



Published in final edited form as:

*J Low Genit Tract Dis.* 2019 April ; 23(2): 110–115. doi:10.1097/LGT.0000000000000454.

## Observed Colposcopy Practice in US Community-Based Clinics: The Retrospective Control Arm of the IMPROVE-COLPO Study

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### Abstract

**Objective:** The aim of the study was to characterize colposcopy practice and management of women with cervical abnormalities in US community-based clinics.

**Materials and Methods:** IMPROVE-COLPO was a 2-arm study of colposcopy patients with an abnormal screening result. The prospective arm recruited women to undergo examination with a commercial digital colposcope. The retrospective-control arm collected data (chart review) from previous colposcopies performed using standard equipment and methods. From the retrospective arm, we analyzed referral trends, colposcopy and biopsy practice, and management patterns.

**Results:** We collected data of 3,602 eligible women (median age = 34 years) that had been examined from 2012 to 2017 by 154 colposcopists at 44 clinics across 12 states. Most patients were premenopausal (87.9%), privately insured (88.2%), and had a low-grade (low-grade squamous intraepithelial lesion/atypical squamous cells of undetermined significance/human papillomavirus positive) indication (87.2%). Most colposcopists performed less than 3 colposcopies monthly and their biopsy rate was 1.47 biopsies/patient for high-grade referrals and 0.97 for low-grade referrals ( $p < .001$ ). Random biopsy was rare (0.4% of biopsies). Most women (74.9%) underwent endocervical sampling, including 62.5% of women aged 21 to 24 years. Colposcopic impression was frequently not reported (58.8%), and its sensitivity to predict histology-confirmed cervical intraepithelial neoplasia (CIN) 2+ as “high-grade” was 56.5% for high-grade referrals and 23.2% for low-grade referrals. Excisions often (44.5%) returned <CIN 2, including patients aged 21–40 years (37.4%).

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E.P. is an employee of DYSIS Medical. The other authors have declared they have no conflicts of interest.

This study was approved by the following: E&I Review Services, Independence, MO (Ref: 14067); The University of Toledo Biomedical Institutional Review Board, Toledo, OH (Ref: 200864); and Advocate Health Care Institutional Review Board, Downers Grove, IL (ID: 6248).

[ClinicalTrials.gov](https://ClinicalTrials.gov) ().

**Conclusions:** In this analysis, most colposcopists performed few colposcopies and took less than 2 biopsies per patient. Colposcopic impression had a poor sensitivity to predict histology-confirmed CIN 2+. Although recent research indicates that taking multiple biopsies improves sensitivity and detection of CIN 2+, this is not being practiced in the US.

### Keywords

biopsy; cervical cancer; cervix uteri; CIN; colposcopy

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The United States (US) female population in the age range of 21 to 65 years who are eligible for cervical cancer screening is approximately 96 million,<sup>1</sup> but the number of colposcopies performed annually in the US is unknown, and the estimated 1.2 million<sup>2</sup> could be low. Colposcopy is performed by a variety of providers including obstetricians/gynecologists, gynecologic oncologists, family practitioners, internists, nurse practitioners, and physician assistants. The service is offered at academic centers, community-based clinics, and private offices of different sizes and profiles. The large geographic spread of the population and the concentration around urban centers suggests that remote areas that need service coverage may have a low volume of patients, posing challenges to the system.

Unlike many European countries, the US lacks a nationwide integrated healthcare system and coverage is offered through diverse pathways that include governmental and private payer organizations.<sup>3</sup> Furthermore, there is no organized screening system for the prevention of cervical cancer or a patient registry of precancers that would enable recalls. Screening in the US is opportunistic and depends on patient education and notification by healthcare providers.

The American Society for Colposcopy and Cervical Pathology (ASCCP), the American College of Obstetricians and Gynecologists, and other professional organizations have published guidelines on screening and management of disease<sup>4-7</sup>; however, there are very little data to date on real-world adherence, especially after the recent recommendations to extend intervals to 3 or 5 years.

