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Establishment of a Program for the Education of Cytotechnologists

Joan R. Kohrs

ESTABLISHMENT OF A PROGRAM FOR THE EDUCATION OF CYTOTECHNOLOGISTS

by

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A Culminating Project Presented to the Faculty of the Graduate School
of Lindenwood College in Partial Fulfillment of the
Requirements for the Degree of
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ABSTRACT

The Barnes Hospital School of Cytotechnology closed in 1977 as have many other programs for the education of cytotechnologists. These programs were victims of hospital budgetary concerns, as well as a job market that had no demand for new cytotechnologists.

Unfortunately with fewer and fewer graduates from accredited programs in the last 15-16 years there is, currently a shortage of these skilled laboratory professionals.

Faced with unfilled vacancies in the cytology laboratory many hospitals are considering re-evaluating the possibilities of sponsoring programs for the education of cytotechnologists.

Barnes Hospital, St. Louis, Missouri, long a leader in both health care and medication education, has established a program for the education of students in cytotechnology.

The steps taken to insure accreditation of the program by the Committee for Allied Health Education and Accreditation (CAHEA) and the support of the medical community of metropolitan St. Louis are documented in the culmination project entitled: Establishment of a Program for the Education of Cytotechnologists.

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COMMITTEE IN CHARGE OF CANDIDACY:

Professor Betty Lemasters, Ph.D

Chairperson and Advisor

Professor Michael Castro, Ph.D

Terry Jo Gile, M.S. MA Ed MT (ASCP)

DEDICATION

This project is dedicated to the many tireless cytotechnologists whose infinite patience and skill have lessened the threat of cervical carcinoma to the women of the United States and to my husband, Bud, for the infinite patience and care of his wife.

ACKNOWLEDGMENTS

The candidate would like to acknowledge all of those people who have assisted in this project: the laboratory supervisors and managers of the St. Louis Metropolitan area. A special thank you to Ms. Terry Jo Gile, Administrative Coordinator for the Laboratory of Barnes Hospital without whose help none of this project would have been undertaken and to Ms. Marilee Means and Ms. Joyce Torrey for their assistance in curriculum and Student Handbook development

APPENDICES

The forms for student evaluations, faculty evaluations and study sheets are in compliance with the requirements listed in the Essentials for Educational Programs prepared by the American Society of Cytology. Some forms follow prototypes used at the School of Cytotechnology at the University of Kansas Medical Center.

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CHAPTER 1

Wages and Vacancies for Cytotechnologists in 1992

In 1992 a survey was conducted by Market Opinion Research in Detroit to establish to prevailing vacancy rate for medical laboratory positions. Additionally, they sought to establish a market analysis of the prevailing wage in the professional marketplace (Castleberry 89). Questionnaires were mailed to 2500 laboratory professionals. Response to the survey was to be accomplished by return postcard. Following the initial mailing a second mailing was sent to all of the nonrespondents. Of the original 2500 mailings the final sample size was 688, which constituted a 28% response rate. This was sufficient to provide a sampling error rate of 3.7% (Castleberry 89). Of the ten positions evaluated, eight were determined to have enjoyed salary adjustments comparable to wage increase achieved in former years. Only two positions, phlebotomist and cytotechnologist experienced pay increases far above those received by other laboratory professionals. Most laboratory professionals experienced salary adjustments that ranged from 5.1% to 13.0%, but the cytotechnologist's salary rose from 14.4% to 22.1%. This rise is a direct result of supply and demand. The median salary range for a staff level cytotechnologist in 1992 was $34,736. Supervisory level cytotechnologists had a median salary level of $43,264 (Castleberry 90).

Additionally in 1992 there was a 27% vacancy rate for cytotechnology positions within the medical laboratory. Today, in 1993,

the vacancy rate has improved to 21%. One in five available positions for cytotechnologists remains unfilled.

One reason for this high vacancy rate is the lack of a training program for cytotechnologists available in the United States. Since the inception of fixed rate reimbursement systems for the payment of hospitalization, hospital based education programs have borne the brunt of the cost cutting efforts. Prior to the fixed rate reimbursement policies, like those of Diagnosis Related Groups (DRGS) used by Medicare and those of Health Maintenance Organizations (HMOS), hospitals were able to set their rates to cover all medical services. An integral part of these services was medical education both in the form of continuing education for medical professionals and new training programs for students of various medical disciplines. Unfortunately since the inception of the new reimbursement practices many programs for the teaching of cytotechnology, as well as those of medical technology, histotechnology and nursing were eliminated as part of the cost saving measure instituted by health care facilities.

Indeed in the 1970's and 1980's when many programs ceased to exist there was no evident shortage of cytotechnologists. As the schools of cytotechnology closed fewer and fewer students were graduated and the number of graduates shrank to less than 200 yearly. These 200 graduates were to replace those technologists leaving the field for retirement, other business pursuits and promotion. Additionally due to the impact of the Clinical Laboratory Improvement Act (CLIA) of 1988, which limits the number of slides that may be screened by a

cytotechnologist daily, many new positions have been created to deal with the workload.

In the St. Louis Metropolitan area an average of 36 weeks is required to find and hire a cytotechnologist. Often a sign-on bonus is offered to prospective employees to entice them to the position that is being offered. Right now in the St. Louis area one large metropolitan hospital is offering a $1,000 sign-on bonus (St. Louis Post Dispatch, January 1993). This offer and the vacant position have been advertised nationally for the last four months and to date the position remains unfilled. The author, a registered cytotechnologist, receives contacts several times a month regarding vacant positions and the possibility of accepting any one of them. This is not an unusual situation as it occurs daily throughout the country.

With this need in mind Barnes Hospital sought to determine the feasibility of establishing a school of cytotechnology. Many questions needed to be answered before pursuing this project, some of which were: 1) Is there support for such a program in the medical community?, 2) the availability of clinical sites for student practicum, 3) lecture participation, 4) possibility of student sponsorship, 5) acquisition of an academic affiliation and 6) acquisition of requisite teaching materials. To seek answers to these questions Terry Jo Gile, Administrative Coordinator to the laboratory initiated meetings with the supervisors of cytology laboratories within the metropolitan area. During these meetings both the shortage of technologists and the need for an educational program to "grow our own" (Gile) were discussed. It was determined that there was a need in

the area for a program to train aspiring cytotechnologists. Assured of the support of the medical community Barnes Hospital, a leader in medical education, assumed the role of sponsoring institution. The Barnes Hospital School of Cytotechnology was soon to become a reality.

CHAPTER 2

Personnel

One of the first requirements for the establishment of an educational program is the acquisition of qualified personnel. The Program Director/Education Coordinator was the first position to be filled. Requirements for this position include the possession of a baccalaureate degree, national registration with the American Society of Clinical Pathologists (ASCP) as a cytotechnologist and five years experience that includes supervisory and education experience. Chosen for this position was the candidate, Joan Kohrs. To Kohrs fell the organization of the entire educational program. In addition to Kohrs a Medical Director was required. The position of Medical Director must be filled by a Board certified anatomical pathologist with an interest in cytology. Two pathologists on staff at Barnes Hospital were selected to be the co-Medical Directors, Douglas Franquemont, M.D. and William Geary II, M.D., Ph.D.

As Program Director/Education Coordinator Kohrs was charged with: 1) the establishment of an academic affiliation with the University of Missouri at St. Louis (UMSL), 2) establishment of clinical affiliations to procure sites for the clinical portion of study, 3) acquisition of classroom space and furniture, 4) acquisition of library material, teaching slide sets, student microscopes and a multi-headed teaching microscope, 5) curriculum development that included text book evaluation, education objectives, lecture schedule syllabus development, and laboratory

rotation, 6) student development including the selection process, academic evaluation, counseling, and the development of a student handbook, 7) professional development program, 8) requirements for the clinical affiliates and the development of a clinical affiliate handbook.

A set of job descriptions for each of the positions of Program Director, Medical Director, Education Director and support clerical staff was developed and a professional development program was put into place. Professional development and continuing education are an integral part of any medical science. When those in medical science are also involved in the teaching of that science it becomes mandatory that the teacher be aware of the latest theories and practices. To that end a requirement of a minimum of twenty hours of continuing education yearly was set for all lecture participants and all medical teaching staff. To achieve this requirement it was suggested that the co-Medical Directors, the Program Director, and the Education Coordinator be allowed two weeks yearly away from their normal duties to attend approved seminars, tutorials and programs. Documentation of each program's completion will be retained in the participating faculty's file. Continuing education hours may be acquired from nationally/regionally sponsored programs or on-site programs. On-site programs may include documented discussions of interesting cases, teleconferences, check sample cases from the College of American Pathologists (CAP) and other hospital based programs. Job descriptions delineating basic required functions for each position were established.

CHAPTER 3

Affiliations

At a scheduled meeting with the dean of the Evening College and other administrative personnel an affiliation agreement was finalized that allows prospective students of cytotechnology to enter the program by two pathways. Entry into the program may be obtained by the admission process. Prospective students may apply to the program if they are currently pursuing an undergraduate degree in the Evening College of UMSL and have fulfilled the requirements of that degree program through the third year of study. In addition to the degree requirements the student must have the minimum requirements for entry to the cytotechnology program which include 20 semester hours (or equivalent) in Biology, 8 semester hours (or equivalent) in Chemistry, and 3 semester hours (or equivalent) in Mathematics. Upon acceptance and successful completion of the cytotechnology program the university will accept 35 semester hours and confer the Baccalaureate Degree in General Studies (B.S.G.S.) to the learner. The Barnes School of Cytotechnology will grant a certificate of completion that allows the student eligibility for the registry examination given by the American Society of Clinical Pathologists (ASCP). This 3+1 program is comparable to the medical technology programs throughout the United States. Alternatively the prospective student may apply if they have already completed a baccalaureate degree that contains the minimum requirements as stated earlier. The program has been included in the Bulletin of the University of Missouri, St. Louis under the heading of

Biology and has been assigned the appropriate course number and course description. Course numbers and titles include 309a Introduction to Cytology, 309b Neoplasia in the Female Genital Tract I, 309c Neoplasia in the Female Genital Tract II, 309d The Processing Laboratory, 309e Respiratory and Oral Cytology, 309f Effusion, Cerebral Spinal Fluid (CSF), and Miscellaneous Cytology, 309g Gastrointestinal, Breast, Genitourinary tract and Fine Needle Aspiration Cytology, 309h Scientific Method and Literature in Cytology, 309i Advance Practices in Cytology.

