 18$ ; marital status,  $n = 8$ ; total number of pregnancies,  $n = 11$ ; total number of deliveries,  $n = 18$ ; education,  $n = 20$ ; pregnancy duration,  $n = 6$ ; history of pregnancy interference,  $n = 12$ ; age,  $n = 34$ .<sup>b</sup> Not included in final regression.

in 2009. This proportion is similar to estimates for other Sub-Saharan African countries including Ethiopia (27%) [10] and Kenya (27.7%) [11], but is higher than the 8% estimate for South Africa before induced abortion became legal [12]. The most common signs of morbidity at presentation, such as sepsis, have also been reported in previous studies [13–15].

More than half the women were managed as outpatients, but it is important to note that many women undergoing routine, low-risk post-abortion care procedures were admitted because of a tendency to consider postabortion care as an inpatient procedure. Because more than half of all women were treated with WHO-recommended manual vacuum aspiration or abortion medication during the first 12 weeks of pregnancy and most women received pain medication, the present data indicate that, in most cases, clinicians used an appropriate clinical protocol to determine what care to provide. However, approximately two-fifths of the women were treated using dilation and curettage. According to the WHO guidelines [16], women presenting in the first trimester should be managed using manual vacuum aspiration. Deviation from this recommendation could be attributable to a lack of equipment or trained personnel.

The provision of blood transfusion was more prevalent in women with severe complications in the present study. However, none of the women managed in private facilities received a transfusion, which could indicate a need to improve the infrastructure of private facilities, to enable them to provide clinically indicated care to the substantial proportion of women they treat.

WHO [1] estimated a case fatality rate from unsafe abortion of 30 deaths per 100 000 unsafe abortions in high-income regions and of 530 deaths per 100 000 unsafe abortions in Eastern Africa. The case fatality rate for Malawi was calculated at 387 deaths per 100 000 post-abortion care procedures, meaning that 0.4% of all women receiving postabortion care die. This estimate is lower than those reported for Kenya (0.9%) [10] and Ethiopia (0.6%) [11]. These findings could indicate that women seeking postabortion care in Malawi present with less severe complications, that providers in Malawi are better equipped to effectively treat complications, and/or that more women in Malawi die before they reach a health facility. Nevertheless, it is essential to note the large differences between the case fatality rates in Malawi and other African countries and those in high-income regions.

Factors significantly associated with the severity of complications in the present study—such as area of residence, marital status, and pregnancy duration—have also been found to be related to severe complications in other studies [17,18]. In the present study, the risk of severe complications decreased slightly with an increasing level of education. Previous studies [3,15,19], including one in Malawi [9], have documented that women with a better education are also wealthier and therefore better able to pay for safe induced abortion services than are others. Women in urban areas could have less severe complications than do women in rural areas because they seek care earlier as a result of better access to hospitals [20]. In the present study, Malawian women who



were separated, widowed, or divorced had higher odds of severe complications than did single women. This finding contrasts with those of other studies, such as one from Zimbabwe [21] that reported an increased risk of induced abortion in single women; since Zimbabwe has many legal restrictions on induced abortions, single women are presumably having an unsafe induced abortion, which is associated with severe complications. Finally, women in the present study who presented in the second trimester of pregnancy had higher odds of severe complications than did those presenting in the first trimester, which is line with findings from Kenya [11].

Data collection in the present study was facility-based, which means that no information was captured on women who did not present for care, such as women too ill to travel to a health facility. Although efforts were made to capture all women presenting for postabortion care at the sampled health facilities, women presenting to other units in the sampled facilities could have been missed. Because the characteristics of the present sample are similar to the national census data from 2008 [22], the present sample is representative of all Malawian women of reproductive age who present to a health facility for complications related to incomplete, inevitable, complete, or missed abortion. The capture of high-quality data was supported by the use of a tested and piloted questionnaire and of data quality systems [23]. Therefore, the present study provides a useful and complete picture of postabortion care provision in Malawi.

The evidence shows that in an environment where access to safe abortion is restricted, women will seek unsafe services or use unsafe methods. The present research draws attention to the important role that unwanted pregnancy and unsafe abortion plays in maternal mortality, underscoring the need to invest in women and ensure their access to comprehensive reproductive health care including contraception and safe abortion. Advocacy is needed to influence policymakers and lawmakers to enact appropriate legislation allowing expanded access to safe abortion, thereby reducing the morbidity and mortality attributable to abortion complications. In addition, tackling unsafe abortion in the policy arena can help to reduce the stigma that often still attaches to induced abortion in the context of maternal health research and policymaking.

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### Conflict of interest

The authors have no conflicts of interest.

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