

Medication Abortions Among New York City Residents, 2001–2008

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CONTEXT: Population-level research on trends in medication abortions and the association of patient characteristics and facility type with procedure choice is limited. Surveillance is necessary to ensure accurate reporting and understanding of service availability.

METHODS: New York City induced abortion data for 2001–2008 were used to calculate medication abortion prevalence among women undergoing early abortions (i.e., at nine or fewer weeks of gestation). Multiple logistic regression analysis was used to assess associations between selected characteristics and having a medication, as opposed to surgical, abortion. Proportions of patients who went to clinics or hospitals that did not offer medication abortions were also calculated.

RESULTS: Five percent of early abortions were medication procedures in 2001; the proportion rose to 13% by 2008. Eighty-two percent of medication abortions in 2008 were performed at freestanding clinics, and 10% at doctors' offices. The likelihood of having had a medication abortion, rather than a surgical one, was lower among blacks and Hispanics than among whites (odds ratios, 0.5 and 0.7, respectively). Medication abortions were more likely among women with more than 12 years of education than among those with less than a high school education (2.1), and more likely among those who went to doctors' offices than among clinic patients (3.6). Throughout 2001–2008, medication abortions were not available at 50% of hospitals and 31% of clinics that provided early abortions.

CONCLUSIONS: The increasing prevalence of medication abortions highlights the importance of active surveillance. Because many facilities do not offer the procedure, a better understanding of barriers to provision is needed.

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In 2000, the Food and Drug Administration's approval of the use of mifepristone in combination with misoprostol for medication abortion was a significant development in abortion provision.^{1–4} Women in the United States now had access to an abortion method that already accounted for more than half of abortions performed by 7–9 weeks' gestation in parts of Europe.¹ More than 20% of abortions performed by nine weeks' gestation in the United States were medication abortions in 2008, compared with fewer than 1% before mifepristone's approval.^{5,6}

As medication abortions have become more available in the United States, surveillance is increasingly critical to ensure the accuracy of abortion statistics and illuminate patterns of use among different subgroups. The Centers for Disease Control and Prevention (CDC) and the Guttmacher Institute periodically report on the prevalence of medication abortions. However, states are not required to provide abortion data to the CDC, and reporting on some variables, including race and ethnicity, is inconsistent.⁷ The Guttmacher Institute compiles more complete abortion numbers from its Abortion Provider Surveys,⁴ but these statistics are reported in the aggregate by clinic and cannot be analyzed at the patient level.

In this study, we have sought to fill gaps in the literature on population-level trends and patterns in use of

medication abortion by drawing on surveillance data from a large, diverse urban population. In New York City, providers are required to report all abortions to the Department of Health and Mental Hygiene. Data are available at the individual level, and include information that has not been previously analyzed for New York City, such as patients' education and zip code. This study's objectives are to describe medication abortion trends in New York City overall and among various subpopulations; to understand the relationship between patient characteristics and the choice of a medication abortion; and to describe the availability of medication abortions among freestanding clinics and hospitals.

METHODS

Data

Our study used data from New York City induced abortion certificates for all 667,633 procedures that occurred from 2001 to 2008. Procedures in 2000 were excluded because mifepristone was not approved until September of that year. Data were compiled by the Department of Health and Mental Hygiene's Bureau of Vital Statistics, which conducts active surveillance of abortion facilities by periodically identifying and contacting known providers and using sources such as local newspapers to identify

new providers. We used the 662,292 observations with complete information on abortion type to describe overall trends in medication abortions among New York City residents. For subsequent analyses, the data were limited to the 485,702 women who had had an early abortion—defined as any procedure performed at nine or fewer weeks' gestation—and who had therefore been eligible for a medication abortion.⁸

A range of social and demographic characteristics were examined: race and ethnicity, age, years of education, number of previous pregnancies, marital status, nativity, payment method, borough of residence and neighborhood poverty rate. We created a four-level indicator of neighborhood poverty using 2000 U.S. census data on the proportion of residents in a zip code with incomes below the 1999 federal poverty line: low (less than 10%), moderate (10% to less than 20%), high (20% to less than 30%) and very high (30% or more). We used Bureau of Vital Statistics classification of facilities as freestanding clinics, hospitals or private doctors' offices.