Clinician training is highly inconsistent and comes from residency training, courses (e.g., ASCCP), mentorship training, or self-education, and there is no formal certificate or accreditation of colposcopy competence. Recently, the ASCCP published guidance on colposcopy practice, but this is voluntary and, in practice, without a formal quality assurance program, and it cannot be monitored. Furthermore, all guidance is founded on data from academic center studies and may therefore not reflect the population or practice in community-based clinics.<sup>8-10</sup>

Despite inconsistencies, cervical cancer incidence in the US is low, because of the success of widespread screening. Demographic changes, however, as well as the introduction of longer screening intervals, have raised concerns about the level of protection in the future compared with that offered previously by annual cytology.<sup>11</sup> Vaccination coverage among adolescents against human papillomavirus (HPV) in the US is increasing, although it is far from adequate.<sup>12</sup> In the future, vaccination and HPV primary screening may result in different

disease characteristics, e.g., with lesions detected earlier when they are smaller, which may challenge colposcopy and management to adapt.

The US healthcare delivery system, as well as the lack of exact data on how many colposcopies are being performed, on who is offering colposcopy services, on how the colposcopies are performed, and on clinical outcomes, challenges the efforts for standardization and improvement. IMPROVE-COLPO was an industry-sponsored study performed in community-based colposcopy clinics that included a control arm that collected data from these colposcopy practices. The objective of this study is to present data on the real-world practice of colposcopy in the US and to provide insights on how to further improve cervical cancer prevention.

## MATERIALS AND METHODS

The IMPROVE-COLPO study was a multicenter, observational, 2-arm cross-sectional study in patients undergoing routine colposcopy at community-based clinics in the US. The study recruited patients undergoing colposcopy with a commercial digital colposcope integrating dynamic spectral imaging (DSI) mapping (DYSIS by DYSIS Medical, Edinburgh, United Kingdom). A cohort of retrospective patients who had previously undergone colposcopy with standard colposcopes (any type) and methods was used for control.

This article presents a post hoc analysis from the retrospective control arm only. The study was approved by a central Institutional Review Board (IRB) (E&I Review Services, Independence, MO) and local IRBs as required and was conducted according to the International Conference on Harmonization Guideline for Good Clinical Practice. Consent was waived for patients in the control arm.

Facilities that had adopted the DSI technology, ranging from single-provider private practices to teaching hospitals, were invited to participate, without further selection criteria. The study colposcopists were those conducting colposcopies at the participating sites, to reflect colposcopy practice in US community-based clinics. There was no further quality control or conditions for selection, other than their willingness to participate. Colposcopists involved included gynecologic oncologists, obstetrician-gynecologists, nurse practitioners, and physician assistants.

The number of control cases was matched to the number of patients in the prospective arm of the study, such that each participating colposcopist contributed the same number of cases (1:1) to each arm to minimize potential bias due to variance in colposcopist training/expertise levels. The number of cases from each colposcopist was not limited but depended on their individual volume of colposcopies, and per facility, cases were collected until the contracted number had been reached.

Data were extracted from medical records after eligible consecutive examinations were identified using appointment and billing information. In this way, all patients who had been examined were screened for eligibility, ensuring the robustness of the selection.

Criteria for inclusion were 21 years or older and an abnormal screening test result.<sup>4,7</sup> Women undergoing colposcopy for unspecified indications, or with an insufficient result, e.g., after a single atypical squamous cells of undetermined significance (ASC-US) or with a single HPV+ result (unless they were older than 25 years with HPV 16/18 from primary screening)<sup>6</sup> were excluded. Other exclusions were known pregnancy, HIV infection or AIDS, previous hysterectomy, and current or previous radiation treatment or chemotherapy for cervical cancer or cancers concurrent with cervical disease.

For each patient, we collected basic demographic information, colposcopic impression, number of biopsies taken, endocervical sampling (ECS) and treatment information, all relevant histopathology results (at the single-biopsy level when multiple samples were collected separately), and recommendations for further management.

