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Research Article

Determining the Period Prevalence and Acuity of Emergency Department Visits Following Induced Abortion Mistakenly Identified as Spontaneous Abortion: An Analytic Observational Prospective Cohort Study

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Abstract

Background: Induced abortions via mifepristone and misoprostol (medical abortion) represented 63% of abortions in the United States in 2023. Women are consistently advised to conceal their recent abortion when visiting the Emergency Department (ED). Consequently, ED visits may be mistakenly attributed to a prior spontaneous abortion or miscarriage rather than induced abortion. **Objectives:** We sought to determine the period prevalence trajectory of these miscodes from 2004-2015 to 2016-2021. In addition, for the period 2016-2021, we sought to determine if there were differences in the severity or acuity of these miscoded visits compared to correctly classified post-abortion visits. **Methods:** We analyzed Centers for Medicare and Medicaid Services (CMS) Transformed Medicaid Statistical Information System Analytic Files (TAF) to identify 28,534 emergency department visits for all causes, and their level of acuity, following either a medical or surgical abortion within 30 days. For abortion-related visits, we determined whether the visits were miscoded as a spontaneous abortion or were correctly coded. **Results:** Between the two time periods, miscode period prevalence rates following medical abortion increased from 4.7% of total visits to 18.0%; and from 45.5% of abortion-related visits to 83.5%. Following surgical abortion, miscodes increased from 1.2% of all-cause visits to 7.7%; abortion-related miscodes increased from 26.8% to 73.9%. During the period 2016-2021, ED visits following medical abortion were more likely to be miscoded than visits following surgical abortion: for all-cause visits, OR 2.63, P<.001; for abortion-related visits, OR 1.79, P<.001. Miscoded ED visits had significantly higher acuity than correctly coded visits. For all-cause visits following medical abortion, OR 3.68, P<.001; for all-cause visits following surgical abortion, OR 3.39, P<.001. For abortion-related visits following medical abortion, OR 1.51, P=.006; for abortion-related visits following surgical abortion, OR 1.41, P=.03. **Discussion:** Coincident with the increasing dominance of medical abortion, there is a concurrent increase in the misattribution of post-induced abortion ED visits to a spontaneous abortion. High levels of visit acuity suggest that these miscodes represent a serious risk factor. Further, these miscodes mask and statistically deflate post-abortion complication rates and undermine both the science and medical management necessary to address these issues, representing a threat to effective surveillance.

Keywords: Induced abortion; Spontaneous abortion; Medical abortion; Surgical abortion; Emergency department visits; Acuity

Introduction

Since its approval by the Food and Drug Administration in September 2000, induced abortion by the administration of mifepristone and misoprostol (medical abortion) as a percentage of all abortions in the United States grew consistently to 23% in 2011, 39% in 2017, 53% in 2020 and 63% in 2023 [1-3]. The 2023 number (1,037,000) of abortions and abortion rate (15.7 per 1,000 women of reproductive age) are the highest recorded in the U.S. in over a decade [4]. This growth in medical abortion has served to refocus attention on issues of patient safety, namely, the incidence and acuity of complications of induced abortions, especially those seen in the emergency department.

There is consistency in findings that indicate that the overall incidence rate of emergency department complications is higher following medical abortion than surgical abortion. A study from Finland based on three national registries concluded that the incidence of adverse events within 42 days was four times higher for the medical abortion cohort (20.0%) versus the surgical abortion cohort (5.6%). Differences were noted for haemorrhage (15.6% vs. 2.1%); incomplete abortion (6.7% vs. 1.6%); and the rate of required surgical evacuation (5.9% vs. 1.8%). No differences were noted in the incidence of infection, thromboembolic disease, psychiatric morbidity or death [5]. Similarly, a study of California Medicaid beneficiaries concluded that the total abortion-related complication rate including the ED as a source for care was 5.2% for medical abortion, 1.3% for first trimester aspiration abortion, and 1.5% for second trimester and later procedures [6]. A study of abortion patients in Ontario found that the rate of any adverse event was approximately 2.9% for medical abortion and 1.2% for first trimester surgical abortion, while the rate of emergency department visits was approximately 10.3% for medical abortion and 7.3% for first trimester surgical abortion [7].

