Effectiveness of Treatment Strategies of Some Women With Pelvic Inflammatory Disease

A Randomized Trial

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Objective: Among all women with pelvic inflammatory disease (PID), prevention of adverse reproductive consequences appears to be similarly achieved by outpatient treatment and inpatient treatment. We assessed whether outpatient is as effective as inpatient treatment in relevant age, race, and clinical subgroups of women with PID.

Methods: Women with clinical signs and symptoms of mild-to-moderate pelvic inflammatory disease (n = 831) were randomized into a multicenter trial of inpatient treatment, initially employing intravenous cefoxitin and doxycycline compared with outpatient treatment consisting of a single intramuscular injection of cefoxitin and oral doxycycline. Comparisons between treatment groups during a mean of 84 months of follow-up were made for pregnancies, live births, time to pregnancy, infertility, PID recurrence, chronic pelvic pain, and ectopic pregnancy.

Results: Outpatient treatment assignment did not adversely impact the proportion of women having one or more pregnancies, live births, or ectopic pregnancies during follow-up; time to pregnancy; infertility; PID recurrence; or chronic pelvic pain among women of various races; with or without previous PID; with or without baseline *Neisseria gonorrhoeae* and/or *Chlamydia trachomatis* infection; and with or without high temperature/white blood cell count/pelvic tenderness score. This was true even in teenagers and women without a previous live birth. Ectopic pregnancies were more common in the outpatient than the inpatient treatment group, but because these were so rare, the difference did not reach statistical significance (5 versus 1, odds ratio 4.91, 95% confidence interval 0.57–42.25).

Conclusion: Among all women and subgroups of women with mild-to-moderate PID, there were no differences in reproductive outcomes after randomization to inpatient or outpatient treatment.

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Level of Evidence: I

Pelvic inflammatory disease (PID) is a common clinical condition consisting of ascending infection from the lower genital tract to the upper genital tract, affecting approximately 8% of all reproductive-age women and 11% of African-American reproductive-age women in the United States.[1] Although acute signs and symptoms are often of moderate severity, long-term sequelae can be serious and include infertility, ectopic pregnancy, recurrent episodes of PID, and chronic pelvic pain.[2–5]

Over three quarters of women treated for PID in the United States are managed as outpatients, a move away from hospital-based management that has accelerated over the past 2 decades.[6] Concerns have been raised that outpatient treatment may not be optimal in maintaining fertility potential and should be avoided,

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particularly in nulliparous and young women.[7] In 2002, we published the first evidence establishing the effectiveness of outpatient management for PID. The Pelvic Inflammatory Disease Evaluation and Clinical Health (PEACH) study, a randomized clinical trial that compared the recommended inpatient and outpatient antibiotic regimens of the Centers for Disease Control and Prevention (CDC), found no differences between treatment groups in the rates of pregnancy, time to pregnancy, recurrence of PID, chronic pelvic pain, or ectopic pregnancy among women with mild-to-moderate PID overall.[8] However, we did not have adequate power to test for treatment-related differences within clinically relevant subgroups.

Since the publication of that report, we have followed the PEACH cohort for an additional 49 months (to a mean follow-up of 84 months). This extended follow-up now allows us to update the comparison of the effectiveness of outpatient and inpatient treatments among women with suspected PID overall; it also gives us additional power to compare treatments within various age, race, parity, and clinical subgroups.

MATERIALS AND METHODS

Methods of participant selection and recruitment, data collection, and follow-up have been described in detail elsewhere.[9] Briefly, between March 1996 and February 1999, women aged 14–37 were recruited from emergency departments, clinics, and sexually transmitted disease units at 7 major (over 90% of enrollment) and 6 minor clinical sites in the eastern, southern, and central regions of the United States. Human subject use approval was obtained at each participating institution, and all participants provided informed consent. Eligibility was based on clinically generalizable criteria that included 1) a history of pelvic discomfort for a period of 30 days or less, 2) findings of pelvic organ tenderness (uterine or adnexal) on bimanual examination, and 3) leukorrhea or mucopurulent cervicitis or both and/or untreated, but documented, gonococcal or chlamydial cervicitis. *Leukorrhea* was defined as white blood cells (WBC) in excess of epithelial cells viewed microscopically, and *mucopurulent cervicitis* was defined by the presence of grossly yellow-green exudate on a cervical swab.