Data are presented as raw numbers and percentages and by descriptive statistics. Different characteristics between subgroups are compared using a two-sided Fisher exact test. A Kruskal-Wallis H test was used to compare the average number of biopsies taken among different referral subgroups.

### Role of the Funding Source

The study sponsor was involved in the study design, the collection, analysis and interpretation of data, the writing of the report, and the decision to submit the paper for publication.

## RESULTS

Data from 3,780 patients were collected for the retrospective arm of the study at 44 clinics. These patients were examined by 154 individual colposcopists from 2012 to 2017. Forty-seven patients (recruited at 12 of the sites) were not eligible for inclusion (unspecified indications or insufficient result,  $n = 36$ ; pregnancy,  $n = 2$ ; previous hysterectomy,  $n = 3$ ; younger than 21 years,  $n = 6$ ), resulting in 3,733 patients eligible for inclusion. Furthermore, 131 colposcopies (3.5%) had taken place before the 2012 ASCCP guidelines were presented<sup>7</sup> and were also excluded from analyses hereinafter, resulting in an analyzed cohort of 3,602 patients. Most of the patients were from 2013 (15%), 2014 (50.7%), and 2015 (29.4%), so there should be minimal bias with respect to the introduction of the guidelines in 2012. Patients were from the Midwest (Illinois and Iowa,  $n = 1,280$ ), Southwest (Texas and Arizona,  $n = 818$ ), Southeast (Florida, Georgia, and North Carolina,  $n = 816$ ) and the Northeast (Virginia, New Jersey, New York, Ohio, Michigan,  $n = 688$ ).

The recruitment clinics included 2 private teaching hospitals, 24 large (3–15 providers) private clinics and 18 small private offices (1–2 providers). Participating providers were a diverse mix of obstetrician/gynecologists, gynecologic oncologists, nurse practitioners, and physician assistants of varying levels of training and experience in colposcopy. The mean number of patients per colposcopist was 23.4. Among the 125 providers (81.2%) who contributed at least 5 colposcopies, the monthly mean number of cases was 2.3 (range = 0.24–13.66, SD = 1.81), with 3 colposcopists at more than twice the SD above the mean (i.e., >5.87 monthly cases).

Patient baseline characteristics can be seen in Table 1. The median age was 34 years and the mean age was 36.3 years. Most patients were privately insured (88.2%), with less than 10% with government-based insurance (Medicare, Medicaid, etc) and 2.2% uninsured (including private pay). Women undergoing colposcopy after a high-grade (HG) screening result (including HSIL [high-grade squamous intraepithelial lesion], ASC-H [atypical squamous cells (cannot exclude HSIL)], and AGC [atypical glandular cells]) represented 12.1% of the total. Although the study was not planned to look specifically at regional differences, the mean and median ages and the distribution of referral grades (low-grade [LG] vs HG) were similar for the geographic regions; the racial distribution of patients was overall consistent except for Midwest where the African-American population was markedly higher.

Analysis of the data demonstrates that patients in the 21–24 age group with ASC-US were frequently (33% of the total) referred with a positive HPV test and without repeat cytology testing as recommended.<sup>7</sup> Similarly, patients with LSIL (54.2%) had been directly referred for colposcopy without repeat testing at 12 months.<sup>7</sup> There were 341 women that were referred with only an HPV-positive indication, and 52 of them were referred with an HPV 16/18 result from primary screening with HPV testing.

Biopsy data are shown in Table 2. The average number of biopsies performed per patient was 1.47 for those with an HG referral and 0.97 for those with an LG referral ( $p < .001$ , Kruskal-Wallis H test). Random biopsies were scarce (14 in total, taken from 9 patients). In most patients with multiple biopsies, each biopsy sample was processed and reported separately. After excluding 13 patients who had multiple biopsies performed and sent as a single specimen, and a CIN 2+ result reported collectively, the positive predictive value (PPV) of biopsy to find CIN 2+ was 36.1% for HG referrals and 8.5% for LG referrals ( $p < .001$  two-sided Fisher exact test).