There have been different conclusions regarding the severity or acuity of the visits experienced by women in the emergency department post-abortion. In some cases, investigators have posited that women experiencing complications after an abortion are merely seeking reassurance and receive observation care only rather than active treatment [8]. If validated, this would suggest that the high emergency department utilization of women especially following medical abortion exaggerates the risk of the procedure. However, a recent study of 926,922 emergency department visits among Medicaid eligible women, 2004-2015, provides starkly contrasting results. Using an extensively validated acuity methodology, the study found that acuity levels for visits within 30 days of an induced abortion by medical means (mifepristone and misoprostol) were significantly higher than for visits following surgical abortion or a live birth. The study also concluded that visits following medical abortion had the greatest increase in incidence (2,649%); the greatest increase of the visits in the highest acuity category (4,041%); and that by 2015, 75.7% of ED visits following medical abortion were considered severe or critical [9]. This increase in both the incidence and severity of ED visits following a pregnancy outcome is consistent with national trends for all emergency department utilization [10].

An understudied issue of serious concern is that women are often advised to misrepresent their recent abortion as a miscarriage when seeking treatment for complications in the emergency department [11-15]. Consequently, the ED doctor is likely to misattribute the complication (e.g., heavy bleeding) to a spontaneous abortion or miscarriage. This misclassification, which results in a formal miscoding of the visit for payment purposes, could also result in improper care which may contribute to an increased level of morbidity, such that the miscoding of the post-abortion complication may itself be a risk factor.

The objectives of this study, therefore, were:

1. To determine the level and trajectory of the prevalence of post-abortion ED visits at which the treatment is mistakenly coded as addressing a miscarriage or spontaneous abortion rather than an induced abortion; and
2. To determine if miscoding is significantly associated with differences in ED visit acuity compared to ED visits which are correctly coded.

Methods

Data were obtained from the Centers for Medicare and Medicaid Services (CMS) Transformed Medicaid Statistical Information System (T-MSIS) Analytic Files (TAF) for the observation years 2016-2021. Data were also extracted from the discontinued Medicaid Analytic eXtract (MAX) files for the years 2004-2015 to enable period prevalence rate comparison. In the 17 states in which Medicaid funded abortion services, all ED visits for all causes were identified which occurred within 30 days of a medical (mifepristone) or surgical abortion. ED visits, other than those specifically abortion-related, may nonetheless be influenced by abortion, such as visits for suicidal ideation, substance abuse and cardiovascular risk [16-18]. We further identified the subcategories of ED visits related to a complication following induced abortion (i.e., abortion-related) or miscoded as treatment for a miscarriage or spontaneous abortion. Finally, we determined whether the treatment prescribed in each visit was considered high or low acuity.

Surgical abortion was defined as the presence of CPT codes 59840, 59841, 59850, 59851, 59852, 59855, 59856 and 59857 with no evidence of a medical abortion 45 days prior. Medical abortion was defined as the presence of HCPCS code S0190 and no evidence of surgical abortion 45 days prior. Abortion-related ED visits were defined by ICD-10 code O04.xx (complications following induced termination of pregnancy), e.g., O04.6, haemorrhage; O04.7, embolism; O04.87, sepsis; or ICD-10 O03.xx, spontaneous abortion complications. The subset of abortion-related visits defined by ICD-10 code O04.xx were considered correctly coded, and the subset of abortion-related visits defined by ICD-10 O03.xx

were considered miscoded. A spontaneous abortion within 30 days of a confirmed induced abortion is physiologically improbable resulting from the infinitesimally small contingent probability of both a pregnancy and a spontaneous abortion-related ER visit, and is therefore considered as mistakenly or purposely misclassified or miscoded.

