

Development of a Curriculum in Colposcopy

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Background. Colposcopy for the detection of genital malignancy and disease associated with human papillomavirus, along with cytologic screening and histopathologic correlation, allows for intervention before the onset of invasive disease. Family physicians are interested in learning colposcopy, but there are few reports in the literature on the training of colposcopists.

Methods. A colposcopy curriculum for family physicians was designed with goals, objectives, and instructional strategies selected to enhance learning and quality assurance of the current principles of colposcopic evaluation. During the pilot project, a third-year resident studied a syllabus and reviewed slides, practiced performance skills, and observed colposcopies. After demonstrating competence, the resident evaluated patients with instructor supervision and feedback.

Results. Resident performance data from written test

scores and a performance checklist indicated an excellent learning curve. High resident satisfaction was reported. Suggestions from expert reviewers were incorporated into the final curriculum product. The evaluation data indicated that, based on this pilot program, family practice residents can effectively learn colposcopy.

Conclusions. Colposcopy is a highly technical skill that can be learned by family physicians through professional training. Competency in colposcopy can provide a new dimension to their practice in the diagnosis and treatment of female lower-genital-tract disease. This colposcopy curriculum is an initial effort in the identification of the content and process required to train family physicians in the use of this diagnostic procedure.

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Colposcopy is used to detect genital malignancy and disease associated with human papillomavirus (HPV).¹ HPV is the most commonly sexually transmitted viral disease in the United States.^{2,3} The prevalence of HPV is documented by data from the Centers for Disease Control that indicate an alarming rate of increase of clinic visits for treatment of venereal warts.⁴ A causal relationship between the presence of HPV and genital neoplasia including vulvar, vaginal, cervical, and penile carcinomas is postulated.⁵⁻⁸ The HPV-DNA has been identified in neoplastic cells⁹ and cervical carcinoma metastasis to lymph nodes,¹⁰ but a direct cause and effect has not been proven. It has been hypothesized that HPV could be a cofactor in malignancy transformation.¹¹ Patients who have an HPV infection, particularly those with the high-risk group of viruses, are at greater risk than the noninfected population and should be carefully followed with

Papanicolaou smears and colposcopy to detect neoplastic changes.

Colposcopy in conjunction with cytologic and histologic correlation is a valuable tool for diagnosis of premalignant and malignant genital disease.¹² The use of colposcopy and colposcopic-directed biopsies on patients with abnormal Papanicolaou smears has allowed disease intervention at an early stage when cure is possible and has resulted in an overall decrease in cervical cancer.¹

The specialty of family practice has been noted for its extensive efforts in developing curricula for medical student and resident education.^{13,14} Other family practice curriculum development efforts have focused on providing residents with procedural skills training.^{15,16} Nevertheless, a literature review identified little evidence of the development of a formal training curriculum in colposcopy in family practice or obstetrics and gynecology. Homesley¹⁷ reported a study of colposcopic skills of residents in obstetrics and gynecology at the Bowman Gray School of Medicine that compared colposcopic accuracy by direct comparison of four-quadrant cervical colposcopic impression with the histologic grade of lesion. The overall sensitivity and specificity of identifying

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lesions did not improve during the 4 years of residency, but the actual curriculum was not described.

Kelley et al¹⁸ reported a 5-year experience in a resident colposcopy clinic at the University of Texas Medical Branch at Galveston, in which colposcopically directed biopsies were followed by histologic confirmation at conization or hysterectomy. The residents' total accuracy over a 5-year period was 92%. Results indicated that with proper supervision and instruction colposcopy can be reliably performed in a resident clinic if it is staffed and supervised by faculty who are trained in the procedure. Again, no mention was made of curriculum design or implementation.

A recent report by Newkirk and Granath¹⁹ described the issues of time, cost, caseload, reimbursement, specialist support, personal training, and office impact related to implementation of a family practice resident training program in colposcopy, androscopy, and cryotherapy. Strategies for developing the curriculum, instructional materials, and workshops were presented.