Participants were selected from 2,941 women screened. Excluded were 346 (11.9%) women who did not meet the inclusion criteria. An additional 1,080 (36.7%) women were excluded on the basis of a priori criteria, including 141 (4.8%) due to pregnancy, 246 (8.4%) who had taken antimicrobial agents in the preceding 7 days, 248 (8.4%) with a previous hysterectomy or bilateral salpingectomy, 51 (1.7%) with an abortion, delivery, or gynecologic surgery in the preceding 14 days, 191 (6.5%) with suspected tuboovarian abscess or other condition necessitating surgery, 163 (5.5%) with an allergy to the study medication, 29 (1.0%) who were homeless, and 11 (0.4%) who vomited after a trial of antiemetic treatment. There were 1,515 women eligible. Of these, 651 refused participation, and of 864 women enrolled, 831 (54.9% of those eligible) were contacted at least once after randomization.

The inpatient strategy involved intravenous cefoxitin (2 g every 6 hours) and intravenous or oral doxycycline (100 mg twice a day) for at least 72 hours, followed by oral doxycycline (100 mg twice a day) for a total 14-day course. Outpatient treatment consisted of a single intramuscular injection of cefoxitin (2 g) plus single oral dose of probenecid (1 g), followed by oral doxycycline (100 mg twice daily) for 14 days. Participants were advised to have their partners treated and to abstain from sexual intercourse until the completion of their partners' treatment.

Random assignment to inpatient and outpatient treatment was generated by the Data Coordinating Center using random blocking stratified by clinical site. Clinical sites received assignments in sealed envelopes and opened these after enrollment and baseline data collection. The Data Coordinating Center ensured correct randomization for all participants. Neither patients nor providers were blinded to group assignment.

Participants were monitored with in-person visits at 5 and 30 days. Subsequent telephone follow-ups were conducted every 3 months during the first year after enrollment and then every 4 months until June 2004, at which point we were in contact with and obtained self-reported follow-up information for 541 (69.1% of women still alive and consenting), representing a mean follow-up time of 84 months (range 64–100 months). The mean follow-up was almost identical among women assigned to inpatient treatment (84.2 months) and outpatient treatment (84.1 months).

Baseline data on demographic descriptors, gynecologic and reproductive history, lifestyle habits, and clinical aspects of the current illness were obtained by a standardized 20-minute interview conducted by study nurses at each center. Subsequent follow-ups elicited self-reported information about pelvic pain, pregnancy and births, signs/symptoms of PID, sexually transmitted infections, contraceptive use, pattern of sexual intercourse, and health care utilization.

Standardized gynecologic examinations were conducted at 5 and 30 days and included tenderness assessment using the 36-point scale developed by McCormick et al,[10] ascertainment of cervical swabs for *N gonorrhoeae* cultures and *C trachomatis* polymer-

ase chain reaction (PCR) detection, collection of vaginal swabs for Gram stain detection of bacterial vaginosis, and aspiration of the endometrium for detection of gonorrhea and chlamydia. Endometrial aspiration followed meticulous cleansing of the cervix with povidone-iodine and alcohol. A central reference laboratory performed the PCRs and Gram stains. Interpreted according to the Nugent criteria, a Gram stain score of 7–10 categorized bacterial vaginosis.[11]

The primary outcomes were pregnancy-related and included the occurrence of a first pregnancy (including live birth, spontaneous/therapeutic abortion, or ectopic pregnancy), first live birth, or first ectopic pregnancy in a given woman; time to first pregnancy; and infertility. *Infertility* was defined when a sexually active woman with at least 12 months of follow-up did not report conception (positive urine or blood test or doctor's diagnosis of pregnancy) despite rare or no use of a contraceptive method. Ectopic pregnancy was based on self-report, verified whenever possible by medical record review. Medical records were available for 45% of the cohort. Other outcomes of interest included chronic pelvic pain measured on the Von Korff pain scale,[12] reported during at least 2 consecutive follow-ups, thereby suggesting a minimum duration of pelvic pain of 6 months. Recurrent PID was self-reported and verified whenever medical records were available. As we previously reported, confirmation of recurrent PID was found in 76% of medical records that could be obtained, and rates of PID by self-report and medical record review were similar.[8]