Endocervical sampling was performed on 2,698 patients (74.9%) (see Table 3) and was more frequent on those with a HG referral than those with an LG referral (86.2% vs 73.6%,  $p < .001$ , two-sided Fisher exact test). Among the 2,509 patients who underwent biopsy, 2,057 also had ECS (82%), compared with 641 among the 1,093 patients (58.6%) without biopsy ( $p < .001$ , two-sided Fisher exact test). Endocervical sampling was performed regularly across all age groups. Among the HG referrals, 19.7% of ECS performed returned CIN 2+; among LG referrals, this was 2.8% ( $p < .001$  two-sided Fisher exact test).

Table 4 presents the histologic detection of CIN 2+/CIN 3+, for the overall population but also stratified per referral group, race, age group, and detection (worst result) by biopsy/ECS/excision. The overall detection rate for CIN 2+ was 13.7% and for CIN 3+ 7.7%. The highest rates were in the 25–29 age group and among Hispanics. Biopsy detected 394 patients with CIN 2+ and ECS another 64. Of these 64 patients, 23 had undergone no biopsy, and in 41 patients, all biopsy/biopsies were <CIN 2.

In this cohort, there were 15 cases of HG glandular lesions or adenocarcinoma in situ (six of them on LG referrals) and 5 cases of invasive cancer (one was on a LG referral). Three of the invasive cancers had been missed by multiple biopsies (that were CIN 3) but were picked up in subsequent excisions.

Colposcopic impression was documented in 1,485 cases (41.2% of the total). Fifty-eight providers (37.7% of all) had not documented a colposcopic impression for any of their cases (n = 943, 26.2% of all cases). Twenty-two providers (14.3%) had recorded their colposcopic impression for all their cases (n = 306, 8.5% of the cases). Among the 1,485 cases with documented colposcopic impression, there were 211 with histology-confirmed CIN 2+. In this subgroup, colposcopic impression had been “high-grade” for 77, with a sensitivity (calculated against histology) of 36.5%. Sensitivity was higher (p < .001, two-sided Fisher exact test) among patients with an HG referral (56.5%) than for those with an LG referral (23.2%). Table 5 compares colposcopic impression to histology outcomes, for women referred with HG a LG indication.

Of the 3,602 patients, 507 were managed with an excision (diathermy or cold-knife conization). Three hundred forty-eight (68.6%) of them were treated after biopsy or ECS had confirmed the presence of CIN 2+ and 112 (22.1%) after biopsy and/or ECS that was normal or CIN 1. The remaining 47 (9.3%) were treated without previous biopsy or ECS. The result of excision was negative or CIN 1 in 221 (43.6%) of the excised patients. Data for the different age groups can be seen in Table 6. Although favored under some circumstances for patients with HSIL cytology,<sup>7</sup> excision at first colposcopy visit (“see and treat”) was seen on only 3 of the 222 HSIL patients.

Among the 3,144 patients who did not have biopsy or ECS, or if they had, their results were <CIN 2, follow-up (typically) by cytology was recommended at 6 months for 1,313 patients and at 12 months for 1,202. In a further 352 cases, cytology was recommended at an interval of less than 6 months.

## DISCUSSION

Based on this large colposcopy data set of 3,602 patients collected from 44 US community-based clinics and 154 providers, we are able to analyze and discuss cervical cancer prevention practices in the “real world.” In this setting, providers perform an average of only 2.3 colposcopies per month. For comparison, in a recent survey of the ASCCP that was used to support the development of practice guidelines,<sup>13</sup> 32% of respondents performed 5 or less colposcopies per month and were considered “low volume.” The colposcopists included in our study are therefore also “low volume” and might be considered limited in their expertise.

It is not known what percentage of colposcopy in the US is taking place in community-based clinics compared with academic centers. Women seen at community-based clinics in this study are most likely to be privately insured and are undergoing colposcopy after an LG screening result. Their demographic profile and the distribution of their baseline cytology likely differ from what is seen at academic centers and compared with those recruited for major academic studies such as the ASC-US LSIL Triage Study<sup>8,9</sup> or the National Cancer Institute biopsy study<sup>10</sup> that were used to derive management and practice recommendations.