Information on the abortion certificate included gestational age and type of termination procedure. An abortion was classified as surgical if the corresponding boxes were indicated, and as medication if the "medical (nonsurgical)" box was selected.⁹ On fewer than 1% of all certificates, the "other" box or none was checked; these procedures were excluded from analyses.

Analysis

We described trends in the prevalence of medication abortions from 2001 to 2008 as a proportion of early abortions among all women, by race and ethnicity, and by facility type. Chi-square tests were performed to examine trends.

The prevalence of medication abortions for the period 2001–2008 was calculated for all women undergoing early terminations, by social and demographic subgroup, and by facility type. We classified each freestanding clinic and hospital by whether it had performed any medication abortions during the study period; this information was not available for individual doctors' offices. The proportion of patients who had had an early abortion at facilities that did not provide medication abortions was assessed overall and by race and ethnicity, education and neighborhood poverty.

We conducted bivariate logistic regression analysis to identify factors associated with having a medication abortion. We then used multiple logistic regression analysis to simultaneously adjust for all characteristics studied. These models included year indicators to capture the associations with unobserved characteristics that varied across time but were constant within yearly cohorts, such as knowledge of medication abortions in the general population. We used the *cluster* option in Stata 11 to adjust standard errors for patient clustering at facilities. While we were able to identify individual hospitals and freestanding clinics, only borough of location was available for doctors' offices; hence, we used unique facility codes for hospitals

and freestanding clinics, and the borough as cluster units for doctors' offices.

RESULTS

Trends in Medication Abortions

From 2001 to 2008, more than 80,000 abortions were performed annually among New York City residents; approximately 60,000 per year were early abortions (Table 1). In 2001, the first full year in which mifepristone was available, 5% of early terminations were medication abortions. The proportion increased 30%, on average, annually between 2001 and 2004, was almost unchanged over the next two years, and rose by 30% between 2006 and 2008 (chi-square test for trend, $p < .0001$). Medication abortions represented 13% of all early abortions in 2008.

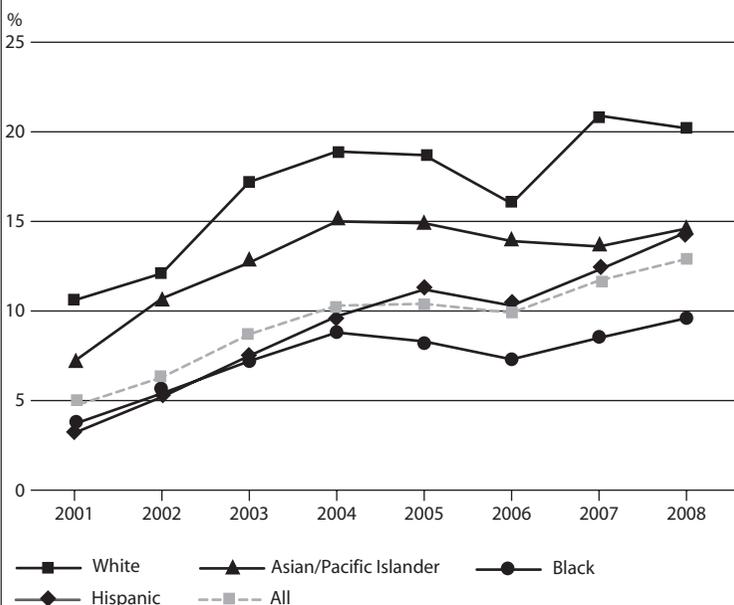
Among women having early abortions, white women consistently had the highest prevalence of medication abortions (Figure 1). In 2001, medication procedures accounted for 11% of early abortions among this group,

TABLE 1. Number of all abortions and of early abortions among New York City residents, and percentage of each that were medication abortions, 2001–2008

Year	All		Early	
	No.	% medication	No.	% medication
2001	85,122	3.6	61,022	4.7
2002	84,605	4.9	62,047	6.3
2003	83,366	6.7	61,100	8.7
2004	84,314	8.0	62,008	10.3
2005	81,772	8.0	60,177	10.4
2006	81,083	7.8	59,840	9.9
2007	81,790	9.2	60,204	11.7
2008	80,240	9.8	59,304	12.9

Notes: Early abortions were performed at nine or fewer weeks' gestation. Unspecified types of abortions were excluded.