Power calculations developed before embarking on the additional 49 months of cohort follow-up revealed that we would have acceptable power to detect differences between treatments among age, race, and clinical subgroups. For example, among women without a history of PID, assuming an outcome rate of 50% in the outpatient group, we would be able to detect as statistically significant outcome rates of 37% or less or 63% or more, which is a 26% relative difference in treatment effectiveness. Assuming an outcome rate of 25% in the outpatient group, we would be able to detect as statistically significant a relative difference between treatments of 44%. Finally, assuming an outcome rate of only 10%, we would be able to detect as statistically significant a relative difference between treatment groups of 70%. These calculations assume a 70% follow-up rate, 80% power, and a 2-sided α of 0.05. Notably, our follow-up rate was close to 70%, and study outcomes (with the exception of ectopic pregnancies) occurred at rates above 10%.

Baseline differences between groups were analyzed with the test for normally distributed continuous variables, the Mann-Whitney U test for nonnormally distributed continuous variables, and the χ^2 or Fisher exact test for categorical variables. Odds ratios with 95% confidence intervals were the main indicators of association. An intention-to-treat principle was followed for all outcomes. Odds ratios adjusted for intrauterine device (IUD) use and bacterial vaginosis were derived from logistic regression analyses. Each model was run for a given overall outcome of interest and then within subgroups. For example, overall pregnancy was the dependent variable in one logistic model, wherein inpatient versus outpatient treatment was the main dependent variable. All subgroups, consisting of age ($\leq$ 19, 20–24, $\geq$ 25 years), race (African American, white, other), parity (nulliparous, any live birth), history of PID (any, none), evidence of gonococcal/chlamydial genital infection at baseline (none, chlamydia and/or gonorrhea), and high temperature/WBC/pelvic tenderness score (no, yes), were defined a priori. These clinical criteria were defined as presence of any of the following: oral temperature 38.3°C or greater, WBC 15,000 or greater, or highest quartile for pelvic tenderness (score $>$ 14). Time to pregnancy was analyzed by using a Kaplan Meier life table analysis and was stratified on the basis of the aforementioned subgroups.

RESULTS

At baseline, women enrolled in the PEACH study were predominately African American (75%) and less than age 25 years (65%) (Table 1). Approximately one third of participants reported a previous history of PID and showed evidence of *N gonorrhoeae* and/or *C trachomatis* at baseline. At baseline, the women in the outpatient and inpatient treatment groups were similar, with the exception that women in the outpatient group were more likely to have an IUD in place and to have bacterial vaginosis.

After a mean follow-up period of 84 months, pregnancy frequency was not significantly different by treatment group, either overall or among subgroups based on race, previous history of PID, parity, baseline gonococcal and/or chlamydial genital infection, or temperature/WBC/pelvic tenderness score (Table 2). In particular, with the exceptions described below, odds ratios (ORs), both without and with adjustment, were bounded by 95% confidence intervals (CIs) that included the null value of 1.0. We also recategorized women with high temperature/WBC/pelvic tenderness score, including only women in the top 10% for tenderness score and again found no significant differences between treatment groups in this more strictly defined subgroup.