Neither the American Academy of Family Physicians (AAFP) nor the American College of Obstetricians and Gynecologists (ACOG) has specific guidelines for colposcopy training. A joint ACOG-AAFP statement indicates that general privileges should be granted on the basis of training, experience, and demonstrated competence.²⁰ ACOG does not recommend that a specific number of colposcopy procedures be observed or performed before granting privileges. Family physicians have an interest in learning surgical procedures that are feasible in the outpatient setting,²¹ and for many family physicians, colposcopy is a procedure of great interest.

The purpose of this paper is to demonstrate the design and implementation of a colposcopy curriculum for a family practice residency training program. A modified version of the same curriculum could be used for training faculty or physicians in practice who have completed a basic continuing medical education (CME) course but desire preceptorship experience before performing colposcopy on their own. This curriculum model is based on currently accepted guidelines of colposcopic practice and attempts to ensure the teaching of accurate diagnostic procedures and treatment modalities. This paper describes the curriculum development process, discusses the instructional and evaluation strategies used, and attempts to make recommendations for other training programs developing similar programs.

Methods

A needs assessment survey conducted with faculty and residents from the Department of Family Practice at the

University of Michigan indicated that there was overwhelming enthusiasm for and interest in completing a colposcopy curriculum. A majority of the 10 faculty and 13 residents indicated that they would like to receive training if it were available in the department.

The majority of the respondents stated that they would like to perform colposcopy on a regular basis after the colposcopy training was completed and indicated that certification was important to document competence. A small minority indicated that they would use colposcopy as a research tool.

At a continuing medical education course, Office Procedures for Primary Care Physicians, conducted in October 1989 at the University of Michigan, 68 participants were surveyed at the completion of a 4-hour session on basic colposcopy. Eighty-three percent of those surveyed desired supervised training before beginning to perform colposcopy on their own. The majority of the participants desired at least 1 day of preceptorship experience and were willing to stay overnight to participate in a full 2 days of training. The majority stated that they did not have access to supervised training in their communities. This survey of primary care physicians who had just completed a formal colposcopy program indicated that a preceptorship is desirable along with acquisition of cognitive knowledge and skills.

In informal conversations, faculty from 12 other family practice residencies expressed their concern that gynecology departments at their institutions would not support colposcopy training for family physicians. Concern was also expressed about the inability to coordinate referrals for laser therapy and conization if support was not available. The majority of family practice faculty at other institutions indicated that they would need to go outside of their own school to receive colposcopy training.

Course planning was completed in several stages before the actual piloting of the curriculum began. In July 1989, the University of Michigan Department of Family Practice made a commitment to provide colposcopy training for faculty and second- and third-year family practice residents. In order for the training to match the volume of patients available for colposcopic evaluation, the course would ideally be part of a resident elective rotation. The residents would be required to take the colposcopy course before performing colposcopy on their own patients at the University of Michigan Family Practice Center at Chelsea.

A versatile stereoscopic colposcope with an optical beam splitter that allowed the attachment of a teaching tube and photographic accessories was purchased. The beam splitter allowed extension of the capability of the scope to teaching because the image obtained through the accessory port was identical to that viewed through

the binocular tubes. A camera and ring flash were purchased for camera-synchronized colpophotography.

A cryogun with versatile interchangeable tip configurations for the vulva, vagina, cervix, and penis and an attachment for a nitrous oxide gas cylinder was obtained. Colposcopic surgical instruments and supplies were purchased, and a colposcopy teaching syllabus was prepared by the senior author. Colposcopy teaching slides were purchased to supplement the senior author's personal collection. Informed consent, patient education, and documentation forms were developed. Patients were scheduled in full-day clinic sessions to enhance learning.

Goals and Objectives

The overall goal of the curriculum is to train family physicians to perform colposcopy in their offices. Objectives were selected from a broad range of topics and subject areas pertaining to colposcopy performance and the cognitive skills needed to ensure a quality learning experience. These objectives were developed to adhere to accepted standards of colposcopic performance and quality assurance in order that a statement of competency might be issued to a participant upon the successful completion of the training program.