FIGURE 1. Percentage of early abortions that were medication abortions, by women's race and ethnicity, 2001–2008



compared with 7% among Asians and Pacific Islanders, and 3–4% among blacks and Hispanics. By 2008, medication abortions accounted for 20% of early abortions among whites and for 10–15% among other women. Following consistent increases in prevalence through 2004 for all racial and ethnic groups, use either declined slightly or increased at a slower rate through 2006. From 2006 to 2008, the prevalence of medication abortions increased

among all groups; the greatest increase occurred among blacks and Hispanics. Chi-square tests for trends were significant for all groups ($p < .0001$).

Medication abortions accounted for 16% of early abortions performed at doctors' offices in 2001, compared with 4% at freestanding clinics and 3% at hospitals (Figure 2). In 2008, 31% of early abortions at doctors' offices were medication abortions, as were 12% at freestanding clinics and 11% at hospitals ($p < .0001$).

The vast majority of early abortions in New York City were performed at freestanding clinics (not shown). In 2001, 19% of medication abortions were performed at doctors' offices, 6% at hospitals and 75% at freestanding clinics. In 2008, the proportions were 10%, 8% and 82%, respectively. Although only 4% of all early abortions in 2008 were performed at doctors' offices, these facilities played a greater role in the provision of medication abortions than of early surgical abortions, accounting for 10% and 3% of procedures, respectively.

Patient Characteristics

Nine percent of all early abortions performed in 2001–2008 were medication abortions (Table 2). Groups with the highest prevalence of medication abortion included whites (17%), Asians and Pacific Islanders (13%), women with more than 12 years of education (15%), women with no previous pregnancies (13%), residents of low-poverty neighborhoods (12%) and those who had the procedure performed in a doctor's office (23%).

In adjusted analyses, six of the 10 examined characteristics were correlated with whether a patient had obtained a medication abortion. Blacks and Hispanics were less likely than whites to have had a medication abortion (odds ratios, 0.5 and 0.7, respectively), and women with more than 12 years of education had twice as high odds of having had a medication abortion as those with fewer than 12 years (2.1). Women who had had two or more pregnancies were less likely than those with no previous pregnancies to have had a medication abortion (0.7). The likelihood of having obtained a medication rather than a surgical abortion was lower among women who lived in Queens or Staten Island than among those living in Manhattan (0.5–0.6), and patients who lived in areas of very high poverty had lower odds of having had a medication abortion than those in low-poverty areas (0.8). Finally, compared with women who went to freestanding clinics, those who went to doctors' offices had almost four times the odds of having obtained a medication abortion (3.6).

Availability of Medication Abortions

While variation in use of medication abortion across subgroups may reflect group preferences or general knowledge of abortion options, we also examined facility-related factors regarding access to the procedure. Overall, the prevalence of medication abortion among early abortions in the period 2001–2008 was highest at doctors' offices (23%), followed by freestanding clinics (9%) and hospitals

TABLE 2. Percentage of early abortion patients who had a medication abortion, and odds ratios (and 95% confidence intervals) from multiple logistic regression analysis assessing the likelihood of having had a medication rather than a surgical abortion, all by selected characteristics