Older (age at least 25 years) women were more

Table 1. Baseline Characteristics of Women Enrolled in the PEACH Study by Inpatient and Outpatient Assignment

	Outpatient (n = 422)		Inpatient (n = 409)		
Baseline Characteristic	**n**	**%**	**n**	**%**	***P***
Age					
≤ 19 y	108	25.6	101	24.7	.33
20–24 y	159	37.7	174	42.5	
≥ 25 y	155	36.7	134	32.8	
Race					
African American	315	74.6	306	74.8	.94
White	69	16.4	64	15.6	
Other	38	9.0	39	9.5	
Education					
< High school graduate	161	38.3	158	38.6	.50
High school graduate	151	36.0	159	38.9	
> High school graduate	108	25.7	92	22.5	
History of PID	127	30.5	124	30.6	.96
Live births					
0	148	35.3	143	35.0	.97
1–2	197	47.0	195	47.8	
≥ 3	74	17.7	70	17.2	
Bacterial vaginosis (Gram stain)*	237	65.2	203	55.2	.03
Contraception past 4 weeks					
Oral contraceptives	42	11.8	38	10.9	.69
Medroxyprogesterone acetate	39	11.0	41	11.7	.75
Intrauterine device	12	3.4	3	0.9	.02
Tubal ligation	24	6.8	37	10.6	.07
Baseline GC or CT†					
None	226	65.1	213	59.2	.10
Any	121	34.9	147	40.8	
High temperature/WBC/ pelvic tenderness					
None	357	84.6	333	81.4	.23
Any	65	15.4	76	18.6	

PID, pelvic inflammatory disease; GC, Neisseria gonorrhea; CT, Chlamydia trachomatis; WBC, white blood cell count.
* Eighty-four Gram stains were not available.
† One hundred twenty-four women had missing information for baseline GC/CT.

likely to become pregnant after outpatient treatment (adjusted OR 1.78, 95% CI 1.17–2.70; Table 2). There were no significant differences in the frequency of live births or infertility, either overall or within any of the subgroups. More women after outpatient treatment than after inpatient treatment experienced an ectopic pregnancy, although this was not statistically significantly different (5 versus 1, unadjusted OR 4.91, 95% CI 0.57–42.25). All ectopic pregnancies occurred among African-American participants (Table 3)

We further examined time to pregnancy by using a Kaplan Meier life table analysis for those women who became pregnant during follow-up. The mean time to pregnancy was 37 months for inpatients and 39 months for outpatients ($P = .27$). Among women with a history of PID, there were no differences between treatment groups in time to pregnancy (data not shown). Furthermore, time to pregnancy was not significantly different between treatments among women of various age, race, parity, baseline gonococcal and/or chlamydial genital infection, or temperature/WBC/pelvic tenderness subgroups (data not shown).

There were no significant treatment-related differences in self-reported recurrent PID overall or among subgroups, nor were there treatment-related differences in chronic pelvic pain either overall or among any of the study subgroups (Table 4).

DISCUSSION

Previously published results from the PEACH trial indicated that women with mild-to-moderate PID did not have worse long-term reproductive outcomes after outpatient than after inpatient treatment.[8] However, the power in that analysis was insufficient to allow for a comparison of the effectiveness of treatments among relevant subgroups of women. The current analysis was undertaken after an additional 49 months of follow-up and after power calculations supported our ability to detect clinically meaningful treatment-related differences even within subgroups. Extending our previous findings, we now report that outpatient treatment assignment did not adversely impact the occurrence of a follow-up pregnancy, live birth, or ectopic pregnancy; time to pregnancy; infer-

Table 2. Occurrence of a Pregnancy or Live Birth During Follow-up by Treatment Assignment, With Comparison of Inpatient and Outpatient Treatment