With the academic affiliation and course descriptions completed attention was directed to the acquisition of clinical affiliates to secure sites for the clinical/practical portion of the program. After establishing telephone contact with the laboratory managers of potential clinical laboratory sites a personal visit by the Program Director was scheduled. Meetings were held with R. L. Patrick, M.D. of SmithKline Beecham Laboratories, Sam Frankel, Ph.D of Metropolitan Reference Laboratories, Anita Cooley, B.S., CT(ASCP) Saint Louis University Hospital, Carol Singer, M.S., MT, DLM(ASCP) Saint Luke's Hospital, Joanne Miller CT(ASCP) and John Rollo, M.D. of Christian Hospital Northeast. All of these outstanding laboratorians agreed to offer their institutions as clinical sites for the student practicum rotation. To assist these clinical sites with the discharge of their responsibilities a Clinical Affiliate Handbook was prepared that includes attendance records, evaluation sheets for the clinical instructor to evaluate the student's performance, as well as evaluation sheets for the learner to evaluate both the clinical instructor and the clinical site. Additionally there is a practice screening schedule

that shows the desired student performance level, a copy of the student handbook, a lecture schedule, laboratory schedule and a syllabus. In addition to the responsibilities listed the clinical affiliates must appoint an Education Coordinator to interact with the student and the Program Director. The Education Coordinator is responsible for counseling the learner during the clinical rotation. The program has been structured to allow the learner to spend approximately six and one-half months in a classroom experiencing didactic material and structured laboratory sessions at the multi-headed microscope.

CHAPTER 4

Resources

A search for available classroom space was the next step. As with any large institution space is a premium, Barnes Hospital is no exception. However, since Jewish Hospital is a part of the Washington University Medical Center campus the search for classroom space was not limited to the one site. Through a meeting with the Dean of the Jewish Hospital College of Nursing and Allied Health, Sharon Pontius, RN Ph.D, it was determined that available space to house the students of the program existed at the college. The space was gratefully accepted and arrangements were made to move student desks and microscopes into the area. Also housed in the classroom used by the students of Medical Technology was a multiheaded teaching microscope that was available for use by the students of cytotechnology.

With the problem of a classroom solved the next step was to evaluate the teaching materials available. Minimum needs included glass slide study sets that depict all of the entities to be discussed and studied. Many of these were available through the cytology laboratory. Selection of text books and reference material was the next order of business.

The seventh edition of the Compendium on Diagnostic Cytology is edited by five outstanding practitioners of cytopathology: George Wied, M.D., Catherine Keebler, CT, Leopold Koss, M.D., Stanley Patten, M.D.

and Dorothy Rosenthal, M.D. The compendium features articles written by noted cytopathologists. These cytopathologists represent the medical field world wide.

Dr. Alexander Meisels, of the Department of Laboratory Medicine, Saint Sacrament Hospital, Quebec, discusses the changes in the uterine cervix in relation to the human papillomavirus. Human papillomavirus has long been implicated as the causative agent in condylomata acuminata (venereal warts). Studies performed by Dr. Meisels now indicate that human papillomavirus may be a causative agent in the development of mild dysplasia of the uterine cervix, a precursor to carcinoma in situ. In this chapter Dr. Meisels discusses the histology and histomorphology of condylomata. Additionally the cytologic presentation of human papillomavirus in cells exfoliated from the uterine cervix is discussed. The koilocyte is the cell that is pathnomonic of condylomata. Koilocyte is the term as described by Koss and Durfee to describe these affected cells. Koilos is a Greek word meaning hollow or cavity referring to the presence of a "hollow" created by margination of the cytoplasm of the affected cells (Koss).

Meisels goes further to discuss the possibility of a coexisting low or high grade squamous intraepithelial lesion either adjacent to or at a distance from the condylomata. This theory of the genesis of squamous epithelial lesions in the presence of the human papillomavirus. (HPV) has been widely accepted by the medical community. This acceptance has created the classification, in the Bethesda System of reporting, of low grade squamous intraepitheilial lesion (mild dysplasia with HPV).

Another outstanding chapter is that of The Cytology of The Central Nervous System written by Dr. Dorothy Rosenthal, Department of Pathology, University of California at Los Angeles School of Medicine. Rosenthal describes the constituents of the normal spinal fluid, as well as the collection method. Continuing, Rosenthal discusses the tumors of the central nervous system and describes the cytologic protestation of the cells that might be encountered during the cytologic evaluation. On page 326, Rosenthal has delineated these features within a chart.

The Compendium has a total of four hundred and forty pages with contributions from sixty one well known cytopathologists from Asia, Europe, Australia, Great Britain, Canada and The United States. Entries include topics dealing with the female genital tract, the respiratory tract, the alimentary tract, the genitourinary tract, body fluids and the cytology of fine needle aspirates.

The entries are well written and easy to read and understand. The editors have done an excellent job in the selection of authors for the various chapters. This book will be an excellent choice for a reference text to be included in the student library The Compendium is published by the Tutorials of Cytology, Chicago, Illinois.

Histology, by Alan Stevens and James Lowe is a three hundred and seventy eight page text published by Gower Medical Publishing of London and New York.

The authors have written in a straight forward concise style that is

easy to grasp and easier to follow. To begin the authors introduce the reader to the cell as a basic functional unit. This is important since cells are classified by their function. Tissues are functional arrangement of cells. Cell history is aligned to cell biology in the same manner as histology is aligned to anatomy.

In understanding cells presented for cytologic evaluation the student of cytotechnology must understand the histopathologic base of the organ sampled. Stevens and Lowe explore the cellular systems of the epithelia, support (formerly called connective tissue), contractile cells and the blood cells. Collectively these cells form the major organ systems of the body.

As the authors describe each of these organ systems the text is augmented with diagrams depicting the gross anatomy of the organ and photographs of the tissue encountered within and about these systems.

This text has been selected as required book for the students of cytotechnology.

Fine Needle Aspiration Cytology: Lymph Node, Thyroid and Salivary Gland, is written by Philip Feldman, M.D., Jamie Covel, CT., and Thomas Kardos, M.D., Feldman and Covell are employed by the University of Virginia Health Services Center. Kardos is the Director of Cytology at Baptist Memorial Hospital.

The text explains the required equipment for doing fine needle aspirations, as well as defining in detail the technique needed to obtain

diagnostic material.

The balance of the book centers upon an explanation of both benign and malignant conditions that may be encountered in lymph nodes, the thyroid and salivary glands and the head and neck. The authors have included more than seven hundred photographs depicting the various lesions described in the text. Photographs are of actual histologic and cytologic specimens that have been prepared and stained with the Wright stain and/or the classic Papanicolaou stain. The text is well illustrated and reasonably well written. It will be added to the reference library for the cytotechnology students. The text is published by the American Society of Clinical Pathologists in Chicago, Illinois.

As a companion to the aforementioned text, Feldman and Covell have authored a companion text entitled, Fine Needle Aspiration Cytology: Breast and Lung.

In addition to an explanation of the technique of fine needle aspiration cytology, the authors have assembled four hundred and sixty four color photographs that illustrate the benign and malignant disorders presented for each body site. The text is well done and is an excellent reference for cytotechnologists and cytopathologists. The text is published by the American Society of Clinical Pathologists.

In this book, Cytopathology of the Uterine Cervix, Alexander Meisels, M.D. and Carol Morin, Ph.D, have produced a text that clearly shows their mastery of uterine cytology. The authors have presented the

reader with a well organized text that covers both the cytologic and histologic patterns associated with cervical cytopathology. The authors include three hundred and two color photomicrographs of the cytologic and histologic patterns that may be encountered in cervical cytology.

Included in this very informative text are procedures for the acquisition of cervical samples and their processing. In addition to the stains presented, the authors discuss ways to avoid artifacts in the preparation that may occlude cytologic evaluation. This text published by the American Society of Clinical Pathologists has been selected for inclusion in the reference library of the Barnes School of Cytotechnology.

James Linder, M.D. and Stephen Rennard, M.D. have produced an excellent text that deals with bronchoalveolor lavage. The text, aptly titled, Bronchoalvelar Lavage, is published by the American Cytology of Clinical Pathologists. The authors provide the clinician with detailed information concerning bronchoalvelar lavage from basic procedures to the more intricate specimen analysis. Included in the text are thirty six color plates depicting various diseases encountered by the authors. The text includes information that may be valuable to the cytopathologist, the clinician and the cytotechnologist. This text may be too limited in its approach to be used as a text for students.

Dr. Leopold Koss has been a leader in the field of cytopathology since the 1950's. Dr. Koss is one of the few physicians left who worked with the father of "modern cytology", Dr. George Papanicolaou. Diagnostic Cytology and its Histopathologic Bases is the fourth edition of

writings by Koss. In addition to conclusions reached by his own research and observations, Koss has elicited contributions from thirteen well known cytopathologists.

Koss describes the structure of cells and their functions before discussing the changes evidenced by these cells when they are in a neoplastic growth. Like his previous books Koss has produced a book that is clear, concise, and easy to read.

The first volume deals with cell structure and function for all body systems. Following this discussion of cell philosophy Koss discusses the normal cells of the female genital tract. Described are the normal cells and tissues of the female reproductive system. Beyond normal morphology discussion is centered upon the disease states caused by inflammation. Inflammatory conditions may be caused by numerous entities some of which include parasites, viral infections, bacterial infections and fungal manifestations. Following the sections dealing with inflammatory processes, Koss details the cellular changes as seen in malignant neoplasia and their precursors.

Volume two follows the same format, but deals with nongynecologic cytology. The systems include are respiratory, alimentary, urinary, body fluids, breast, thyroid and central nervous system.