Selected Instructional and Evaluation Strategies

The curriculum was pilot-tested as a resident elective in February 1990. The curricular materials were evaluated by a third-year family practice resident, two expert colposcopists, and a curriculum development specialist (the second author).

The content of the curriculum was organized in a sequence that reflected a learning curve based on cognitive and performance knowledge and skills. The resident completed a pretest and a posttest designed to evaluate knowledge and skills learned during the experience. The pretest and posttest consisted of 20 written items. The two tests were identical, consisting of multiple choice and true-false items that assessed the resident's knowledge of the content of the course syllabus. The resident practiced and demonstrated operation of the colposcope, biopsy instrumentation, and operation of the cryotherapy equipment before having any actual patient interactions. The resident observed the instructor performing the colposcopic routine and followed a checklist. The 4-page checklist used to teach and evaluate the learner's proficiency in performing colposcopy was outlined using these major headings:

A. Preparation of patient for examination

- B. Colposcope operation
- C. Rectal and vulvar examination
- D. Vaginal examination
- E. Cervical examination
- F. Postcolposcopy follow-up
- G. Cryotherapy of human papillomavirus (HPV) and cervical intraepithelial neoplasia (CIN)

A copy of the checklist is available from the authors on request.

After observing the procedure several times, the resident was required to perform colposcopy under the direct supervision of the instructor. During the final patient examinations, the resident was evaluated by the instructor using the checklist to ensure thorough assessment and optimal performance. A summative evaluation was conducted, assessing the resident's completion of items on the checklist, the resident's ability to correctly identify slides, and the resident's performance on the posttest. The instructor evaluated the resident's performance in all of these areas and provided the resident with feedback. A statement of competency in performing basic colposcopy was given to the resident, and the resident completed an evaluation of the learning experience.

Results

A colposcopy curriculum was designed according to the needs assessment, literature review, and suggestions made by the consultants. The curriculum was designed so that the resident was presented with knowledge and performance skills at each step of the process. As the resident progressively demonstrated that these skills were learned and perfected, the resident observed the instructor in actual patient situations. By this integrative, one-on-one interaction, the resident was able to assimilate the knowledge and skill needed to perform colposcopy and review the performance criteria for implementation before doing colposcopy on his or her own. The resident's confidence was enhanced at each step by immediate feedback from the instructor.

The course content in the syllabus was chosen to represent the breadth of knowledge of current colposcopy principles. The major topic areas selected were:

1. Cervical cytology screening
2. Human papillomavirus (HPV)
3. Introduction to colposcopy
4. The normal and atypical transformation zone of the cervix
5. Microinvasive and invasive carcinoma of the cervix
6. Common mistakes of colposcopic evaluation

7. Treatment modalities for condyloma and cervical intraepithelial neoplasia (CIN)
8. Colposcopy in pregnancy
9. Principles of androscopy

The learning objectives that were developed for each of these topic areas and the associated readings are listed in Table 1.

The course schedule is outlined in Table 2. Before beginning the course, the resident received a set of slides and practiced recognizing the basic patterns of morphologic change as the cervix progresses from normal to atypical. The resident kept this set of slides throughout the course for instructional clarification of difficult pattern recognitions. A pretest of 20 questions that assessed basic knowledge of colposcopy was administered before the start of the course. Questions were geared to stimulate the resident's interest in the clinical decision making of actual patient situations. The 4-page examination used for the pretest and posttest is available on request from the authors. It was optional but highly recommended that the resident purchase a colposcopy text for use during the course and for future reference.

The colposcopy course is described in terms of six full-day sessions. The morning of day 1 included a seminar and instructional session on the basic principles outlined as unit topics in the syllabus.

The afternoon session for day 1 included performance skill demonstrations by the instructor and practice by the resident. Performance skills included use of the colposcope, biopsy, and cryotherapy instruments. Skills were evaluated by a checklist, which the resident received at the start of the course. The checklist was used to assess performance each day and as an evaluation device at the end of the course. Instruction was given on the informed consent and colposcopy documentation forms and patient education materials that were used during the actual patient interactions. Day 1 may be modified in future offerings for residents and other learners according to their previous knowledge of colposcopy.