	Pregnancy During Follow-up							Live Birth During Follow-up						
	Outpatient		Inpatient					Outpatient		Inpatient				
Baseline Characteristic	**n**	**%**	**n**	**%**	**OR**	**OR***	**95% CI**	**n**	**%**	**n**	**%**	**OR**	**OR***	**95% CI**
Total	246	59.4	224	55.6	1.17	1.27	0.92–1.76	138	33.3	135	33.5	0.99	1.08	0.77–1.51
Age														
≤ 19 y	85	78.7	64	64.6	1.00	1.00		48	44.4	40	40.4	1.00	1.00	
20–24 y	99	64.7	118	69.0	1.16	1.14	0.74–1.74	61	39.9	72	42.1	1.01	0.99	0.67–1.47
≥ 25 y	62	40.5	42	31.5	1.53	1.78	1.17–2.70	29	19.0	23	17.3	1.12	1.30	0.82–2.06
Race														
African American	188	60.5	169	55.8	1.00	1.00		99	31.8	103	34.0	1.00	1.00	
White	38	56.7	31	50.0	1.23	1.37	0.98–1.93	26	38.8	16	25.8	1.02	1.10	0.77–1.57
Other	20	55.6	24	63.2	1.15	1.21	0.85–1.72	13	36.1	16	42.1	0.89	0.95	0.65–1.37
History of PID														
No	182	63.9	159	57.6	1.00	1.00		105	36.8	95	34.4	1.00	1.00	
Yes	62	50.0	62	50.4	0.98	1.02	0.57–1.81	32	25.8	37	30.1	0.81	0.91	0.48–1.75
Parity														
0	84	59.2	74	53.2	1.00	1.00		50	35.2	42	30.2	1.00	1.00	
≥ 1	160	59.3	150	56.8	1.11	1.29	0.86–1.93	87	32.2	93	35.2	0.87	1.03	0.68–1.56
Baseline GC or CT†														
None	124	56.1	106	50.2	1.00	1.00		73	33.0	62	29.4	1.00	1.00	
Any	77	64.2	90	62.1	1.09	1.29	0.71–2.34	42	35.8	58	40.0	0.84	1.13	0.63–2.01
High temperature/WBC/ pelvic tenderness														
No	211	60.5	186	56.7	1.00	1.00		119	34.1	109	33.2	1.00	1.00	
Yes	35	53.8	38	50.6	1.14	1.40	0.63–3.11	19	29.2	25	34.7	0.78	1.04	0.45–2.42

OR, odds ratio; CI, confidence interval; PID, pelvic inflammatory disease; GC, Neisseria gonorrhea; CT, Chlamydia trachomatis; WBC, white blood cell count.
* Adjusted for bacterial vaginosis and intrauterine device at baseline.
† One hundred twenty-four women had missing information for baseline GC/CT.

Table 3. Infertility and Ectopic Pregnancy During Follow-up by Treatment Assignment, With Comparison of Inpatient and Outpatient Treatment

	Infertile During Follow-up							Ectopic Pregnancy During Follow-up					
	Outpatient		Inpatient					Outpatient		Inpatient			
Baseline Characteristic	**n**	**%**	**n**	**%**	**OR**	**OR***	**95% CI**	**n**	**%**	**n**	**%**	**OR**	**95% CI**
Total	69	16.7	83	20.6	0.77	0.88	0.59–1.32	5	1.2	1	0.2	4.91	0.57–42.25
Age													
≤ 19 y	13	12.0	23	23.2	1.00	1.00		0	0.0	0	0.0	1.00	
20–24 y	23	15.0	21	12.3	0.82	0.88	0.50–1.53	1	0.7	1	0.6	1.04	0.06–16.63
≥ 25 y	33	21.6	39	29.3	0.59	0.70	0.43–1.14	4	2.6	0	0.0	–	–
Race													
African American	56	18.0	60	19.8	1.00	1.00		5	1.6	1	0.3	1.00	
White	8	11.9	16	25.8	0.78	0.85	0.56–1.30	0	0.0	0	0.0	4.88	0.57–41.97
Other	5	13.9	7	18.4	0.87	1.09	0.70–1.69	0	0.0	0	0.0	4.97	0.58–42.77
History of PID													
No	37	13.0	50	18.1	1.00	1.00		3	1.1	1	0.4	1.00	
Yes	30	24.2	32	26.0	0.91	1.12	0.57–2.18	2	1.6	0	0.0	–	–
Parity													
0	33	23.2	41	29.5	1.00	1.00		1	0.7	1	0.7	1.00	
≥ 1	36	13.3	42	15.9	0.81	0.91	0.52–1.60	4	1.5	0	0.0	–	–
Baseline GC or CT†													
None	39	17.6	46	21.8	1.00	1.00		2	0.9	1	0.5	1.00	
Any	17	14.2	28	19.3	0.69	0.68	0.31–1.48	1	0.8	0	0.0	–	–
High temperature/WBC/ pelvic tenderness													
No	57	16.3	66	20.1	1.00	1.00		4	1.1	1	0.3	1.00	
Yes	12	18.5	17	22.7	0.77	0.82	0.31–2.18	1	1.5	0	0.0	–	–