The works of Koss have long been considered the "Bible" of the cytologists. These volumes continue with this concept. This text is one selected as a required text for students in the cytotechnology program.

The text is published by Lippincott.

One of the first texts edited by a cytotechnologist is the Manual of Cytotechnology published by the American Society of Clinical Pathologists, edited by Catherine Keebler. This manual includes chapters that deal with ethics, and laboratory management. Contributors include Alan NG, M.D. for endometrial cytology and George Wied, M.D. for hormonal cytology.

The book is enhanced by color plates depicting the cellular changes described in the text. This is a good first reading for students because it is very simply written.

Diagnostic Pulmonary Cytology is written by Gene Saccamanno, M.D., Ph.D. This is the second edition of Saccamanno's work. He has updated information on pulmonary cytology by including material on metastatic tumors to the lung and endo/transbronchial and percutaneous needle aspirations. As with the other authors, Saccamanno begins with normal cells and progresses to the changes manifested by chronic inflammation to the cellular changes encountered from premalignant and malignant lesions. Enhancing the text are ninety color plates depicting the changes discussed.

In all there are nine hundred and eighteen photomicrographs presented to aid the cytotechnologist in the diagnosis of respiratory specimens. Saccamanno writes clearly and well. This is an excellent reference text. The book is a publication of the American Society of

Clinical Pathologists.

Comprehensive Cytopathology, edited by Marluce Bibbo, M.D. and published by Saunders of Philadelphia is an eleven hundred page megalith of information As with most comprehensive texts Bibbo includes chapters written by fifty two contributors writing on genecological and non-gynecological cytology. This list of contributors reads like a "Who's Who of Cytopathology." Contributors include Frost, Frable, Reagan, Patton, Johnston and Weid.

All of the chapters are well written. The photomicrographs, however, are in black and white which detracts from the descriptive text. The information contained in this text is massive. Although well written the text is difficult to read. It is particularly difficult for students who are not progressing to a medical degree. None of the tenets of cytology discussed are new, but each is well described. For the sheer joy of information this volume has been included as a required text for cytotechnology students. My students, to date, have been dismayed not at the volumes of information, but at the weight of the book.

The Atlas of Diagnostic Cytopathology has been written and compiled by Barbara Atkinson, M.D., and is published by Saunders of Philadelphia. The Atlas is very well done. Descriptive terms, as well as changes enumerating the cellular features of benign and malignant cells are included. After each descriptive section there follows numerous excellent full color photomicrographs. This book is essential as a reference text for all students of cytotechnology.

The second edition of the Handbook of Laboratory Tests edited by Jacobs, Kasten, Demott, and Wolfson is a compilation of laboratory tests. The test are listed by discipline alphabetically. Each offering indicates the required patient preparation, type and amount of specimen needed. Additionally normal and critical values are indicated. In some instances these values are discussed as to probable diagnostic implications. The book is included in the reference library for students of laboratory medicine.

The third edition of Hematology by Barbara Brown is an excellent dissertation about the cells encountered in the human circulatory system. Brown includes features of leukocytes and erthyocytes from their beginnings as a pleuripotential stem cell to differentiation and maturity. Brown includes staining methods that assist in microscopic visualization of cells. The pathologic conditions of the blood components i.e., leukemia is discussed in detail. In view of the fact that cytologists may encounter cells from lymphomas and leukemias, this book is included in the library as a reference.

Linda Vacca has compiled a book that includes most of the staining methods used in the pathology laboratory. In her book Laboratory Manual of Histochemistry, she has listed, for each stain, the theory, required reagents, procedure, and expected results. Enhancing each stain are comments that relay to the reader information regarding safety, stability and storage of the reagents used. The manual is included in the reference library.

The authors Tilde Boon and L. P. Kok have written a text that discusses standardization of staining procedures used in cytology. In their book, Standardization of and Quanitation of Diagnostic Staining in Cytology, they have endeavored to go beyond mere staining procedures. Included are spectrophlometric data of the cytologic stains normally used in the laboratory.

The book is one hundred nine pages and is published in the Netherlands by Coloumb Press. The book is in the student's reference library.

The texts reviewed document the rapid advance in knowledge that has occurred in the last five to ten years of cytopathology.

The review of the literature discussed herein has been an experience and the experience has been rewarding. Cytology is a relatively new science: Papanicolaou first introduced cytology as a means to detect cervical cancer in the late 1920's. Yet cytology did not take hold as a diagnostic tool until the 1950's. Since then cytology has exploded to include all body organs. Fine needle aspiration techniques have expanded the diagnostic value of cytology. Cytology is now accepted world wide as a tool for the diagnosis of pathologic conditions. As cytology expands so must the knowledge of the cytotechnologist and the cytopathologist.

A standardized system of reporting the findings of the cytologic evaluation is necessary. Both the World Health Organization and the

United States Medical Community have addressed this need. In 1990 the Bethesda System of reporting cytologic findings was recommended as the standard for cytologic reports.

Future research will undoubtedly focus upon advances in fine needle cytology that may soon rival the frozen section as a definitive diagnostic tool. As with any education programs the primary educator/educational committee must continually evaluate new offerings that may assist the learner in their pursuit of knowledge and its application to cytotechnology.

Since cytology is a very subjective discipline lectures are enhanced when microphotographs capable of being projected upon a screen are used. Such microphotographs are available commercially from several sources. One of the most esteemed sources is the Tutorial of Cytology located in Chicago, Illinois. Before purchasing these lectures/study sets of photomicrographs Kohrs felt that it was an act of wisdom to attend one of the tutorials at which these same lecture sets would be used. In that way she felt that she could update her own information while evaluating those study sets that could be purchased.

Fortunately one such Tutorial was scheduled for January 16-23, 1993 at the Sheraton Universal Hotel in Universal City, California. At her own expense Kohrs paid the registration fee, transportation, and room/board costs. The money was well spent as the Tutorial is an international event that draws both participants and lecturers from around the world. Ms. Kohrs was able not only to evaluate and purchase the

necessary lecture sets but was also able to obtain the latest theories and practices of cytotechnology.

CHAPTER 5

Students

Barnes Hospital School of Cytotechnology will not discriminate on the basis of race, color, creed, ancestry, religion, age, handicap, sex, National origin, citizenship, disabled veteran or Vietnam veteran status as provided by Federal, State and Local Law.

To that end a list of standards and functions was developed that outlined those required to successfully complete the program in cytotechnology. (Appendix I)

A student handbook was prepared to advise prospective and accepted students to the policies of the school, the admission process, available services and criteria for successful program completion. Also included in the student handbook are a lecture calendar, lecture schedule, laboratory schedule and syllabus.

Students are requested to evaluate all lecturers both those on permanent staff and those lecturers visiting from other health care facilities. Evaluation forms for tests, clinical rotations, as well as the entire program have been included. Students valid comments will be used to further improve the educational programs offered by the program (See Appendix II).

Additionally forms to evaluate student performance were developed

to aid the faculty in addressing individual student needs (Appendix III).

SCHOOL OF CYTOTECHNOLOGY

BARNES HOSPITAL

UNIVERSITY OF MISSOURI - ST. LOUIS

STUDENT HANDBOOK

Cytology Program

The program in cytotechnology at the Barnes Hospital School of Cytotechnology is the clinical component that may complete the collegiate education of students in General Studies specializing in cytotechnology from the affiliated university: University of Missouri, St. Louis. The program builds upon the student's background in biology.

The clinical year consists of scheduled lectures supplemented with laboratory experience at one of the clinical sites, eight hours a day, five days a week. Occasionally, additional time is needed to complete a procedure or assignment.

Graduates of the program will possess career entry-level proficiency in cytotechnology as addressed in the American Society of Cytology (ASC) and CAHEA Essentials for Cytotechnology (Essentials 1993).

Personal and professional development of students is the concern of the faculty as the students pursue the educational process. Reading assignments are used to supplement lectures and laboratory exercises. Examinations are used to evaluate the progress of the students. Individual conferences/counseling are scheduled with the Program Director at which time the student's achievements and well being will be addressed. Emphasis is placed upon the student's academic achievement and professional performance.

Program Outcomes

The program in cytotechnology is designed to build a basic science background as defined in the ASC essentials entry-level competencies defined as the following:

1. Upon presentation of a cytologic specimen to the laboratory, the cytotechnologist will be able to:

   Accept or reject the specimen
   Select and perform the most advantageous preparation technique
   Select and perform the most advantageous staining procedure
   Coverslip and label the specimen
   Apply principles of quality control
   Solve problems in staining and preparatory procedures
   Evaluate and implement new preparation procedures

2. When given cervicovaginal cellular samples, the cytotechnologist will be able to use the microscope to identify and discriminate among the following entries:

   The various normal cellular constituents
   The various inflammatory cells
   Microorganisms and their effects on cells
   Manifestations of cellular degeneration
   The benign atypias
   Squamous dysplasia, by degree and morphologic origin
   Microinvasive squamous carcinoma by morphologic type

Invasive squamous cell carcinoma by morphologic type

Cellular changes caused by radiation, chemotherapy and hormones

Vaginal adenosis

Post-irradiation dysplasia

Adenocarcinoma of the endocervix

Adenocarcinoma of the endometrium and its precursors

Extra-uterine malignant neoplasm

Rare uterine neoplasms

3. The cytotechnology will be able to evaluate gynecologic material with sufficient competency to meet the entry level responsibility of issuing the final report for negative gynecologic specimens.

4. When given cellular samples from the respiratory system, alimentary tract, genito-urinary system, breast, body cavities including cerebrospinal fluids, and from transthoracic, transabdominal and surface nodules fine needle aspiration procedures, the cytotechnologist will be able to identity microscopically:

Normal cellular constituents

Inflammatory cells

Microbiologic entities and associated cytomorphology

Manifestation of cellular degeneration

Benign atypias

Cellular manifestations of various premalignant processes

Squamous cell carcinoma, adenocarcinoma and other malignant neoplasms

Cellular effects of radiation and chemotherapy

Altered cellular morphology due to collection methods

5. When given a cellular preparation, the cytotechnologist will be able to detect at a high level of accuracy, select, and clearly mark the cells most representative of the nature of any pathological process present. (The development of the detector skill is the primary skill to be attained.)