On day 2 (morning and afternoon), the instructor evaluated 12 patients while the resident observed. The resident obtained informed consent from the patient and followed the checklist as the instructor evaluated the patient. The resident completed the colposcopy documentation form, made a diagnostic impression of each case to correlate with the histological results, prepared the biopsy specimens in the laboratory, and completed the necessary pathology requisition forms. The instructor reviewed the colposcopy documentation form prepared by the resident at the conclusion of each individual patient encounter. This ensured accuracy of visual pat-

tern recognition. The checklists of all patient interactions were reviewed at the end of the day.

During day 3 the resident performed colposcopies. As the instructor observed, the resident evaluated 10 patients and obtained informed consent, followed the checklist, completed the documentation forms, and prepared the samples for laboratory analysis. The resident reviewed the cytology and histology laboratory reports on the patients from the previous week, called the patients and discussed the results, and made arrangements for a follow-up appointment. The instructor provided feedback after each patient encounter and at the end of the day.

Days 4 and 5 were repeats of day 3, allowing the resident the opportunity to become more proficient at colposcopy performance. Use of the checklist was continued so that the resident could determine his or her learning curve. Additional sessions were scheduled if the resident or instructor thought they were needed.

Day 6 included the final evaluation session, with the resident performing six colposcopies as the instructor completed a final checklist on the resident's performance of the entire routine. At this point, performance was expected to be with minimal errors. The instructor provided immediate feedback. The resident completed a review of 10 pattern recognitions using 10 slides and made minimal errors.

Following completion of the training program, the resident completed a course evaluation and posttest questionnaire. The 2-page course evaluation form included items concerning resident achievement of goals, satisfaction with teaching methods, and self-assessment of ability to perform colposcopy. A copy of this form is available from the authors on request. After all the data were reviewed, the resident was given a certificate of competency. This statement became part of the resident's evaluation file.

Resident's Performance and Reaction Data

The resident's cognitive evaluation scores showed a 46% improvement from pretest (10 of 20 items correct) to posttest (19 of 20 items correct). Visual accuracy of pattern recognition on the final test was 100%. Evaluation of the checklist on the final day indicated 95% of the performance skills were completed without prompting by the instructor and, with prompting, 100% were completed with accuracy.

The resident evaluated the course using two questionnaires: one, a standard residency evaluation form, and the other one developed by the authors to assess specific information relating to colposcopy content. The resident strongly agreed that the overall experience met

Table 1. Colposcopy Curriculum for Family Physicians: Major Topic Areas, Learning Objectives, and Recommended Readings