The primary outcome of interest was the percent of ED visits coded as high acuity. The acuity determination methodology was derived from the Ambulatory Payment Classification (APC) System which was developed to guide federal (Medicare and Medicaid) payment for services [19]. There are five levels of acuity: 99281 (nonurgent), 99282 (urgent), 99283 (moderate), 99284 (severe) and 99285 (critical) [10]. Severe or critical (99284 or 99285) designations are considered as high acuity in this analysis. The coding is determined by both the severity of the presenting problem and the complexity of the medical management required to treat the problem. Severe (99284) visits have a presenting problem of high severity requiring urgent evaluation by the physician. Examples would be chest pain which required testing or an admission for observation; shortness of breath requiring oxygen; or abdominal pain requiring advanced imaging. Critical visits (99285) also have high severity but, in addition, pose an immediate significant threat to life or physiologic function. Examples of presenting problems would be severe respiratory distress requiring diagnostic testing, three or more treatments and possible admission to the hospital; sepsis requiring IV or intramuscular antibiotics; new neurological symptoms such as paralysis, blurred vision or slurred speech; and suicidal or homicidal ideation [20,21].

Our analytic strategy had three phases. First, for the two periods, 2004-2015 and 2016-2021, we determined period prevalence rates, and rate ratios of the latest to earlier periods, for miscoded ED visits following medical and surgical abortion and as a percent of both abortion-related and all-cause visits. Second, for the period 2016-2021 for abortion-related and all-cause visits separately, we determined the distribution of visits by coding status (miscoded or correct), abortion type (medical or surgical) and acuity level (high or low). Third, for every relevant comparison we calculated bivariate logistic regression odds ratios, 95% confidence intervals, P-values and z-statistic scores to determine the strength of the association between exposure (miscoding) and outcome (high acuity).

Summary analytic tables were created using (SAS/STAT) software, version (10) of the SAS system for (Unix). Copyright 2019 SAS Institute Inc.

This study has been exempted from Institutional Review Board (IRB) review pursuant to U.S. Department of Health and Human Services Policy for Protection of Human Research Subjects at C.F.R. 46.101(b). See IRB: 7269, www.sterlingirb.com.

Results

Trajectory of ED Visit Miscode Prevalence

The period prevalence of emergency department spontaneous abortion miscodes increased from 2004-2015 to 2016-2021. Miscoded ED visits as a percentage of ED visits for all causes following medical abortion increased from 4.7% to 18.0%, or 283.0% (rate ratio 3.821, P<.001). Miscodes as a percentage of abortion-related ED visits following medical abortion increased from 45.5% to 83.5%, an increase of 83.5% (rate ratio 1.837, P<.001).

For visits following a surgical abortion, increases in miscode prevalence between the two periods were larger: 541.7% (rate ratio 6.105, P<.001) as a percentage of all-cause visits (1.2% to 7.7%) and 175.7% (rate ratio 2.758, P<.001) as a percentage of abortion-related visits (26.8% to 73.9%).

While miscodes remain more prevalent following medical abortion, miscodes following surgical abortion have grown approximately twice as much between the two observation periods (Table 1) as a percentage of both all-cause and abortion-related visits.

Type of Prior Abortion	2004-2015 (12 years)	2016-2021 (6 years)	Prevalence Rate Ratio
Medical			
All Visits	21,210	12,388	3.821 [3.544-4.121], P<.001
Miscodes (%)	997 (4.7%)	2,225 (18.0%)	
Abortion Related	2,192	2,663	1.837 [1.704-1.981], P<.001
Miscodes (%)	997 (45.5%)	2,225 (83.5%)	
Surgical			
All Visits	95,478	16,146	6.105 [5.635-6.615], P<.001
Miscodes (%)	1,201 (1.2%)	1,240 (7.7%)	
Abortion Related	4,483	1,678	2.758 [2.546-2.989], P<.001
Miscodes (%)	1,201 (26.8%)	1,240 (73.9%)	

Table 1: Period Prevalence of ED Visit Spontaneous Abortion Miscodes by Type of Prior Induced Abortion, and Rate Ratios.