6. On detection of cellular manifestations of disease, the cytotechnologist will be able to develop a differential diagnosis based on the cellular evidence in conjunction with pertinent knowledge and clinical data. A cytotechnologist will be able to prepare a report for the pathologist incorporating all of this information.

7. The cytotechnologist will be able to demonstrate knowledge of the significance of symptoms in the evaluation of cellular material.

8. The cytotechnologist will be able to demonstrate knowledge about various modes of treatment which can be used in the evaluation of cellular morphology and the development of the differential diagnosis.

9. The cytotechnologist will be able to evaluate cellular morphology in cell block preparations.

10. The cytotechnologist will demonstrate cognitive knowledge by the ability to use diagnostic terminology in reporting to the clinician or the pathologist.

11. The cytotechnologist will demonstrate ability to review histologic tissue sections for the purposes of quality control and to build cognitive correlation between tissue patterns of disease and the cellular manifestations of disease.

12. The cytotechnologist will demonstrate ability to read and evaluate published professional literature for its pertinence and reliability and use the material reported in the preparation and evaluation of specimens

13. The cytotechnologist will demonstrate through appropriate methodology knowledge of the following practical components of laboratory organization and management:

Supply and inventory methods
Annual reports and statistics
Budget preparation
Reporting methods
Policy and procedure manual preparation
Problem-solving

14. The cytotechnologist will be able to incorporate quality control measures in the preparation and microscopic evaluation of submitted specimens as required by various accrediting agencies.

15. The cytotechnologist will be familiar with and practice laboratory safety measures and regulations.

16. The cytotechnologist will demonstrate understanding of the principles of preparing continuing education sessions (such as journal club or literature review seminar or investigation projects). The cytotechnologist will recognize the importance of objectives, visual aids and evaluation.

17. The cytotechnologist will demonstrate understanding of the basic principles of scientific research.

18. The cytotechnologist will demonstrate knowledge of the ethical role and responsibilities of the cytotechnologist. The cytotechnologist will be able to:

Practice discretion and confidentiality in regard to laboratory and patient reports.

Relate specimen evaluation to the significance and impact of such evaluations on patient care.

Practice honesty and integrity in daily duties

Practice the principles of good personal relationships with peers, staff and faculty (Essentials 1993).

Required Courses:

CURRICULAR DESIGNATION: Biology COURSE NO.: 309a

FULL TITLE: Introduction to Cytology

HOURS: 5 PREREQUISITES: Biology 113 & 114, 210, Math 30 and acceptance to the Cytotechnology program at Barnes Hospital.

Bulletin Description:

Orientation to the profession of cytotechnology including basic cell biology, ethics, the microscope, history of the profession. Also basic concepts of pathology are introduced including normal, benign proliferative, inflammatory, and reparative processes. The cellular alternations caused by these processes are introduced using the female genital system. The history, anatomy , and endocrine system of the female genital tract are also covered. Microscopy of this section includes proper use and care of the microscope, hormonal cytology, and the range of normal reparative reactions. The recognition of specific infectious agents and/or their cellular manifestations is also included using the female genital tract as the body system under investigation. Units include Orientation; Hormonal Cytology; Cytotechnology and the Microscope; Basic Cell /Structure; Anatomy, Histology, Normal Cytology, and Benign Proliferative Cytology; and Inflammation and Repair. 20 hours of lectures per week and 20 of laboratory per week for 6 weeks. Offered exclusively for students meeting Cytotechnology requirements in the NAACLS accredited program at Barnes Hospital.

Required Courses:

CURRICULAR DESIGNATION: Biology COURSE NO.: 309b

FULL TITLE: Neoplasia in the Female Genital Tract I

HOURS: 5 PREREQUISITES: Introduction to Cytology and acceptance to the Cytotechnology program at Barnes Hospital

Bulletin Description::

The pathologic concepts of neoplasia, the morphogenesis of carcinoma, and the cellular changes associated with both premalignant and malignant changes of squamous cell lesions in the cervix are studied. Microscopy of this section includes prescreening of clinical case load identifying normal and abnormal cellular criteria. Units include Dysplasia; CIS; and Carcinoma of the Uterine Cervix. 20 hours of lecture per week and 20 hours of laboratory per week for 6 weeks. Offered exclusively for students meeting Cytotechnology requirements in the NAACLS accredited program at Barnes Hospital.

Required Courses:

CURRICULAR DESIGNATION: Biology COURSE NO.: 309c

FULL TITLE: Neoplasia in the Female Genital Tract II

HOURS: 6 PREREQUISITES: Neoplasia in the Female Genital Tract I and acceptance to the Cytotechnology program at Barnes Hospital

Bulletin Description:

Emphasis on lesions of the uterine corpus, metastatic lesions, and lesions of the vulva and vagina. Also treatment effect and pregnancy changes are included in this section. Practical microscopy is also continued with the pre-screening of clinical cases. Units include Diseases of the Uterine Corpus; Cytogenetics and Endocrinopathies; Radiation Effect, Metastic Disease, Pregnancy Changes, and Diseases of the Vulva and Vagina; Review; and Comprehensive Gyn Examination. 15 hours of lectures per week and 25 hours of laboratory per week for 7 weeks. Offered exclusively for students meeting Cytotechnology requirements in the NAACLS accredited program at Barnes Hospital.

Required Courses:

CURRICULAR DESIGNATION: Biology COURSE NO.: 309d

FULL TITLE: The Processing Laboratory

HOURS: 3 PREREQUISITES: Neoplasia in the Female Genital Tract II and acceptance to the Cytotechnology program at Barnes Hospital

Bulletin Description:

Lectures include routine procedures for receipt, staining, coverslipping, and filing of gyn and non-gyn specimens; centrifugation, filtration, special stains, laboratory safety, quality control, and the organization of a laboratory are also covered. Clinical laboratory includes time working under the direct supervision of a cytotechnologist practicing laboratory techniques and procedures for the processing of all gyn and non-gyn specimens. Laboratory safety, quality control, and management procedures are also practiced. Microscopy during this time includes further practice in the prescreening of gyn specimens while increasing speed and accuracy of the diagnosis. 5 hours of lectures per week and 35 hours of laboratory per week for 4 weeks. Offered exclusively for students meeting the Cytotechnology requirements in the NAACLS accredited program at Barnes Hospital.

Required Courses:

CURRICULAR DESIGNATION: Biology COURSE NO.: 309e

FULL TITLE: Respiratory and Oral Cytology

HOURS: 3 PREREQUISITES: The Processing Laboratory and acceptance to the Cytotechnology program at Barnes Hospital.

Bulletin Description:

This course is designed to acquaint the student with the normal, benign, and malignant changes of the upper and lower respiratory tract and the oral cavity. The anatomy, histology, and cytology of each of the body sites is studied as well as infectious agents common to these sites. Microscopy includes prescreening gyn material while further increasing speed and accuracy. Respiratory and oral specimens are also included in the practical microscopy. Students rotate through the processing laboratory. 10 hours of lectures per week and 30 hours of laboratory per week for 4 weeks. Offered exclusively for students meeting the Cytotechnology requirements in the NAACLS accredited program at Barnes Hospital.

Required Courses:

CURRICULAR DESIGNATION: Biology COURSE NO.: 309f

FULL TITLE: Effusion, CSF, and Miscellaneous Cytology

HOURS: 3 PREREQUISITES: Respiratory and Oral Cytology and acceptance to the Cytotechnology program at Barnes Hospital

Bulletin Description:

This course includes the cytology of the reticula-endothelial system, effusions, CSF, and other miscellaneous fluids. Normal, benign, and malignant cellular are covered as well as the anatomy and histology of each body site. Microscopy includes further practice in gyn material and all non-gyn specimens studied to this point. Students continue to rotate through the processing laboratory. 5 hours of lectures per week and 35 hours of laboratory per week for 4 weeks. Offered exclusively for students meeting the Cytotechnology requirements in the NAACLS accredited program at Barnes Hospital.

Required Courses:

CURRICULAR DESIGNATION: Biology COURSE NO.: 309g

FULL TITLE: GI, Breast, GU, and FNA Cytology

HOURS: 6 PREREQUISITES: Effusion, CSF and Miscellaneous Cytology and acceptance to the Cytotechnology program at Barnes Hospital

Bulletin Description:

This course includes the cytology of the GI system, the breast, the urinary tract, and other miscellaneous body sites. The anatomy and histology of each of the body sites is studied; cellular criteria for benign, normal, and malignant changes are introduced. Advanced topics such as aspiration cytology will also be covered. Microscopy includes further practice in the prescreening of gyn material as well as all non-gyn material studied to this point. Students continue to rotate through the processing laboratory. Units include Breast; Urine; and FNA Cytology; as well as the Non-gyn Review and Comprehensive Examination. 5 hours of lectures per week and 35 hours of laboratory per week for 5 weeks. Offered exclusively for students meeting the Cytotechnology requirements in the NAACLS accredited program at Barnes Hospital.

Required Courses:

CURRICULAR DESIGNATION: Biology COURSE NO.: 309h

FULL TITLE: Scientific Method and Literature in Cytology

HOURS: 1 PREREQUISITES: GI, Breast, GU, and FNA Cytology and acceptance to the Cytotechnology program at Barnes Hospital

Bulletin Description:

This course will focus on the scientific method and research tools as used in recent journal articles. Discussion will specifically focus on critical evaluation of the conclusions presented and the evidence used to support those conclusions. Also, data retrieval will be practiced as the students research and write a paper on a cytology related topic. Unit includes the Scientific Method and Research and Data Retrieval in Cytology. 8 seminar hours and 50 hours for writing an independent research paper. Taken concurrently with Advanced Practice in Cytology. Offered exclusively for students meeting the Cytotechnology requirements in the NAACLS accredited program at Barnes Hospital.