Topic Area	Learning Objectives	Recommended Readings
Cervical cytology screening	<ol style="list-style-type: none"> 1. Define the recommendations for cytology screening. 2. Define the basis for an abnormal Papanicolaou smear. 3. Understand and distinguish causes of false-negative cervical cytology including sample, screening, and interpretative error. 4. Correlate the original "class" system with current terminology as reported for cervical cytology. 5. Understand common errors of treating positive Papanicolaou smears. 6. Understand the technique for obtaining a properly prepared cytology smear. 	<ol style="list-style-type: none"> 1. Koss LG. The Papanicolaou test for cervical detection. <i>JAMA</i> 1989; 261:737-43. 2. Council on Scientific Affairs. Quality assurance in cervical cytology. <i>JAMA</i> 1989; 262:1672-8. 3. Boyce JG, Fruchter RG, Romanzi L, et al. The fallacy of the screening interval for cervical smears. <i>Obstet Gynecol</i> 1990; 76:627-32. 4. Lai-Goldman M, Nieberg RK, Mulcahy D, Wiesmeier E. The cytobrush for evaluating routine cervicovaginal-endocervical smears. <i>J Reprod Med</i> 1990; 35:959-63. 5. Lindheim SR, Smith-Nguyen G. Aggressive evaluation for atypical squamous cells in Papanicolaou smears. <i>J Reprod Med</i> 1990; 35:971-3.
Human papillomavirus (HPV)	<ol style="list-style-type: none"> 1. Understand the pathogenesis of cervical cancer in relation to HPV. 2. Understand the controversy surrounding treatment strategies for subclinical HPV. 3. Understand HPV typing. 4. Understand the cytologic and colposcopic findings of HPV infection. 	<ol style="list-style-type: none"> 1. Selvaggi SM. Spatula/cytobrush vs spatula/cotton swab detection of cervical condylomatous lesions. <i>J Reprod Med</i> 1989; 34:629-33. 2. Nash JD, Burke TW, Hoskins WJ. Biologic course of cervical human papillomavirus infection. <i>Obstet Gynecol</i> 1987; 69:160-2. 3. Riva JM, Sedlacek TV, Cunnane MF, Mangan CE. Extended carbon dioxide laser vaporization in the treatment of subclinical papillomavirus infection of the lower genital tract. <i>Obstet Gynecol</i> 1989; 73:25-30. 4. Spitzer M, Krumholz BA, Seltzer VI. The multicentric nature of disease related to human papillomavirus infection of the lower genital tract. <i>Obstet Gynecol</i> 1989; 73:303-7. 5. Carmichael JA, Maskens PD. Cervical dysplasia and human papillomavirus. <i>Am J Obstet Gynecol</i> 1989; 160:916-8.
Introduction to colposcopy	<ol style="list-style-type: none"> 1. Understand common terminology for colposcopy. 2. Utilize practical hints for beginning colposcopy. 3. Compare colposcopy instruments. 4. Understand the use of biopsy instrument. 5. Understand how to obtain informed consent. 6. Understand how to properly document colposcopy findings. 7. Visualize and understand the entire colposcopic procedure by checklist format. 	<ol style="list-style-type: none"> 1. Felmar E, Payton CE, Gobbo R, Herbst M. Colposcopy: a necessary adjunct to Pap smears. <i>Fam Pract Recert</i> 1988; 10:21-32. 2. Grainger DA, Roberts DK, Wells MM, Horbelt DV. The value of endocervical curettage in the management of the patient with abnormal cervical cytologic findings. <i>Am J Obstet Gynecol</i> 1987; 156:625-8. 3. Examples of sales materials from different colposcopy manufacturers, surgical instrument manufacturers and cryosurgery systems.
Normal and atypical transformation zone of the cervix	<ol style="list-style-type: none"> 1. Understand the concept of a normal and abnormal transformation zone. 2. Understand the basis for the colposcopic visual impression of CIN. 3. Understand the concepts of punctation and mosaicism. 4. Understand the grading of colposcopic patterns and prediction of their severity. 	<ol style="list-style-type: none"> 1. Richart RM. Causes and management of cervical intraepithelial neoplasia. <i>Cancer</i> 1987; 60:1951-9.