Total Visits (2016-2021)

Of the total of 28,534 ED visits within 30 days of any type of induced abortion in the period 2016-2021, 3,465 (12.1%) were mistakenly coded as resulting from spontaneous abortion. Among the 12,388 ED visits following medical abortion, 2,225 (18.0%) were miscoded. For the 16,146 ED visits following surgical abortion, 1,240 (7.7%) were miscodes. Therefore, visits following chemical abortion are significantly (OR 2.63 [2.44-2.83], P<.001, z=25.67) more likely to be incorrectly coded as following spontaneous abortion than are visits following surgical abortion (Figure 1).

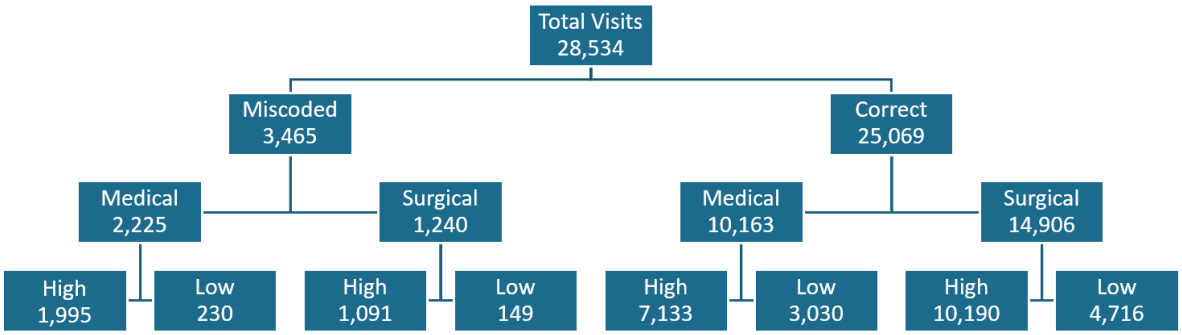

Figure 1: Total Emergency Department Visits Within 30 Days of Medical or Surgical Induced Abortion, by Coding Status and Acuity Level, 2016-2021.

Of the total 2,225 miscoded visits following a medical abortion, 1,995 (89.7%) were coded as high acuity. For the 10,163 visits following medical abortion that were correctly coded, 7,133 (70.2%) were high acuity. ED visits following medical abortion but mistakenly coded as spontaneous abortion are significantly (OR 3.68 [3.19-4.25], P<0.001, z=17.88) more likely to have high acuity than visits correctly coded (Figure 1).

Of the total of 1,240 miscoded ED visits following a surgical abortion, 1,091 (88.0%) were coded with high acuity. Of 14,906 visits following surgical abortion which were correctly coded, 10,190 (68.4%) were high acuity. As the result, ED visits following surgical abortion and mistakenly coded as spontaneous abortion are significantly (OR 3.39 [2.84-4.04], P<.001, z=13.70) more likely to have high acuity than correctly coded visits (Figure 1).

Abortion-Related Complication Visits (2016-2021)

There were 4,341 visits that were combined into the abortion-related population subset composed of the 3,465 miscoded spontaneous abortions and 876 visits that were coded specifically as complications following induced abortion (e.g., haemorrhage, embolism, renal failure). For all of these visits, only 20.2% were correctly coded. Among the 2,663 visits in this group following medical abortion, 2,225 (83.5%) were miscoded. Of the 1,678 visits following surgical abortion, 1,240 (73.9%) were miscoded as spontaneous abortion. Therefore, abortion-related ED visits following medical abortion were significantly (OR 1.79 [1.55-2.08], P<.001, z=7.66) more likely to be miscoded than visits following surgical abortion (Figure 2).