The number of biopsies taken per patient was less than 2 in this analysis, with a significant difference between HG and LG referrals. The PPV of cervical biopsy was also significantly

different in these 2 subgroups, and this may be partially due to the number of biopsies taken. Random biopsy was rarely performed. Cervical intraepithelial neoplasia 2+ in this population was detected at a lower rate than that reported in the previously mentioned studies or in other large data sets,<sup>14</sup> which could be either due to differences in patient populations or to inefficient detection or both. A comparison of the results among LG referrals to the active arm of the IMPROVE-COLO study<sup>15</sup> suggested that detection in a matched and comparable population was higher with the study device and DSI mapping, although the active arm could have participation bias (“Hawthorne Effect”).

Most patients across LG and HG referrals and across all age groups underwent ECS, which found CIN 2+ in 139 patients (3.9% of all patients) and was the method that detected 64 of them (12.9% of all patients with CIN 2+), suggesting its utility in colposcopy. Although it was not recorded whether all of this disease was actually endocervical, this detection rate is higher than that reported from the National Cancer Institute biopsy study<sup>16</sup> but consistent with the finding of that study, that detection of CIN 2+ by ECS is associated with a lower number of biopsies.

Colposcopic impression, although not a diagnosis or an endpoint, is an important component of colposcopy, and is incorporated as a basic finding to document<sup>17</sup> and a significant risk factor to consider for clinical decision-making.<sup>18</sup> Our results suggest that most often, it is not documented in patient charts, and it is uncertain whether it was formed at the time of the examination or not. Without a standard method to document it, findings on impression should be interpreted with caution, but judging from the limited number of cases with reporting, its performance in predicting CIN 2+ is poor, especially for patients with a LG referral, consistent with the number of biopsies performed and the PPV of biopsy to find CIN 2+ in this subgroup.

Recommendations for follow-up after colposcopy that found no CIN 2+ were often for intervals shorter than the 12 months recommended in the ASCCP guidelines.<sup>7</sup>

A strength of this data set is that it collected data from retrospective consecutive examinations and in this way captured how colposcopy is practiced outside of a clinical study. At the time of the colposcopic examination, it was unknown that they would eventually be used in a study, so participation bias and performance bias (“Hawthorne effect”) are avoided. Such data on real-world practice from a wide range of community-based clinics and a large number of colposcopists was previously unavailable.

The study has its limitations because the data set collected per patient was not as complete as in other studies (e.g., we did not collect information on the visualization of the squamocolumnar junction for each colposcopy or the HPV status of each patient and histopathology was not adjudicated). In addition, although the study recruited according to guidelines (and recorded no information on women examined with insufficient referral indications), judging by the observed exclusions, one can conclude that women are sometimes seen with insufficient indications, such as a single ASC-US or a single HPV positive result. Although the extent and impact of this cannot be evaluated on the basis of the current data, it does highlight a potential gap between recommended and actual practice.

Although it would be interesting to evaluate how an HPV 16/18 result affects practices, HPV 16/18 genotyping was uncommon in our study, and thus, data are very limited. Furthermore, in evaluating its relevance, data were derived from clinics with some interest in colposcopy, evidenced by their investment in a novel digital colposcope. It has actually been suggested<sup>19</sup> that a vast number of colposcopies in the US are performed by providers that see an even lower monthly average number of cases than those in this study. This likely results in a further reduction in the accuracy and efficiency of “real-world” colposcopy practice in the US. Finally, as suggested by the patient profiles, the study is missing information and data from lower socioeconomic status patients that would be important to evaluate.

## CONCLUSIONS

Data from “real-world” colposcopy practice in US community-based clinics highlight the need for standardization, training, improvement, and eventually introduction of quality control in colposcopy.

## ACKNOWLEDGMENTS

The authors thank Philip Lavin (Boston Biostatistics Research Foundation, MA) for statistical support for this analysis.

This study was sponsored by DYSIS Medical.