OR, odds ratio; CI, confidence interval; PID, pelvic inflammatory disease; GC, Neisseria gonorrhea; CT, Chlamydia trachomatis; WBC, white blood cell count.

* Adjusted for bacterial vaginosis and IUD at baseline.

† One hundred twenty-four women had missing information for baseline GC/CT.

tility; PID recurrence; or chronic pelvic pain among women of various ages and races; with and without a prior birth; with or without previous PID; with or without baseline *N gonorrhoeae* and/or *C trachomatis* infection; and with or without high temperature/WBC/pelvic tenderness score. Ectopic pregnancy occurred rarely and more frequently in the outpatient group, albeit not significantly.

Ectopic pregnancy was a rare occurrence in PEACH participants, reported by less than 1% of women, a surprisingly low rate,[13,14] which may explain why ectopic pregnancies were detected only in the dominant racial group in the study: African-American women. Explanations for the greater, albeit nonsignificant, occurrence of ectopic pregnancy among women assigned to outpatient treatment are 2-fold. First, a likely possibility is that a limited number of observations created unstable estimates. Second, intravenous antibiotic therapy, characterizing the inpatient treatment strategy, may have more effectively reduced ectopic pregnancy. We believe this is unlikely, however, because it assumes some pathophysiologic mechanism independent of that involved in outcomes not different between treatments, such as infertility.

Older women were statistically significantly more likely to become pregnant after outpatient treatment. However, older women assigned to outpatient treatment had neither a statistically greater likelihood of live births nor a statistically lower likelihood of infertility. Thus, we infer that this single statistically significant finding is probably a function of multiple comparisons.

The lack of treatment-related difference in multiple reproductive outcomes and among subgroups of women strengthens our previous null findings.[8] The lack of statistical difference between treatment groups might be interpreted as a poor outcome in both groups or as a good outcome in both groups, but neither interpretation can be verified in the absence of a control group without PID. Currently, the CDC recommends hospitalizing women with PID based on health care provider discretion and in the following situations: surgical emergencies, pregnancy, failure to respond to oral antimicrobial therapy, inability to tolerate outpatient therapy, and tubo-ovarian abscess.[15] Women with these conditions were excluded from the PEACH trial so, in these situations, we can make no inference about appropriate treatment. However, the CDC also suggests that women with severe illness be hospitalized. Because the CDC does

Table 4. Self-Reported Recurrent Pelvic Inflammatory Disease and Chronic Pelvic Pain During Follow-up by Treatment Assignment, With Comparison of Inpatient and Outpatient Treatment