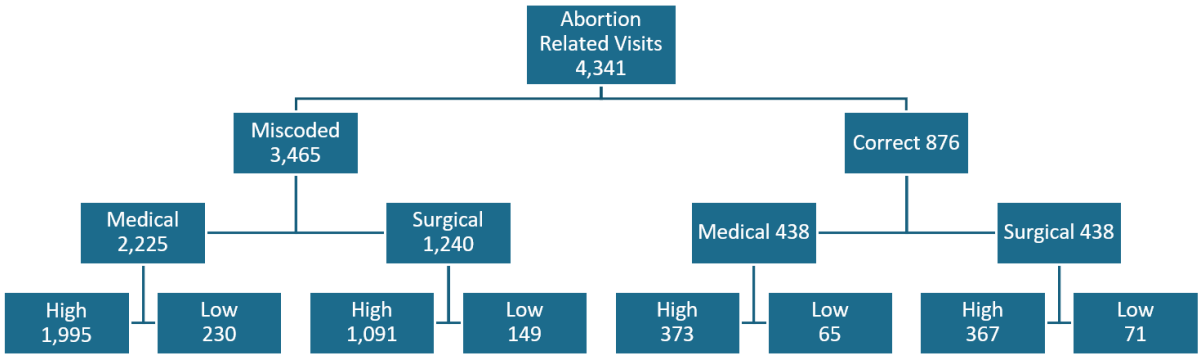

Figure 2: Abortion Related Emergency Department Visits Within 30 Days of Medical or Surgical Abortion, by Coding Status and Acuity Level, 2016-2021.

Of the 2,225 miscoded visits following a medical abortion, 1,995 (89.7%) were coded as high acuity. For the 438 visits following medical abortion that were correctly coded, 373 (85.1%) were high acuity. ED visits following a medical abortion are significantly (OR 1.51 [1.12-2.03], P=.006, z=2.73) more likely to be coded high acuity if they have been miscoded as spontaneous abortion rather than those correctly coded for abortion-related complications (Figure 2).

Of the 1,240 mistakenly coded ED visits following a surgical abortion, 1,091 (88.0%) were coded high acuity. For the 438 correctly coded visits, 367 (83.8%) were considered high acuity. Therefore, ED visits following a surgical abortion are significantly (OR 1.42 [1.04-1.92], P=.03, z=2.23) more likely to be considered high acuity if they have been miscoded rather than correctly coded (Figure 2).

Treatment mistakenly determined as resulting from a spontaneous abortion in an ED visit following within 30 days of any induced abortion is a pervasive problem, adversely impacting an accurate count of nearly 80% of abortion-related ED visits. While the acuity differences are smaller among abortion-related visits than all-cause ED visits, a clear pattern emerges from this analysis: ED visits following medical abortion are significantly more likely to be miscoded than those following surgical abortion; and miscoded ED visits have significantly higher acuity than correctly coded visits (Figures 3 and 4).