Characteristic	N	%	Odds ratio	
			Unadjusted	Adjusted
All	485,702	9.3	na	na
Race/ethnicity				
Black	222,991	7.3	0.39 (0.38–0.40)	0.52 (0.41–0.67)
Hispanic	160,188	9.2	0.50 (0.49–0.51)	0.66 (0.53–0.82)
White (ref)	51,889	16.8	1.00	1.00
Asian/Pacific Islander	28,552	12.8	0.73 (0.70–0.76)	0.84 (0.65–1.08)
Age				
≤19 (ref)	68,820	8.4	1.00	1.00
20–29	264,152	10.1	1.23 (1.19–1.26)	1.13 (0.95–1.34)
≥30	150,862	8.4	1.00 (0.97–1.03)	0.96 (0.73–1.25)
Yrs. of education				
<12 (ref)	75,603	7.0	1.00	1.00
12	198,025	8.0	1.16 (1.12–1.20)	1.19 (0.86–1.65)
>12	123,878	15.3	2.41 (2.34–2.49)	2.10 (1.52–2.90)
Previous pregnancies				
0 (ref)	110,531	12.6	1.00	1.00
1	82,686	10.7	0.83 (0.81–0.86)	0.89 (0.77–1.01)
≥2	292,434	7.7	0.58 (0.57–0.59)	0.70 (0.57–0.87)
Marital status				
Married (ref)	75,713	9.6	1.00	1.00
Unmarried	398,245	9.0	0.94 (0.92–0.97)	1.01 (0.84–1.22)
Nativity				
U.S.-born (ref)	300,296	9.4	1.00	1.00
Foreign-born	166,058	9.1	0.96 (0.94–0.98)	0.96 (0.83–1.11)
Payment method				
Medicaid (ref)	183,202	7.6	1.00	1.00
Other third party	134,595	9.5	1.28 (1.24–1.31)	1.02 (0.75–1.37)
Self-pay	159,893	11.0	1.50 (1.46–1.53)	1.08 (0.72–1.61)
Borough				
Manhattan (ref)	74,474	13.0	1.00	1.00
Bronx	116,027	8.9	0.66 (0.64–0.68)	0.89 (0.44–1.82)
Brooklyn	170,495	9.0	0.66 (0.65–0.68)	0.83 (0.39–1.76)
Queens	109,346	8.0	0.58 (0.56–0.60)	0.54 (0.31–0.94)
Staten Island	15,360	8.1	0.59 (0.55–0.63)	0.56 (0.37–0.86)
Neighborhood poverty rate†				
Low (ref)	43,150	11.7	1.00	1.00
Moderate	135,965	9.6	0.80 (0.77–0.83)	0.93 (0.85–1.02)
High	118,390	9.4	0.78 (0.76–0.81)	0.89 (0.77–1.02)
Very high	176,885	8.0	0.66 (0.64–0.68)	0.78 (0.63–0.97)
Type of facility				
Freestanding clinic (ref)	408,648	8.9	1.00	1.00
Hospital	54,213	6.9	0.76 (0.73–0.79)	0.74 (0.23–2.41)
Doctor's office	22,837	22.9	3.04 (2.94–3.14)	3.55 (1.54–8.15)

†Proportion of residents with incomes below the 1999 federal poverty line: low, less than 10%; moderate, 10% to less than 20%; high, 20% to less than 30%; very high, 30% or more. Notes: The adjusted model controlled for all characteristics in the table, as well as year of procedure. "Other" and "unknown" responses were included in the overall N and percentage, and in the adjusted model. na=not applicable. ref=reference category.