	Self-Reported Recurrent Pelvic Inflammatory Disease							Chronic Pelvic Pain						
	Outpatient		Inpatient					Outpatient		Inpatient				
Baseline Characteristic	**n**	**%**	**n**	**%**	**OR**	**OR***	**95% CI**	**n**	**%**	**n**	**%**	**OR**	**OR***	**95% CI**
Total	74	18.4	94	24.3	0.70	0.71	0.48–1.05	159	40.7	182	44.6	1.18	1.21	0.87–1.67
Age														
≤ 19 y	22	21.2	28	29.5	1.00	1.00		39	36.8	43	43.9	1.00	1.00	
20–24 y	24	15.9	34	20.5	0.71	0.69	0.43–1.13	70	46.4	60	36.6	1.14	1.12	0.75–1.67
≥ 25 y	28	19.0	32	25.4	0.67	0.71	0.43–1.17	73	48.3	56	43.4	1.00	1.13	0.74–1.72
Race														
African American	62	20.6	71	24.7	1.00	1.00		124	40.5	109	36.9	1.00	1.00	
White	10	15.2	12	19.7	0.78	0.79	0.53–1.20	37	55.2	27	45.8	1.22	1.25	0.89–1.76
Other	2	5.7	11	28.9	0.70	0.70	0.46–1.07	21	60.0	23	62.2	1.12	1.27	0.89–1.81
History of PID														
No	38	13.7	52	19.7	1.00	1.00		123	43.6	102	37.9	1.00	1.00	
Yes	36	30.0	41	34.5	0.82	0.75	0.40–1.41	57	47.1	55	46.6	1.02	0.98	0.54–1.77
Parity														
0	24	17.6	29	21.8	1.00	1.00		50	35.7	47	34.6	1.00	1.00	
≥ 1	49	18.6	65	25.6	0.66	0.69	0.43–1.12	132	49.6	112	43.9	1.26	1.28	0.86–1.91
Baseline GC or CT†														
None	39	18.4	56	27.6	1.00	1.00		114	52.1	95	46.6	1.00	1.00	
Any	26	21.8	32	22.9	0.94	0.87	0.45–1.69	44	37.3	44	31.2	1.31	1.39	0.77–2.51
High temperature/WBC/ pelvic tenderness														
No	60	17.8	75	23.8	1.00	1.00		156	45.2	137	43.2	1.00	1.00	
Yes	14	21.9	19	26.4	0.78	0.74	0.28–1.99	26	41.3	22	29.7	1.95	1.72	0.75–3.98

OR, odds ratio; CI, confidence interval; PID, pelvic inflammatory disease; GC, Neisseria gonorrhea; CT, Chlamydia trachomatis; WBC, white blood cell count.
* Adjusted for bacterial vaginosis and intrauterine device at baseline.
† One hundred twenty-four women had missing information for baseline GC/CT.

not define *severe illness*, we used as surrogate measures an elevated oral temperature, WBC, or abdominal tenderness score and found no treatment-related differences in outcomes among women with these clinical presentations.

Older CDC recommendations and some researchers advocate treatment of nulligravid women and teenagers as inpatients. Again, our results do not demonstrate that inpatient treatment enhances preservation of reproductive health in these relatively large subgroups of patients.

There were numerous strengths of this study. The randomization resulted in a similar distribution of most baseline characteristics between the treatment groups, thereby limiting confounding. The unequal distribution of IUD and bacterial vaginosis would have been expected to disadvantage outpatients with respect to reproductive outcomes and thereby could not have accounted for our inability to demonstrate excesses in adverse outcomes among women assigned to outpatient treatment. Moreover, we adjusted for IUD use and bacterial vaginosis in calculating risk estimates. Study generalizability was enhanced by inclusion of women with mild-to-moderate PID, who make up approximately 90% of women with PID.[16] Finally, outcomes consisted of important long-term reproductive events, the sequelae that, with treatment, we are ultimately attempting to prevent.

The greatest potential limitation of subgroup analyses in the PEACH study is the inability to detect small treatment-related differences. Despite additional follow-up and a larger number of endpoints, we could generally, but not always, detect relative differences in the range of 26–70%. Other limitations include the lack of universal documentation of tubal obstruction among women with infertility and self-reported documentation of all outcomes, which, despite our attempts to validate endpoints, remains a caveat to interpretation of results. Additionally, the cohort largely involved low-income African-American women, who represent only one component of all women with PID. Finally, because there was no external comparison group, we do not know if treatment restores fertility to levels comparable to women without a history of PID.

Our current findings reinforce our previous conclusion that, without evidence of unfavorable effectiveness, large cost-savings accrued by treating women outside the hospital favor outpatient management. In our original comparison of outpatient versus inpatient treatment from the PEACH Study, we estimated that by switching 85,000 women per year from inpatient to outpatient treatment, annual cost savings might be in the neighborhood of $500 million.[8] With the possible exception of an excess of rarely occurring ectopic pregnancy among women treated as outpatients, in no relevant subgroups and for no adverse reproductive outcomes could we find a disadvantage in using outpatient treatment for PID.

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