Table 1. Continued

Topic Area	Learning Objectives	Recommended Readings
Microinvasive and invasive carcinoma of the cervix	<ol style="list-style-type: none"> 1. Understand and recognize the signs of invasive disease of the cervix. 2. Learn to differentiate normal from atypical vessels. 	<ol style="list-style-type: none"> 1. Walker J, Bloss JD, Liao SY, et al. Human papillomavirus genotype as a prognostic indicator in carcinoma of the uterine cervix. <i>Obstet Gynecol</i> 1989; 74:781-5. 2. Lewandowski G, Delgado G, Holloway RW, et al. The use of in situ hybridization to show human papillomavirus deoxyribonucleic acid in metastatic cancer cells within lymph nodes. <i>Am J Obstet Gynecol</i> 1990; 163:1333-7.
Common mistakes of colposcopic evaluation	<ol style="list-style-type: none"> 1. Understand the most common errors of colposcopic evaluation. 2. Understand the strategies to correct the errors. 	<ol style="list-style-type: none"> 1. Rochelson B, Krumholz BA. The "unsatisfactory" colposcopic examination. <i>J Reprod Med</i> 1983; 28:131-6. 2. Soisson AP, Molina CY, Benson WL. Endocervical curettage in the evaluation of cervical disease in patients with adequate colposcopy. <i>Obstet Gynecol</i> 1988; 71:109-111. 3. Townsend DE, Richart RM, Marks E, Nielsen J. Invasive cancer following outpatient evaluation and therapy for cervical disease. <i>Obstet Gynecol</i> 1981; 57:145-9.
Treatment modalities for condyloma and cervical intraepithelial neoplasia (CIN)	<ol style="list-style-type: none"> 1. Understand the reason for selecting a specific treatment modality. 2. Understand the proper selection of a specific treatment and the expected cure rate. 3. Perform cryotherapy properly. 	<ol style="list-style-type: none"> 1. ACOG Committee Opinion. Use of cryotherapy in the treatment of cervical intraepithelial neoplasia. #34, August 1985, Revised 4/88. 2. Ferency A. Comparison of cryo- and carbon dioxide laser therapy for cervical intraepithelial neoplasia. <i>Obstet Gynecol</i> 1985; 66:793-8. 3. Creasman WT. Symposium on cervical neoplasia. II. Cryosurgery. <i>Colp Gynecol Laser Surg</i> 1984/1985; 1:275-9. 4. Rodney WM, Felmar E, Morrison J, et al. Colposcopy and cervical cryotherapy. <i>Postgrad Med</i> 1987; 81:79-82, 85-6. 5. Boonstra H, Koudstaal J, Oosterhuis JW, et al. Analysis of cryolesions in the uterine cervix: application techniques, extension and failures. <i>Obstet Gynecol</i> 1990; 75:232-9. 6. McIndoe GA, Robson MS, Tidy JA, et al. Laser excision rather than vaporization: the treatment of choice for cervical intraepithelial neoplasia. <i>Obstet Gynecol</i> 1989; 74: 165-8.
Colposcopy in pregnancy	<ol style="list-style-type: none"> 1. Understand the differences between the nonpregnant and pregnant colposcopic patterns. 2. Understand the techniques for performing colposcopy in pregnancy. 3. Understand the follow-up protocol after delivery. 	<ol style="list-style-type: none"> 1. Ferency A. HPV-associated lesions in pregnancy and their clinical implications. <i>Clin Obstet Gynecol</i> 1989; 32: 191-9. 2. Schwartz DB, Greenberg MD, Daoud Y, Reid R. Genital condylomas in pregnancy: use of trichloroacetic acid and laser therapy. <i>Am J Obstet Gynecol</i> 1988; 158:1407-16. 3. Rando RF. Increased frequency of detection of human papillomavirus deoxyribonucleic acid in exfoliated cervical cells during pregnancy. <i>Am J Obstet Gynecol</i> 1989; 161: 50-5.
Principles of androscopy	<ol style="list-style-type: none"> 1. Understand the principles of the male examination for HPV. 2. Know how to systematically examine the male genitalia with acetic acid. 3. Know how to biopsy the male genitalia. 4. Understand the treatment modalities for male HPV. 	<ol style="list-style-type: none"> 1. Krebs HB, Schneider V. Human papillomavirus-associated lesions of the penis: colposcopy, cytology, and histology. <i>Obstet Gynecol</i> 1987; 70:299-304. 2. Krebs HB. Genital HPV infections in men. <i>Clin Obstet and Gynecol</i> 1989; 32:180-90. 3. Barasso R, De Brux J, Croissant O, Orth G. High prevalence of papillomavirus-associated penile intraepithelial neoplasia in sexual partners of women with cervical intraepithelial neoplasia. <i>New Engl J Med</i> 1987; 317:916-22.

the training goals and needs. The resident's self-assessment of individual cognitive and performance skills was excellent.

The resident rated the syllabus content, teaching methods, and adequacy of patient volume as excellent and stated

that the most valuable aspect of the course was the supervised, one-on-one instruction with the colposcope, performing actual examinations on patients with normal and abnormal findings. The resident stated definitely that the course should be offered on a continuous basis.