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**TABLE 1.**

**Baseline Characteristics of the Study Population**

Characteristic	Overall	Age groups			
		21–24y	25–29y	30–54y	55 y
No. included women, y	3,602	467 (13.0%)	748 (20.8%)	2,089 (58.0%)	298 (8.3%)
Median age	34.0	23.0	27.0	38.0	61.0
Average age	36.3	22.7	26.9	39.0	62.0
Menopausal Insurance status	437 (12.1%)	1 (0.2%)	3 (0.4%)	152 (7.3%)	281 (94.3%)
Private	3,176 (88.2%)	407 (87.2%)	637 (85.2%)	1,900 (91.0%)	232 (77.9%)
Medicare	60 (1.7%)	0 (0%)	1 (0.1%)	10 (0.5%)	49 (16.4%)
Medicaid/other	279 (7.7%)	47 (10.1%)	93 (12.4%)	127 (6.1%)	12 (4.0%)
Uninsured	80 (2.2%)	11 (2.4%)	17 (2.3%)	48 (2.3%)	4 (1.3%)
Race/ethnicity					
White	2,240 (62.2%)	303 (64.9%)	485 (64.8%)	1,277 (61.1%)	175 (58.7%)
Black/African American	732 (20.3%)	71 (15.2%)	123 (16.4%)	440 (21.1%)	98 (32.9%)
Asian	102 (2.8%)	14 (3.0%)	13 (1.7%)	72 (3.4%)	3 (1.0%)
Hispanic	383 (10.6%)	60 (12.8%)	91 (12.2%)	215 (10.3%)	17 (5.7%)
Pacific Islander	3 (0.1%)	0 (0%)	1 (0.1%)	2 (0.1%)	0 (0%)
Native American	5 (0.1%)	0 (0%)	0 (0%)	5 (0.2%)	0 (0%)
Multiracial	10 (0.3%)	0 (0%)	5 (0.7%)	5 (0.2%)	0 (0%)
Other	127 (3.5%)	19 (4.1%)	30 (4.0%)	73 (3.5%)	5 (1.7%)
Referral indication					
HSIL	222 (6.2%)	38 (8.1%)	58 (7.8%)	112 (5.4%)	14 (4.7%)
ASC-H	151 (4.2%)	10 (2.1%)	37 (4.9%)	91 (4.4%)	13 (4.4%)
AGC	63 (1.7%)	5 (1.1%)	6 (0.8%)	42 (2.0%)	10 (3.4%)
LSIL	1,498 (41.6%)	253 (54.2%)	347 (46.4%)	822 (39.3%)	76 (25.5%)
ASC-US/HPV	1,222 (33.9%)	154 (33.0%)	279 (37.3%)	667 (31.9%)	122 (40.9%)
ASC-US ×2	81 (2.2%)	4 (0.9%)	10 (1.3%)	60 (2.9%)	7 (2.3%)
HPV+	341 (9.5%)	0 (0%)	7 (0.9%)	279 (13.4%)	55 (18.5%)
Follow-up of CIN 2/3 lesion	4 (0.1%)	2 (0.4%)	1 (0.1%)	1 (0%)	0 (0%)
Post-excision	20 (0.6%)	1 (0.2%)	3 (0.4%)	15 (0.7%)	1 (0.3%)

Data are presented as *n* or *n* (%), unless otherwise specified. HPV+ includes persistent HPV positivity and HPV 16/18 results.

**TABLE 2.**

## Details of Biopsy Practice

	<b>HG referrals</b>	<b>LG referrals</b>
No. included women	436 (12.1%)	3,142 (87.2%)
Patients with		
No biopsy	78 (17.9%)	1,003 (31.9%)
1 biopsy	149 (34.2%)	1,376 (43.8%)
2 biopsies	135 (31.0%)	615 (19.6%)
3 biopsies	63 (14.4%)	136 (4.3%)
4 biopsies	11 (2.5%)	12 (0.4%)
Random biopsy	2 (0.5%)	7 (0.2%)
Total directed biopsies	638	3,033
Total random biopsies	4	10
Average biopsies (overall)	1.47	0.97
Median biopsies (overall)	1.0	1.0
Average biopsies (on biopsied patients)	1.79	1.42
Median biopsies (on biopsied patients)	2.0	1.0
Biopsies with CIN 2+ (PPV)	230 (36.1%)	257 (8.5%)

PPV calculation excludes CIN 2+ patients with multiple biopsies that were processed/reported together.