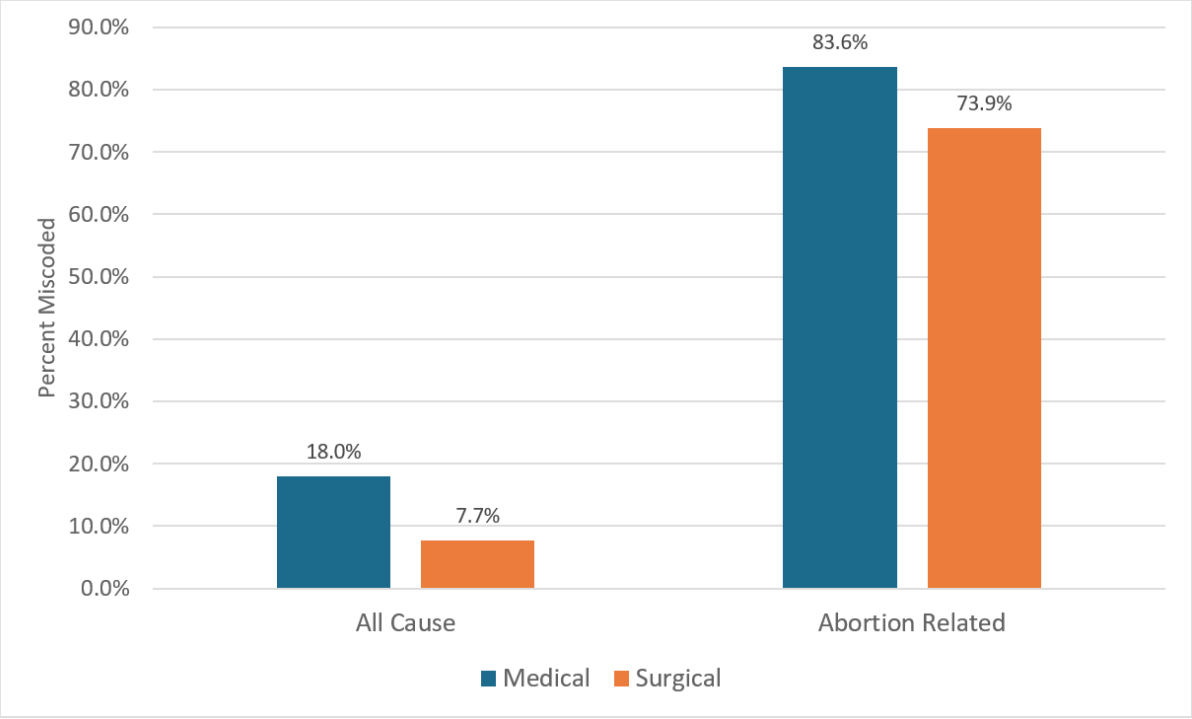

Figure 3: Percent of Visits Miscoded by Cause of Visit and Type of Abortion, 2016-2021.