Table 2. Colposcopy Course Schedule

Time	Activity
Before the course	Learner reviews syllabus and slides Optional purchase of textbook Pretest
Day 1	Tutorial/self-instruction on basic principles of colposcopy Performance skills demonstration and practice Review of documentation forms Checklist review
Day 2	Learner observes instructor evaluation of 10 to 12 patients Learner completes documentation forms Learner follows by checklist Feedback by instructor
Day 3	Learner evaluates 10 patients as instructor observes Learner follows checklist Learner completes documentation forms Feedback by instructor
Day 4	Learner evaluates 10 patients as instructor observes
Day 5	Learner evaluates 10 patients as instructor observes
Day 6	Learner evaluates four to six patients as instructor evaluates Learner completes review of 10 pattern recognition slides Learner completes checklist with minimal errors Scheduling of additional sessions if needed
Week following course	Posttest Evaluation of course by learner Statement of competency

External Reviewer Data

Two expert colposcopists reviewed the curriculum and recommended that at least 50 colposcopies should be performed during the course. One of the experts suggested that the resident should continue to perform 10 colposcopies per month after successful completion of the course in order to maintain cognitive knowledge and performance skills. This reviewer also recommended that the 10 colposcopies should be conducted with opportunities for an instructor to confirm the visual impression. Specific questions on the vulva and vagina were not included in the pretest, and the external reviewers suggested that these topics be added. The expert colposcopists agreed that the curriculum design was excellent, and they had no philosophical disagreement with family phy-

sicians doing colposcopy if they were adequately trained. One expert viewed the curriculum as a major step toward standardization in colposcopy training.

A curriculum development specialist also reviewed the curriculum and reported that the course materials were well developed and followed a consistent approach throughout the course units. He recommended changes that would result in greater consistency in style and format throughout the syllabus. He concluded that the materials were complete, the supplemental reading material was relevant and current, and the test items matched the content of the teaching materials. The curriculum specialist rated the overall design as good and stated that with format and style revisions, it could be excellent.

Discussion

The evaluation data indicated that, based on this pilot, family practice residents can effectively learn colposcopy. Following the successful completion of the pilot project, three additional residents requested to take the elective. With the amount of interest generated since the project was piloted, it is presumed that most of the departmental residents will elect to complete colposcopy training before graduation. An effort is now underway to train additional faculty using the same model. Course materials have also been sent to faculty in other family practice departments who requested information on how to initiate colposcopy training at their institutions.

It is inconceivable that a family physician could be successful in performing colposcopy without the cooperation and support of gynecologists at their institutions or in their communities. Community effort is encouraged so that the family physician will have a referral source for those patients who need more specialized treatment such as laser ablation, conization, or hysterectomy. If the referral gynecologist does not feel comfortable with the qualifications of the family physician to perform colposcopy, the colposcopy may be repeated and the patient subjected to two procedures. Discussion with the referral gynecologist and establishment of guidelines before beginning colposcopy will make the process more efficient for the patient and the physicians. The family physician and the gynecologist working together in the same office initially on several patient evaluations may help to assure the gynecologist of the family physician's competence.

In response to expert review and learner evaluations, the course syllabus was revised to achieve a consistent format and style. An extra day was added to the course in order to ensure that 50 colposcopies would be performed

by the resident. Additional questions were added to the pretest.

The overall curriculum product was designed to fit into a 2-inch, three-ring binder. Resident and expert evaluations of future courses will be conducted to continue to identify teaching problems and different avenues for improving the learning curve of cognitive and performance skills.

Colposcopy is a highly technical skill. With motivation, diligence, and practice, however, it can be learned. The challenge of this new curriculum will be to continually incorporate into it the constantly changing concepts for evaluating the abnormal Papanicolaou smear and HPV-associated disease and the vast amount of literature surrounding the theories on and controversies about the proper treatment of the diseases that are diagnosed by colposcopic-directed biopsies. Advanced colposcopy courses are available for the semi-experienced or experienced colposcopist. These courses offer an opportunity for exchange of ideas and discussion of cases. Since no specific guidelines exist for the training of new colposcopists, continuing medical education courses offer a forum to help establish criteria and training methods.

Family physicians have an opportunity to pursue training excellence in colposcopy and provide a new dimension to their practice as they diagnose and treat female lower-genital-tract disease. This colposcopy curriculum is an initial effort in the identification of the content and process required to train family physicians in the use of this diagnostic procedure.

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