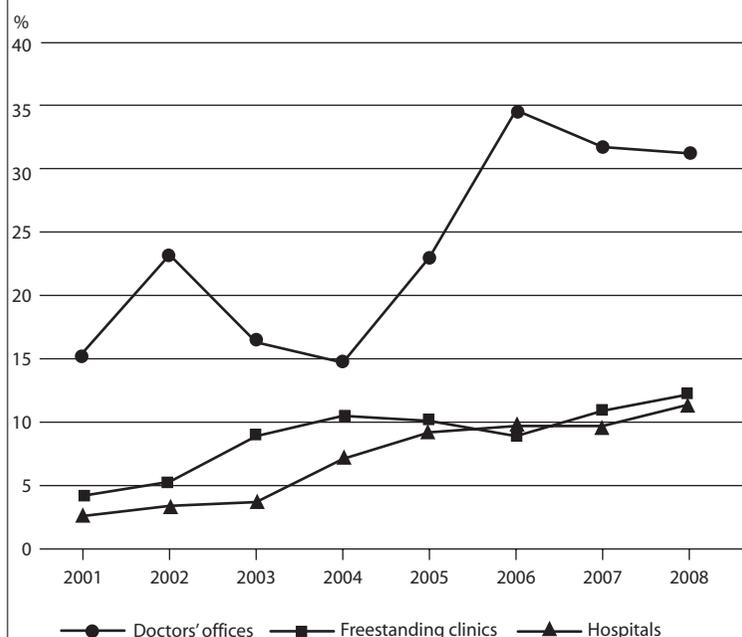
(7%), but within facility types, availability varied significantly. Thirty-one percent of freestanding clinics and 50% of hospitals that provided early abortions did not perform any medication abortions in the study period (not shown). These facilities accounted for 9% and 29% of all early abortions at freestanding clinics and hospitals, respectively (Table 3), but the proportions varied among subgroups of women. Among patients who had had an early abortion at freestanding clinics, Hispanics, women with fewer than 12 years of education and women who lived in neighborhoods characterized by very high poverty had the highest likelihoods of using clinics that did not offer medication abortions (12–17%). Among hospital patients, Hispanics, women with fewer than 12 years of education, and residents of neighborhoods with low or very high poverty were the most likely to have gone to facilities that did not perform medication abortions (33–35%).

DISCUSSION

Since mifepristone was approved, medication abortions have become an important reproductive health option for New York City residents seeking early terminations. The increase in the prevalence of medication abortions in New York City from 5% of early abortions in 2001 to 13% in 2008 is consistent with national trends reported by the CDC and the Guttmacher Institute.^{4,10–15}

We observed unevenness in the trend—notably, flat or slightly declining rates between 2004 and 2006. One possible explanation is incomplete abortion reporting during this period. The New York City Bureau of Vital Statistics conducts active surveillance of induced abortions by periodically contacting known and new providers. The total number of abortions reported depends on the amount

FIGURE 2. Percentage of early abortions that were medication abortions, by type of facility, 2001–2008



of surveillance and can therefore vary from year to year, depending on resources.⁹ One method for identifying new providers, for example, is investigating abortion advertisements in community publications, which is labor-intensive. Periodic outreach to the wider medical community—including family medicine and primary care physicians—may be needed to ensure that new providers, particularly doctors' offices, are actively reporting medication abortions.

Our multiple regression analysis indicated that race and ethnicity and education were among the strongest predictors of type of abortion: Whites and women with more education had increased odds of having obtained medication abortions. Cost may partly explain these patterns, particularly during the early years of mifepristone availability. Nationwide, in 2001, the mean cost of a medication abortion exceeded that of a surgical abortion by as much as \$100.¹⁶ In 2009, the median cost of a medication abortion was \$490; for a surgical abortion at 10 weeks' gestation, it was \$470.⁶ However, costs may differ substantially among facilities: A survey of five of New York City's largest abortion facilities (each of which reported at least 4,970 abortions in 2008) revealed that four of them charged \$35–175 more for a medication than for an early surgical abortion.¹⁷ Clinical studies of the acceptability of mifepristone among U.S. women did not find significant correlations between acceptability and social and demographic characteristics; however, participants were not required to pay for their abortions, so the additional cost of a medication abortion was not a consideration for these women.^{18–20}

Limited education may be a barrier to having a medication instead of a surgical abortion, because of the relative complexity of medication abortion protocols. Such abortions

TABLE 3. Percentage of early abortion patients who went to facilities that did not perform any medication abortions, by facility type, according to selected characteristics

Characteristic	Freestanding clinics		Hospitals	
	N	%	N	%
All†	408,648	8.6	54,213	29.0
Race/ethnicity**				
Black	195,333	5.8	21,892	25.0
Hispanic	129,400	16.1	21,555	32.6
White	43,065	2.6	5,971	27.6
Asian/Pacific Islander	21,409	4.9	3,208	28.1
Yrs. of education**				
<12	58,116	16.6	13,372	32.5
12	167,618	12.0	22,822	21.9
>12	108,220	4.5	10,798	21.5
Neighborhood poverty rate**,‡				
Low	36,437	2.9	4,174	34.0
Moderate	113,870	6.8	12,721	26.3
High	99,013	6.9	14,018	20.3
Very high	151,424	12.3	21,619	35.1

**Percentages within facility type were significantly different at $p < .01$.

†Includes patients with missing information for the characteristics shown.