Required Courses:

CURRICULAR DESIGNATION: Biology COURSE NO.: 309i

FULL TITLE: Advanced Practices in Cytology

HOURS: 3 PREREQUISITES: GI, Breast, GU, and FNA Cytology and acceptance to the Cytotechnology program at Barnes Hospital

Bulletin Description:

Microscopy includes further practice in the screening of all gyn and non-gyn material at professional entry levels of speed and accuracy. Students continue to rotate through the processing laboratory and participate in case conference. 35 hours of laboratory per week for 8 weeks taken concurrently with Scientific methods and Literature in Cytology. Offered exclusively for students meeting the Cytotechnology requirements in the NAACLS accredited program at Barnes Hospital.

Requirements for Admission to the Cytotechnology Program:

All applicants must satisfy the following prior to starting the cytotechnology program:

1. Completion of a baccalaureate degree or eligibility for a baccalaureate degree upon completion of the clinical program.

2. Grade point average of 2.50 in science and math courses (A = 4.0)

3. Completion of the following course work:

   Biology - 20 semester hours
   Mathematics - 3 semester hours in college level mathematics
   Chemistry - 8 semester hours

Non-degreed applicants must

1. Be enrolled in an allied health curriculum at the affiliated university.

2. Fulfill degree requirements prior to the start of the clinical year.

Degreed applicants (affiliated or non-affiliated) must have received a degree prior to the start of the clinical year.

Non-American citizens must have an immigrant or student visa. Sponsorship will not be assumed by the hospital program. Students with foreign degrees in addition to those previously listed must have satisfied one of the following three options by the start of the clinical program.

1. Possession of a baccalaureate degree in Biology or Allied Health.

2. Possession of a baccalaureate degree in general studies (math, English, history, etc.) or in a professional area (pharmacy, medical technology, dentistry, etc) and include 20 semester units or equivalent in biology, 8 semester units or equivalent in chemistry and 3 semester units or equivalent in mathematics.

3. Admission to an accredited U.S. graduate program whereby the college or university has accepted the foreign degree, regardless of the declared major.

For any of these options, course work must be subject evaluation. Please contact the Program Director for specific information on the evaluation procedure.

Attendance

The program is twelve months in length. Six months will be spent at the Barnes Hospital location and six months at the clinical laboratory designated. Classes at the Barnes Hospital location will be conducted from 7:30AM to 4:00PM Monday through Friday. Hours for the clinical laboratory will be determined by the laboratory assigned. Regular

attendance at both the class work and the internship program is essential and expected. Successful completion of the program cannot be achieved with sporadic attendance. There are valid reasons for absence that may include illness, death of a family member, or an uncontrollable emergency situation. When the need for an excused absence occurs, it is the student's responsibility to notify the Program Director at the earliest opportunity. The student will be expected to make up all missed class work. It is the responsibility of the student to obtain all lecture notes/reading material missed.

Students who miss more than 5% of the program work, either at the class room or at the internship level may receive a failing mark or be required to repeat the missed portion of the program. This is not meant to imply that an absence rate of 5% is acceptable.

Calendar

A calendar indicating the dates class will not be in session, as well as lecture dates and written and practical test dates will be given to each student at the start of each semester.

Criteria for Successful Program Completion

An academic average of 75% for all practical and written examinations is required of all students throughout the program. Additionally, a grade of 90% for the daily screening of slides during the internship is required for graduation. Quizzes and final examinations will be given in each course. All quizzes/examinations will be returned to the

students for review and discussion. If desired, further discussions with the Program Director may be scheduled.

Course grades will be assigned as follows:

A	=	95-100
B	=	85-94
C	=	75-84
D	=	65-74
F	=	64 and below

During the internship portion of the program the student will be evaluated on their screening of unknown slides. Students must complete a Student Evaluation Form (Bethesda System Format) for each case reviewed. AT NO TIME IS THE STUDENT TO SCREEN SLIDES FOR ANY REASON OTHER THAN THEIR OWN LEARNING PROCESS. Certified cytotechnologists who rescreen cases following the student's evaluation will enter their diagnosis on the Student Evaluation Form. Comments appropriate to the diagnosis are welcomed. All slides that have cells demonstrating atypia, malignancy, dysplasia, or where a significant disparity between the student's and cytotechnologist's evaluation exists may be referred to the pathologist for review. At the end of each month, a report documenting the student's screening performance will be compiled and reviewed with the student in order that the student's performance may be improved or maintained.

General Policies for Students

Student ID badges must be worn at all times. Students are expected to adopt a professional standard of dress that includes:

1. Good personal hygiene

2. Appropriate street wear: denim attire of any kind including slacks, jeans, skirts, shirts, jumpers, dresses, etc, are unacceptable.

3. Shoes, socks/hose must be worn at all times. Athletic shoes are unacceptable, but perforated shoes/sandals are not.

4. When in the laboratory area, lab coats MUST be worn at all times.

5. Lab coats worn in the laboratory area are NOT to be worn outside the laboratory work area.

6. Hair/facial hair should be clean and well groomed. In the laboratory all long hair must be secured back and off the shoulders so as not to contact contaminated materials/work surfaces.

7. Examples of inappropriate attire include:
   a. Painter pants, overalls, shorts, pants with ragged cuffs or holes.
   b. Shirts with slogans/pictures on them
   c. Sweat shirt/pants

d. Curlers in hair

e. Dangling jewelry/flowing hair (Laboratory Policy Manual Barnes Hospital)

Educational Methods

Didactic lectures augmented with transparencies, kodachrome slides, color plates and microscope work will comprise the first six months of the program. Cell identification using the multiheaded microscope will illustrate lecture material. At all times student participation is expected and encouraged. Students will routinely review slides to identify those cells or elements just discussed. Sessions with the Program Director/Medical Directors will be available for the student's benefit.

Screening techniques will begin early in the program and continue throughout the student's internship program to increase the student's proficiency.

During the student's rotation through the cytopreparatory laboratory, the student will learn to access, stain and coverslip Gyn and Non-gyn specimens. Techniques for the processing of Non-gyn specimens will be demonstrated and discussed.

A research project is the final requirement of the course. The research project must have the approval of the Program Director. An outline of the project is to be submitted to the Program Director upon completion of the first six months of the program for approval. The final project is due one month before graduation and must be at least 20

pages in length. During the last month of training the student will present his project orally to his peers. Additionally, copies of the research project must be submitted to the Evaluation Committee for review and grading. The Evaluation Committee consists of the Eduction coordinator at the laboratory that provided the internship and an instructor of the student's choosing and the Program Director.

Ethics

Ethics are an important facet basic to all health care professions. A code of ethics to which cytotechnologists adhere will be discussed. Students are expected to be respectful and concerned for fellow students and patients. It is mandatory that students hold confidential privileged information that may become available to him/her. It is expected that students will endeavor to adhere to the code of ethics embraced by cytotechnologists.

Grades

Grades will be given for each course taken in which written and practical examinations are given so that the student will be aware of his academic standing. If requested, a transcript of the clinical training courses will be provided.

Job Placement

Currently, there are numerous openings in the United States for qualified, registered cytotechnologists. As the end of the course study nears, time off for interviews for potential employment will be given at he discretion of the Program Director. It is the student's responsibility to

obtain employment upon completion of the program. Barnes Hospital School of Cytotechnology assumes no responsibility for placing students for employment.

Lunch Room Facilities

Student lunch is from 11:30-12:00 daily. Facilities for lunch, purchased or carried from home, are available in the employee cafeteria at Barnes Hospital. Additional luncheon facilities are available in the hospital and in Queeny Tower. Display of the student I.D. will allow a discount at employee cafeterias.

Microscopes

Microscopes are an integral part of the cytotechnologist's profession. During the length of the program, each student will be assigned a microscope to use throughout the course. After instruction in the proper care and use of the microscope, each student will be responsible for maintaining his/her own microscope and documenting all (maintenance/quality control). At no time may the microscope leave the classroom without permission from the Program Director.

Parking

Parking is a premium at the medical center. Parking is provided free of charge at employee parking lots with shuttle service to the medical center. Arrangements will be made for students who request an employee parking permit.

Financial Information

Tuition, Fees and Expenses:

All students must pay the following direct charges:

Application fee:	$ 50 non-refundable
Tuition	$150/credit hour
Graduation fee:	$ 75 (one-time fee)
Books:	$300-400

Additional Expenses:

Meals - Students are responsible for their own meals. Students may eat in the Hospital cafeteria at the employee discount rate.

Transcripts - For former students and graduates, $5. There is a $2 charge for currently enrolled students.

Other - Additional expenses include student's own transportation to off-campus clinical facilities and hospitalization insurance.

Financial Aid:

Stafford Loan (GSLP)

Other federal and state programs in which the college participates with the University of Missouri, St. Louis.

Refunds:

Refunds are made as follows (Saturday, Sundays, Holidays excluded)

1-5 day of semester	90%
6-10 day of semester	70%
11-25 day of semester	50%
After 25th day of semester	No refund

A minimum of $20.00 cancellation fee will be withheld from all refunds. Deductions from all refunds may be made for financial obligations to the University of Missouri/Barnes Hospital School of Cytotechnology.

Each student is required to pay a health fee of $3.00 and a student activity of $86.04 to the University of Missouri. There is an optional accident and sickness insurance plan available at a low cost to students and their dependents. Information regarding premiums and coverage is available upon request from the cashier's office. An additional fee of $4.00 per credit is assessed for computerization of student records.

Payments:

A payment schedule may be arranged by contacting the Financial Aid Office. All tuition and fees are made payable to University of Missouri - St. Louis, MO (Bulletin UMSL).

Additional Information

Applications

Applications may be obtained any time after April 1st, by calling or writing the School. The application and transcript deadline is August 1st prior to the February term in which you are seeking admission. At the time of application, further information about admission procedures will be sent.

Starting Date

First Monday in February annually.

Vacations

Winter vacations are five days each. In addition to vacation time, students are dismissed for the following holidays:

Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas Day, and New Year's Day.

Accreditation

The Barnes Hospital is accredited by Joint Commission on Accreditation of Healthcare (CAHEA) organizations. The Department of Pathology laboratories are accredited by the College of American Pathologists. The Cytotechnology Program maintains its accreditation through the American Society of Cytology and CAHEA.