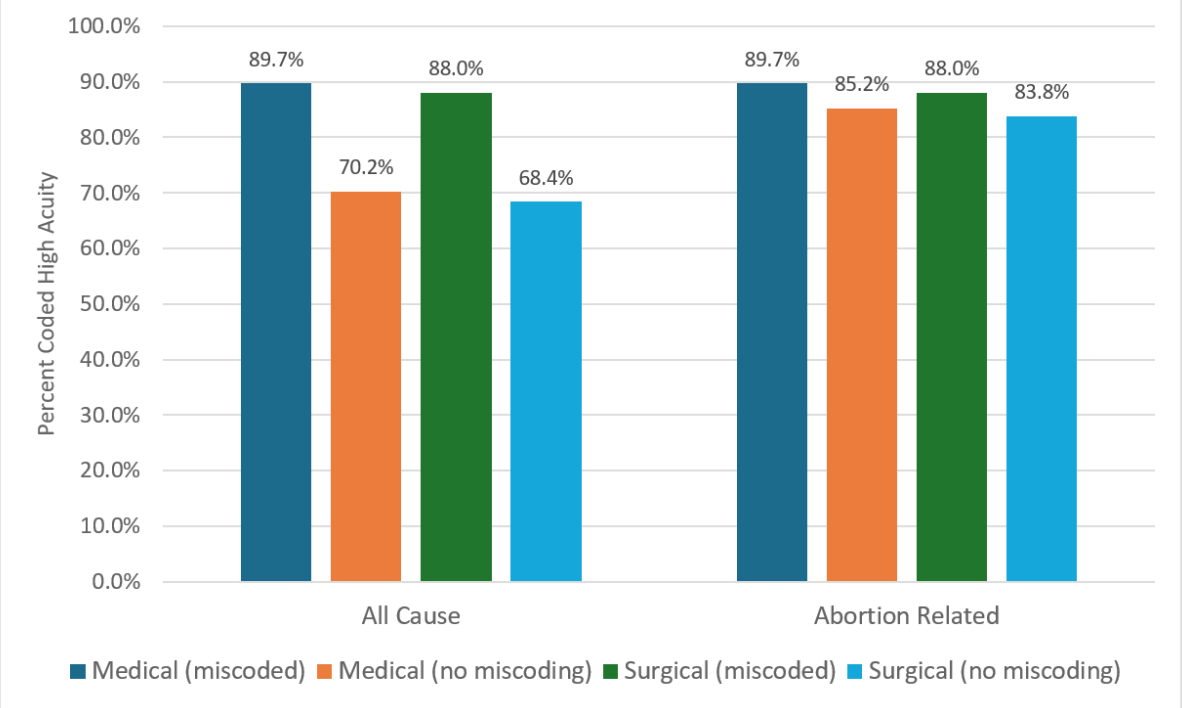

Figure 4: Percent of Visits Coded High Acuity by Cause, Abortion Type, and Miscoding, 2016-2021.

Discussion

The vast majority of induced abortions occurring up to 70 days of gestation are now conducted using the administration of mifepristone and misoprostol. However, these findings indicate there is an increasing likelihood that, should the woman require treatment in the ED following the abortion, the complication or adverse event is attributed to a spontaneous abortion or miscarriage and not the induced abortion. Further, on average, these miscoded visits require more extensive treatment than ED visits which are accurately coded.

Miscoding via concealment of the abortion could result in delay of the delivery of necessary care or otherwise influence or misdirect important decisions in the management of the patient's condition. Miscoding could also result from medical coding errors subsequent to an ED visit rather than active concealment by the patient, with both purposeful and accidental misclassifications resulting in the underreporting of post-abortion complications. As an example, studies have indicated that more than half of women who carry out a medical abortion experience severe pain [22,23]. Very recent studies have indicated that women are not prepared for the level of pain they feel, that for some it is comparable to the pain of a delivery and not, as often described to them, "like your period" [24,25]. Due to the prevalence of miscoding, if women sought medical attention in the emergency department for their unexpected severe pain, these episodes may be identified as the result of spontaneous abortion and not the medical abortion. These miscoded abortion complications remain invisible to research scientists resulting in a large underestimation of actual medical abortion complications. Further research on the incidence, acuity and contributing factors of adverse events associated with the concealment via miscoding of induced abortion is warranted.

This study has limitations. Medicaid beneficiaries are by definition financially disadvantaged, and these results may not be generalizable to other socio-economic populations. Administrative claims payment data are subject to coding errors, inconsistent coding practices and the exclusion of codes considered nonessential for billing purposes [26,27]. Comparisons between the discontinued CMS MAX and current TAF files suggest that there may be differences which could marginally affect the ED visit counts but there is no reason these differences would bias the miscode prevalence rates in either observation time period [28]. Acuity increases could be influenced by systematic ED use by sicker patients [29].

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Ethical Considerations

This study has been exempted from Institutional Review Board (IRB) review pursuant to U.S. Department of Health and Human Services Policy for Protection of Human Research Subjects at C.F.R. 46.101(b). See IRB: 7269, www.sterlingirb.com.

Conflict of Interest

In accordance with the requirement by Family Medicine and Primary Care: Open Access to disclose any potential conflicts of interest, all authors declare they are affiliated with the Charlotte Lozier Institute; Cirucci, Skop, and Harrison declare that they are affiliated with the American Association of Pro-Life Obstetricians and Gynecologists; and Reardon declares that he is affiliated with the Elliot Institute, as stated in the title page.

Author Contributions

Conceptualization: JS

Investigation: All authors

Methodology: JS, JWF

Formal Analysis: JS, CC, JWF

Writing, Original Draft: JS

Writing, Review and Editing: All authors

Availability of Data

Data or data access are available from CMS, but under the data use agreement (CMS DUA RSCH-2019-53489), the authors may not share data.

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