HG indicates HSIL, ASC-H, and AGC; LG, LSIL, ASC-US, and HPV.

**TABLE 3.**

## Details of ECS

	Patients	Had ECS	
		After biopsy	Without biopsy
Overall	3,602	2,057 (57.1%)	641 (17.8%)
Referral group			
HG	436	315 (72.2%)	61 (14.0%)
LG	3,142	1,736 (55.3%)	577 (18.4%)
Age group			
21–24	467	255 (54.6%)	37 (7.9%)
25–29	748	444 (59.4%)	106 (14.2%)
30–54	2,089	1,220 (58.4%)	419 (20.1%)
55	298	153 (51.3%)	83 (27.9%)

Data are presented as *n* or *n* (%).

HG indicates HSIL, ASC-H, and AGC; LG, LSIL, ASC-US, and HPV.

**TABLE 4.**

## Clinical Outcomes

	<i>n</i>	CIN 2+	CIN 3+
Overall	3,602	495 (13.7%)	279 (7.7%)
Referral group			
HG	436	206 (47.2%)	154 (35.3%)
LG	3,142	287 (9.1%)	125 (4.0%)
Race			
White	2,240	313 (14.0%)	184 (8.2%)
Black/African American	732	72 (9.8%)	33 (4.5%)
Hispanic	383	70 (18.3%)	42 (11.0%)
Asian	102	16 (15.7%)	9 (8.8%)
Other	145	24 (16%)	11 (6%)
Age group			
21–24	467	59 (12.6%)	24 (5.1%)
25–29	748	135 (18.0%)	75 (10.0%)
30–54	2,089	266 (12.7%)	156 (7.5%)
55	298	35 (11.7%)	24 (8.1%)
Detected by			
Biopsy		394 (79.6%)	164 (58.8%)
Endocervical sample		64 (12.9%)	42 (15.1%)
Excision		37 (7.5%)	73 (26.2%)

Data are presented as *n* or *n* (%).

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**TABLE 5.**

## Colposcopic Impression

Colposcopic impression	Final histology	
	<CIN 2	CIN 2+
HG referrals ( <i>n</i> = 436)		
Not documented	149	121
Normal or LG	67	37
HG	14	48
Sensitivity for CIN 2+	NA	56.5%
LG referrals ( <i>n</i> = 3,142)		
Not documented	1,675	162
Normal or LG	1,151	96
HG	29	29
Sensitivity for CIN 2+	NA	23.2%

Sensitivity calculation considers only the cases with a documented colposcopic impression. Histology result includes all methods of detection (biopsy, ECS, excision).

HG indicates HSIL, ASC-H, and AGC; LG, LSIL, ASC-US, and HPV; NA, not applicable.

**TABLE 6.**

Excisional Treatment Practice and Outcomes

	Overall	Age group			
		21–24y	25–40y	41–54 y	55 y
No. women	3,602	467	2,048	789	298
Had excision	507 (14.1%)	48 (10.3%)	322 (15.7%)	100 (12.7%)	37 (12.4%)
Excision after CIN 2+	348 (68.6%)	33 (68.8%)	240 (74.5%)	54 (54.0%)	21 (56.8%)
Excision after normal/CIN 1	112 (22.1%)	6 (12.5%)	65 (20.2%)	27 (27.0%)	14 (37.8%)
Excision without previous procedure	47 (9.3%)	9 (18.8%)	17 (5.3%)	19 (19.0%)	2 (5.4%)
Result was <CIN 2	221 (43.6%)	18 (37.5%)	117 (36.3%)	62 (62.0%)	24 (64.9%)

Data are presented as *n* or *n* (%).