Certification

All students completing this program are eligible to take certifying examinations offered by the American Society of Clinical Pathologists

(ASCP) and the National Certification Agency for Medical Laboratory Personnel, among others.

For further information contact:

Joan Kohrs, BS CT(ASCP)
The Barnes Hospital School of Cytotechnology
One Barnes Hospital Plaza
St. Louis, MO 63110

The Barnes Hospital School of Cytotechnology is located in St. Louis, Missouri.

Clinical experiences, cytology practica are provided by clinical affiliates.

Library

The student has access to the library located in the pathology laboratory, as well as access to all medical center libraries.

Library Facilities

Located at one end of the classroom area.

In addition to the resources available at the School library students and faculty have access to all of the materials of all the Medical Center libraries. Students may use the Rothschild Medical Library at Jewish Hospital and the Washington University

School of Medicine Library, as well as the libraries located at Missouri University, St. Louis, Washington University.

Academic/Professional Probation

Students may be placed on academic/professional probation as follows:

1. Grade point average falls below 2.0 in any semester.

2. A failing grade is recorded in any course.

3. Accuracy rate falls below 90% in screening during the internship phase.

Students may be removed from probationary status as follows:

1. Semester grade point average rises to or above 2.0.

2. A passing grade is achieved in any course previously failed.

3. The screening accuracy rate climbs to 90%

When a student is placed on probation, a plan to correct the deficiency will be devised and implemented. Such a plan will be outlined/discussed with the student with a time frame set to achieve the remedial work. At all times, every attempt will be made to assist the student to succeed.

Documentation of the corrective action and the student's probation is part of the student's file and will be maintained as such.

Student Employment

Students may feel that it is necessary to work outside the classroom. However, due to the intense course of study and the quantity of material to be covered, students are encouraged to keep outside work hours to a minimum. Any student who is found to be working as a cytology screener prior to graduation from the program will be expelled from the program immediately.

Student Records

A file for each student is maintained by the Program Director. Each file will include copies of all written and practical examinations, a copy of the research project and college transcripts. The student may review his file at any time. Files are kept in a locked file cabinet.

Telephone

There are pay telephones throughout the hospital that students may use. There are times when the student may use the Program Director's telephone. Calls from this phone should be kept to a minimum and must be brief.

Counseling

The Counseling Service of the University of Missouri, St. Louis offers free professional assistance to students, faculty and staff with personal, social, educational or career concerns. Included in the

services provided are individual and group counseling, a range of workshops with specific aims, as well as career testing and career development counseling. The Career Resource Center houses a library of career related materials.

Additionally, students may benefit from the Employee Assistance Program offered at Barnes Hospital.

Name _____ Month February 1993

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1 Orientation Tour Introduction to Cytology	2 Ethics Microscope	3 Cell Physiology	4 Slide Eval. Bethesda Med. Term	5 Intro to Slide Screen	6
7	8 FGT Anatomy Laboratory Safety	9 Cyto/Histo FGT Hormonal Cytology	10	11 Benign Proliferative Reserve Cell Hyperplasia	12 Quiz & Discussion	13
14	15 Cytologic Stains Cyto. Lab	16 Cyto/Histo. Inflam./Repair	17 Micro-changes Protozoa/ Virsus etc	18	19 Quiz & Discussion	20
21	22 Evaluation Malignant Cell	23 Cyto/Histo Dysplasia	24	25	26	27
28						

Name _____ Month March 1993

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1	2	3 Cyto/Histo HPV Correlation to Dysplasia	4	5 Quiz & Discussion	6
7	8 Laboratory Prep. Procedures	9	10	11	12	13
14	15 Glandular Neplasms of The CX	16	17 Histo Glandular CA Cyto Glandular CA	18	19 Quiz - Written and Practical Discussion	20
21	22 Histo Sq. CA Cyto Sq. CA	23	24 Histology of Microinvasive CA Cytology of Microinvasive CA	25	26 Histology Invasive CA Cytology Invasive CA	27
28	29 Diseases of Uterine Corpus	30	31			

Name _____ Month April 1993

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1	2 Written/ Practical Quiz Discussion	3
4	5	6	7 Cytogenetics Endrocrino-pathies	8	9	10
11 EASTER	12	13 Laboratory Management	14	15	16 Written Quiz	17
18	19	20 Research Methodologies Literature Review	21	22 Radiation/ Therapy	23	24
25	26 Metastatic Disease	27	28	29 Diseases of the Vagina and the Vulva	30 Written Quiz Discussion	

Name _____ Month May 1993

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
2	3 Diseases of the Vulva	4	5	6	7	1/8
9	10 Review Female Genital Tract	11 Review Female Genital Tract	12 Review Female Genital Tract	13 Review Female Genital Tract	14 Review Female Genital Tract	15
16	17 Final Exam-FGT Pract/Written Discussion	18 Embryology/ Anatomy Respiratory		20 Histology Cytology Normal Respiratory	21	22
23	24 Organisms/ Mycoses Respiratory Tract	25	26 Histo/Cyto Benign Lesions Respiratory Tract	27	28 Practical Quiz and Discussion	29
30	31 No School					

Name _____ Month June 1993

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1 Histo/Cyto Lung Cancer	2	3 Met. CA Lung	4	5
6	7 FNA Lung Cyto - of	8	9	10	11 Written/ Practical Quiz/ Discussion	12
13	14 Histo/Cyto Oropharnyx Esophagus Stomach (normal)	15 Histo/Cyto Small/Large Intestine Normal	16 Benign Lesions of GI Tract	17 Histo/Cyto of Malignancies Oropharnynx Esophagus Stomach	18 Histo/Cyto Malignancies Small/Large Intestines	19
20	21 Histo/Cyto Liver, GB, Pancreas	22	23 FNA Cyto Liver, Pancreas, GB, Salivary Gland	24	25 Quiz/Discussion Written/ Practical	26
27	28 Histo/Cyto of Normal Mesothelium	29	30 Malignancy of the Mesothelium			

Name _____ Month July 1993

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1	2 Pitfalls in Effusion Cytology	3
4	5 No School	6 Literature Review/Oral Presentations to Peers	7 Literature Review/Oral Presentation to Peers	8	9 Practical Quiz Effusions	10
11	12 Histo/Cyto Breast	13 FNA Benign Lesions-Breast	14 FNA Cytology Malignant Lesions Breast	15	16	17
18	19 Histo/Cyto Normal UA Tract Male/Female	20 Histo/Cyto Inflam./Benign UA Tract	21 Histo/Cyto Malignancies UA Tract	22	23 Quiz Discussions Written/ Practical	24
25	26 Histo/Cyto Thyroid Inflam/Benign Lesions Thyroid	27 Cyto of Malignancies of Thyroid FNA Cyto Thyroid	28 CSF Benign/ Malignant Cytology	29 Pathology of Lymphoma/ Leukemia	30 Histo/Cyto Prostate Histo/Cyto Synovial Fluids	31

LECTURE SCHEDULE

Date	Topic
Feb 1993 1	Orientation/Tour (AM) Introduction to Cytology (PM)
2	Ethics Introduction to the Microscope
3	Cell Physiology
5	Slide Evaluation Medical Terminology The Bethesda System
8	Anatomy and Embryology of the Female Genital Tract (FGT) Laboratory Safety
9	Histology of FGT Cytology of FGT Hormonal Cytology
11	Benign Proliferative/Reserve Cell Hyperplasia
15	Introduction to Cytology Stains Introduction to the Cytology Lab
17	Microbiology, Protozoa, Viral Changes and Opportunistic Organisms
22	Evaluation of the Malignant Cell/Criteria for Malignancy

LECTURE SCHEDULE

Date	Topic
23	Histology of Dysplasia Cytology of Dysplasia
March 1993 3	Histology of HPV Cytology of HPV Relatioship to Dysplasia
15	Glandular Neoplasms of the Cervix
17	Histology of Glandular Cell CA Cytology of Glandular Cell CA
22	Histology of Squamous Cell CA Cytology of Squamous Cell CA
24	Histology of Microinvasive CA Cytology of Microinvasive CA
26	Histology of Invasive CA Cytology of Invasive CA
28	Diseases of the Uterine Corpus: Endometrial Hyperplasia, Endometrial CA
31	Extra Uterine Cancer Rare Tumors
April 1993 7	Cytogenetics Endocrinopathies
15	Laboratory Management

LECTURE SCHEDULE

Date	Topic
20	Research Methologies Literature Review
22	Radiation, Therapeutic Effects on the Cell
26	Cytology of Metastatic Disease to FGT
29	Diseases of the Vagina Diseases of the Vulva
May 1993 18	Embryology of Respiratory Tract Anatomy of Respiratory Tract
24	Organisms/Mycoses of Respiratory Tract
26	Histology Benign Lesions of Respiratory Tract Cytology Benign Lesions of Respiratory Tract
June 1993 1	Histo/Cyto Lung Cancer
3	Metastatic Cancer of Lung
7	FNA Cytology
14	Histo/Cyto of Oropharynx Esophagus, Stomach
15	Histo/Cyto Small, Large Intestine (normal)
16	Histo/Cyto Benign Lesions of GI Track
17	Histo/Cyto Malignancies of Pharynx, Esophagus, Stomach
18	Histo/Cyto Malignancies Small/Large Intestine
21	Histo/Cyto of Liver, Gallbladder, Pancreas
23	FNA Cytology of Liver, Gallbladder, Pancreas
28	Histo/Cyto of Normal Mesothelium

LECTURE SCHEDULE

Date	Topic
30	Malignancies of the Mesothelium
July 1993 2	Pitfalls in Effusion Cytology
6	Literary Review/Research Methods
12	Histo/Cyto of the Breast (normal)
13	FNA Cytology Benign Lesions of Breast
14	FNA Cytology Malignant Lesions of Breast
19	Histo/Cyto Normal Urinary Tract
20	Histo/Cyto Inflammation Urinary Tract
21	Histo/Cyto of Malignancies Urinary Tract
26	Histo/Cyto Normal Thyroid Inflammation/Benign Lesions of Thyroid
27	Histo/Cyto Malignant Lesions of the Thyroid
28	CSF, Benign, Malignant Cytology
29	Pathology of Lymphoma, Leukemia
30	Histology, FNA Cytology Prostate
31	Synovial Fluid Cytology