‡Proportion of residents with incomes below the 1999 federal poverty line: low, less than 10%; moderate, 10% to less than 20%; high, 20% to less than 30%; very high, 30% or more.

require more engagement by patients and detailed instructions from providers, since the process often involves women's taking a second pill at home, as well as a follow-up visit to confirm termination.⁸

The type of abortion facility was also a strong predictor of whether women had a medication abortion, as those who went to a doctor's office were more likely than clinic patients to have had the procedure. Because medication abortions do not require surgical skills or specialized equipment, it is easier for most physicians to offer them to patients than to perform surgical abortions.

Half of hospitals and one-third of clinics that performed early abortions did not provide any medication abortions during the study period. Among patients at freestanding clinics—who accounted for the vast majority of early abortions—increased proportions of Hispanics, women with fewer than 12 years of education and those living in neighborhoods of very high poverty went to facilities that did not provide medication abortions. This variation may partly account for the social and demographic differences in the prevalence of medication abortion. Yet it is unclear why this variation exists, particularly in New York City, which has a large number of abortion facilities and good public transportation. One possible explanation is that clinics that do not offer medication abortions may be more likely than others to be located in areas of very high poverty. Furthermore, the social and demographic characteristics of these facilities' patients may have been the same prior to mifepristone's approval. These findings may reflect patterns of care-seeking for abortion that predate the introduction of mifepristone.

Notably, the social and demographic patterns among clinic patients did not always hold for hospital patients. This may partly reflect differences in the geographic distribution of hospitals that do not provide medication abortions. Also, patients who have abortions at hospitals may be more likely to have been referred by private doctors or family planning clinics, while abortion clinic patients may be more likely to have independently sought out specific facilities. Further study is required to test these hypotheses.

Recent efforts by abortion advocates to integrate abortion into the training of obstetricians and gynecologists have been aimed at encouraging doctors to offer the procedure in their practices.²¹ Advocates hoped that the approval of mifepristone offered another means by which private doctors' offices could increasingly provide abortions, possibly allowing women to receive abortion care from their personal doctors.^{3,22-24} Compared with clinics that specialize in abortion, private doctors' offices may be better positioned to effectively provide continuity in patients' reproductive health care, including contraceptive counseling to prevent future unintended pregnancies. However, in New York City, private doctors' offices performed 4% of all abortions in 2008 (the proportion was 1% for the United States in 2008),⁶ and accounted for only

10% of medication abortions. Medical liability insurance may be one barrier to abortion provision among family medicine physicians, whose insurance carriers may either charge large premiums or refuse coverage outright.²⁵

One limitation of the data is that they did not permit us to identify individual doctors' offices; we could not determine the number of offices providing abortions during the study period or whether the same providers performed surgical abortions in hospitals while offering medication abortions at their offices. The latter possibility could explain some of the difference in medication abortion prevalence among types of facilities. In addition, underreporting by doctors' offices may be harder to detect than that by hospitals and freestanding clinics, given the relatively small numbers of abortions performed at offices. One potential consequence is an underestimate of abortions, particularly medication abortions, performed at doctors' offices. Whether the approval of mifepristone has resulted in the entry of new doctor providers who perform only medication abortions remains an unanswered question.

This study is the first to use population-based data to examine the social and demographic characteristics associated with having a medication, as opposed to surgical, abortion, as well as to describe availability among hospitals and clinics in New York City. Our results suggest that patient characteristics may predict the likelihood of having a medication abortion; whether these are related to the added cost of the procedure requires exploration. Almost a decade after mifepristone's approval, large proportions of facilities still do not offer medication abortions. Further research on barriers to provision, including additional staffing, medication costs and insurance coverage, may help clarify the extent to which these issues are considerations for facilities.

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