LABORATORY SCHEDULE

Week	Date	Lecture	Lab
1	Feb 1	Introduction to Cytology	N/A
	2	Ethics Introduction to the Microscope	Microscope
	3	Cell Physiology	
	4	Slide Evaluations	Techniques of Slide Evaluation
	5	Bethesda System	
2	8	Anatomy FGT	Lab (Histo) FGT
	8	Laboratory Safety	
	9	Histo/Cyto FGT Hormonal Cytology	MHM session FGT (Normal) MHM session (Hormonal)
	10	Individual Study Day	Slide Set Study Normal/ Hormonal
	11	Benign Proliferative	MHM Benign/Prolif
	12	Written Quiz and Discussion	
3	15	Introduction to Cytologic Stains Introduction to the Processing Lab	Cyto Processing Lab

LABORATORY SCHEDULE

Week	Date	Lecture	Lab
	16	Cyto/Histo Inflam/Repair	MHM Inflammation/ Repair
	17	Microbiologic Changes Protozoa/Virus, etc.	MHM Micro-changes
	18		
4	22	Evaluation of Malignant Cell	MHM Criteria for Malignancy Examples
	23	Cyto/Histo of Dysplasia	MHM Dysplasia(s)
	24		
	25		MHM Dysplasia(s)
	26		
5	Mar 1		
	2		
	3	Cyto/Histo HPV Correlation HPV to Dysplasia	MHM HPV MHM HPV/Dysplasia
	4		
	5	Written and practical Quiz - Discussion	
6	8	Cyto Preparatory Procedures	Cytology, Lab Area
	9		Lab/Prep

LABORATORY SCHEDULE

Week	Date	Lecture	Lab
	10		Lab/Prep
	11		Lab/Prep
	12		Lab/Prep
7	15	Glandular Neoplasms of Cervix	Lab/Prep
	16		Lab/Prep
	17	Cyto/Histo Glandular CA	MHM Glandular CA/CX
	18		MHM Review Dysplasia, HPV Glandular CA/CX
	19	Practical/Written Quiz-Discussion	
8	22	Cyto/Histo Sq. Cell CA	MHM Cyto Sq. cell CA
	23		
	24	Cyto/Histo Microinvasic CA	MHM Microinv. CA
	25		
	26	Ctyo/Histo Invasive CA	MHM Invasive CA
9	29	Diseases of Uterine Corpus	Histo Lab Observation Uteri
	Apr 2	Practical and Written Quiz and Discussions	

LABORATORY SCHEDULE

Week	Date	Lecture	Lab
10	5		
	6		
	7	Cytogenetics Endocrinopathies	Children's Hospital Cytogenetics lab/ observe MHM cell patterns/ endocrinopathies
	9	No School	
11	12		
	13	Laboratory Management	
	14		
	15		
	16	Written Quiz and discussion	
12	19		
	20	Research Methodologies and Literary Review	
	21		
	22	Cellular effects radiation/ therapy	
	23		
13	26	Metastatic Disease	MHM Cytology of metastatic disease

LABORATORY SCHEDULE

Week	Date	Lecture	Lab
	27		
	28		
	29	Diseases of Vagina	MHM Diseases vagina
	30	Written Quiz and Discussion	
14	May 3	Diseases of Vulva	MHM Cytology of Diseases of Vulva
	4		
	5		
	6		
	7		
15	10-14	Review FGT	MHM Review FGT
16	17	Final Exam FGT Practical and Written	
	18	Respiratory Tract Embryology/ Anatomy	
	19		
	20	Histo/Cyto Normal-Respiratory	MHM - Normal /Cells Found in Respiratory Tract
	21		

LABORATORY SCHEDULE

Week	Date	Lecture	Lab
17	24	Organism/Mycoses	MHM Organisms/ Mycoses Respiratory Tract
	25		
	26	Histo/Cyto Benign Lesions Respiratory /Tract	MHM Benign Lesions - Lung
	27		
	28	Practical Quiz Lung and Discussion	
18	31	No School	
	June 1	Histo/Cyto Lung Cancer	MHM Cytology of Lung CA
	2		MHM Lung CA
	3	Metastatic Disease - Lung	MHM Met. Disease Lung
	4		
19	7	FNA - Lung	MHM - FNA Lung FNA/Lung Assist/ Review
	8		FNA/Lung Assist/ Review

LABORATORY SCHEDULE

Week	Date	Lecture	Lab
	9		FNA/Lung Assist/ Review
	10		FNA/Lung Assist/ Review
	11	Quiz Written Practical	FNA/Lung Assist/ Review
20	14	Histo/Cyto Oropharnyz/ Esophagus/Stomach	MHM Cytology of Oropharynx, Esophagus, Stomach (normal)
	15	Histo/Cyto Small/Large Intestine	MHM Normal Cytology of Small/ Large Intestine
	16	Benign Lesions of GI Tract	MHM Benign Lesions GI
	17	Histo/Cyto Malignancies Oropharnyx/Esophagus/ Stomach	MHM Cytologic Presentation Malignancies Oropharynx, Esophagus, Stomach

LABORATORY SCHEDULE

Week	Date	Lecture	Lab
	18	Histo/Cyto Malignancies Small/ Large Intestines	MHM Cytology Malignant Cells of Small/Large Intestines
21	21	Histo/Cyto Liver/GB/Pancreas	MHM Normal Histo/ Cyto of Liver, GB, Pancreas
	22		
	23	Histo/Cyto Liver/GB/Pancreas	MHM Cytology FNA
	24		
	25	Quiz Written/Practical and Discussion	
22	28	Histo/Cyto Normal Mesothelium	MHM Normal Cytology/Mesothel
	29		
	July 1		
	2	Pitfalls in Effusion Cytology	MHM Pitfalls
23	5	No School	
	6	Literature Review 1/2 of class	Oral Presentation/ Peers
	7	Literature Review 1/2 of class	Oral Presentation/ Peers

LABORATORY SCHEDULE

Week	Date	Lecture	Lab
	8		
	9	Practical Quiz Effusions	
24	12	Histo/Cyto Breast	MHM Cytology of Normal Breast
	13	FNA - Benign Lesions Breast	MHM Benign Cytology/Breast
	14	FNA - Cytology Malignancies/ Breast	MHM Malignancies/ Breast
	15		
	16		
25	19	Histo/Cyto Urinary Tract	MHM Normal Cytology GU
	20	Histo/Cyto Inflam. Urinary	MHM Inflammation Urinary
	21	Histo/Cyto Malignancies Urinary Tract	MHM - CA Urinary Tract
	22		
	23	Quiz - Written and Practical Discussion	
26	26	Histo/Cyto Normal Thyroid Histo/Cyto Inflam. Thyroid	MHM - Normal Thyroid/inflam. of thyroid

LABORATORY SCHEDULE

Week	Date	Lecture	Lab
	27	Cyto-Thyroid Malignancies FNA Thyroid Malignancies	FNA - Thyroid Malignancies
	28	CSF - Benign/Malignant Cytology	MHM - Normal CSF MHM - Malignant cells CSF
	July 29	Pathology Lymphoma/ Leukemia	MHM - Cytoogy of Lymphoma/ Leukemia
	30	Histo/Cyto Prostate Histo/Cyto Synovial Fluids	MHM - Prostate Synovial Fluids
27	Aug 2-6	Review for Final	Final
28	9-13	Final/Final Discussions	Final
29-50	Aug 16 to Jan 14	Clinical Rotations as Assigned	
51	Jan 17-24	Review/Evaluation/Research Topics Completed	
	Jan 28	Graduation	

CYTOLOGY - COURSE OUTLINE

Dates	Topics to Cover	Required Reading
Feb 1-5 Week 1	Orientation Ethics Microscope Basic Cell Structure	Stevens, Histology, Chapt 1 & 2 Manual for Cytologists,Chapt 1-6 Bibbo, Comprehensive Cytopathology, Chapt 1, 3, 4, & 7, Pgs 86-90 Bethesda System, JAMA Vol 262 No 7, pgs 931-934 Koss. Diagnostic Cytology, Vol 1, pgs 1-11, 15-18, 19-104
Feb 8-19 Week 2-3	<u>Female Genital Tract</u> Hormonal Cytology Anatomy, Histology Benign Proliferative	Red Manual, Chapt 7, 8 & 12 Bibbo, Chapt 6 & 6, pg 9-177 Stevens, Chapt 3, 5 & 18 Koss, Vol. 1, Chapt 4, pgs 118-119, Chapt 8-9, review Chapt 10.

CYTOLOGY - COURSE OUTLINE

Dates	Topics to Cover	Required Reading
Feb 15-26	Introduction to Staining	Red Manual, Chapt 11, 27, 24, 25
Week 3-4	Inflammation/Repair	Bibbo, Chapt 8 & 6, to Atypical Sq.
	Microbiologic Changes	Metaples, etc. Chapt 34-39
	Viral Changes	Koss, Vol 1, Chapt 10, Chapt 33 (30, 31, 34-36)
Mar 1-12	Evaluation of the Malignant	Red Manual, Chapt 12, pages 100-105
Week 5-6	Cell	Bibbo, Chapt 9, 177-197
	Dysplasia	Koss, Vol 1, Chapt 11
	Carcinoma-in-Situ (CIS)	

CYTOLOGY - COURSE OUTLINE

Dates	Topics to Cover	Required Reading
Mar 15-26 Week 7-8	Carcinoma of Cervix Microinvasive, Invasive Radiation Changes	Red Manual, Chapt 12, pgs 106-118 Bibbo, Chapt 9, 207-230 Koss, Chapt 12-18
Mar 29-Apr 9 Week 9-10	Diseases of the Uterine Corpus Rare Neoplasms No School April 9	Bibbo, Chapt 13 Koss, Chapt 17
April 12-16 Week 11	Cytogenetics Endocremopathies	Red Manual, Chapt 10 & 23 Bibbo, Chapt 2 & 7 Koss, Chapt 7 & 9

CYTOLOGY - COURSE OUTLINE

Dates	Topics to Cover	Required Reading
April 19-23 Week 12	Management/Literary Review/ Research	
Apr 26- May 7 Week 13-14	Radiation Effect Metastatic Disease Vulva Vagina	Red Manual Review, Chapt 14, pgs 128-129 Bibbo, Chapt 12 &13 Koss, Chapt 15, 16 & 17 Stevens: review pgs 330-334
May 10-14 Week 15	Review/Cytoprep Techniques	
May 17 Week 16	Final Exam Female Genital Track	

CYTOLOGY - COURSE OUTLINE

Dates	Topics to Cover	Required Reading
May 18- June 11 Week 17-20	Respiratory No School May 31	Red Manual, Chapt 16, 26 Bibbo, Chapt 14, 23-30 Koss, Chapt 19, 20 & 29 Stevens, Chapt 9
June 14- June 25 Week 21-22	Oral GI Track	Red Manual, Chapt 16 & 18 Bibbo, Chapt 15 & 16 Koss, Chapt 21 & 24 Stevens, Chapt 10 & 11

CYTOLOGY - COURSE OUTLINE

Dates	Topics to Cover	Required Reading
June 28 - July 9 Week 23-24	Effusions No School July 5	Red Manual, Chapt 19 Bibbo, Chapt 27 Koss, Chapt 25
July 12-16 Week 25-26	Breast	Red Manual, Chapt 19 Bibbo, Chapt 27 Koss, Chapt 20 & 29 Stevens, Chapt 19, pgs 364-368

CYTOLOGY - COURSE OUTLINE

Dates	Topics to Cover	Required Reading
July 19-23 Week 27-28	Urine	Red Manual, Chapt 17 Bibbo, Chapt 17 Stevens, Chapt 16 Koss, Chapt 22 & 23
July 26-30 Week 29	CSF/Misc Reticulo-endothelial Malignancies	Red Manual, Chapt 21 Bibbo, Chapt 18 (review Chapt 35-37) Koss, Chapt 27 (review Chapt 7)
Aug 2-5 Aug 6	Review Final Final	Review

CYTOLOGY - COURSE OUTLINE

Dates	Topics to Cover	Required Reading
Aug 9-Jan 21 Weeks 28-51	Clinical site rotations Literature Review Research Topic	
Jan 24-28 Week 52	Review of ASCP Exam Course Evaluations	
Jan 31	Graduation	

CHAPTER 6

Curriculum

With the lecture schedule and laboratory sessions completed attention was turned to developing educational objectives for each unit to be covered. Each chapter of the selected texts was carefully read and a list of student objectives and expected outcomes was completed for each section. Objectives and expected outcomes were correlated to both the lecture schedule and the syllabus.

Additionally an outline of the expected outcomes and objectives for each laboratory exercise was developed. Laboratory exercises include group sessions at the multiheaded microscope in which all students participate. During these sessions the primary instructor for that session will point out, on glass microscope slides, the features of the entities under discussion. Following the multiheaded microscope session students will return to their individual microscopes to review glass slide study sets. Using microscope cell-finders the entities under study will be encircled. Upon completion of this portion of the exercise the students will return to the multiheaded microscope to answer the questions posed on the study sheets and to justify their diagnosis. This pattern will continue for each portion of the curriculum under study. An example of the objectives and expected student proficiencies for the cytology of body fluids and glandular neoplasms of the uterine cervix are demonstrated in Appendix IV. The objectives/proficiencies for both the didactic and microscope laboratory sessions (Appendix V).

In addition to these objectives the study sheets prepared for the students use during individual microscopic evaluations are included (Appendix VI).

CHAPTER 7

The Program Finalization

Seeking Accreditation and Accepting the Class of 1993-1994

Finalization of the curriculum was the last step preceding completion of the Self-Study and application of accreditation to the Committee on Allied Health Education and Accreditation (CAHEA). Upon acceptance of the application a complete Self-study is required to be submitted to the American Society of Cytology (ASC). The ASC is responsible for determining program requirements for all schools of cytotechnology whether they are new or existing programs. The self-study defines the programs resources, facilities, staff, student evaluations, school policies and curricula offered.

Upon receipt of the self-study the ASC will forward a copy to each of two members of the Cytology Education Review Committee. These members review the self-study to determine that the program is/is not in compliance with program essentials. When the self-study is found to comply with the listed program requirements a site visit is scheduled. During the on site visit the program and its facilities are reviewed. Current students are interviewed as to program content and all required documents are documented. If the program is determined to meet all of the criteria required for a successful educational program the school receives full accreditation for its program. Upon receipt of the intent to schedule an on site visit the program under consideration is able to

accept its first class.

The Barnes Hospital School of Cytotechnology has completed the self-study and the self-study review and is awaiting the on site visit of the Cytology Education Review Committee from the ASC. The students for the first class of this cytotechnology program were interviewed and accepted in December 1992. The first class session was held February 1993 with expected course completion and graduation scheduled in January 1994.

This project was completed on February 1, 1993 yet its ultimate success will be in January 1994 when its first students join the ranks of nationally registered cytotechnologists who through their diligence and skill have consistently lowered the incidence of cervical carcinoma in the United States and elsewhere.

APPENDIX I

The following is a list of standards and functions needed to sucessfully complete a cytotechnology program in the school of cytotechnology

Standards	Functions
a. Sufficient use of the sense of vision to obtain accurate evaluations and complete report forms accurately.	a. Microscopic valuating of normal and abnormal cells from various body sites.
b. Sufficient use of sense of vision to be able to analyze specimens and apply criteria accurately.	b. Observation of patient specimens, application of criteria of normalcy, inflammatory response and malignancy of cellular preparations by microscopic evaluation. Respond to emergency lights.
c. Sufficient use of speech and the sense of hearing and to understand others.	c. Communicate information orally. Direct cytopreparatory techniques. Receive oral communications easily.
d. Sufficient aptitude in interactive skills and sensitivity to maintain a cooperative and productive climate of work relationships.	d. Establish relationships with staff, physicians, and patients as needed.
e. Sufficient fine motor functions and coordination to perform task involved in the functions with safety and accuracy.	e. Prepare specimens, manipulate microscope, use laboratory equipment safely and correctly.

Standards	Functions
f. Sufficient psychological stability and knowledge and use of techniques/resources to respond quickly and/or efficiently in order to minimize errors.	f. Recognize problematic situations and take appropriate actions.
g. Sufficient use of the sense of touch to obtain accurate evaluation.	g. Light microscope.
h. Sufficient use of the sense of smell in detecting/analyzing odors.	h. Assessing patient specimens.

APPENDIX II

Barnes Hospital School of Cytology

Student Evaluation of Lecturer

Lecture: _____

Date: _____

Topic: _____

	Yes	No
1. Did the speaker speak clearly and loudly?	____	____
2. Was the speaker well organized?	____	____
3. Could you easily assimilate the material presented?	____	____
4. Would you like to hear this speaker again?	____	____
5. Were audio-visual aids used?	____	____
6. Were they adequate?	____	____
7. If audio-visual aids were not used, should they have been?	____	____

8. What portion(s) of the presentation did you find difficult to grasp?

9. Why was it difficult for your?

10. What portion(s) of the presentation did you find most beneficial?

11. Do you have any suggestions to make that might improve this presentation?

Student Evaluation Sheet

Topic

1. Based on your readings, how would you rate the lecture as to:

	Poor	Fair	Good	Excellent
a. Completeness				
b. Logical Presentation				
c. Clarity				
d. Relating to previous concepts				

2. In addition to the lecture, how would you rate the visual instruction (i.e. Kodachromes, 5-headed scope sessions, pre-test slides, etc.)?

	Poor	Fair	Good	Excellent
a. Number of examples				
b. Range of examples (covering the topic)				
c. Instructive value of examples				

3. How would you rate the test (regardless of how well you did!)?

	Poor	Fair	Good	Excellent
a. Test material was covered				
b. Student objectives covered				
c. Challenging, yet fair questions				
d. Tests important knowledge:				

Comments.

Barnes Hospital School of Cytotechnology

First Six Months of Training

Date:

1. Were objectives appropriate?

2. Did didactic material give you the necessary information to give you confidence for the clinical portion?

3. If no, what information do you require?

4. Please comment on lectures and laboratory educational activities as they apply to your development as a cytotechnologist.

5. How could the program director, medical directors and adjunct clinical instructors be more effective in meeting your goals.

Barnes Hospital School of Cytotechnology

Student Evaluation - Clinical Rotation

1. Evaluate each section of your clinical rotation in the following areas:

   _____ a. Staff's willingness to help students.

   _____ b. Extent to which staff encouraged, accepted, and responded to questions.

   _____ c. Extent to which state objectives were covered.

   _____ d. Share the strengths and weaknesses of the rotations.

   _____ e. Suggestions for future rotations.

Please give an overall rating of the rotation using the following scale>

5 Excellent

4 Very Good

3 Good

2 Fair

1 Poor

Evaluation

Component clinical rotation: Rating: _____

_____ _____

Student Signature Date

Barnes Hospital School of Cytotechnology

Student Evaluation of the Program for

Education of Cytotechnolgists

Name: _____ Year of Graduation: _____

1. Do your feel your training adequately prepared you to function as a cytotechnologist?

2. How could the faculty and staff be more effective, helpful and useful?

3. What do you feel are the strengths of the program?

4. What do you feel are the weaknesses of the program?

5. What changes would you make to improve the program?

6. Would you suggest this program to others who want ot be a cytotechnologst?

7. What are your plans following graduation?

8. Additional suggestions or comments.

_____ _____

Student Signature Date

APPENDIX III

Barnes Hospital School of Cytotechnology

Record of Grades/Examinations

Student: _____

O = Oral Exam W = Written Exam P = Practical Exam

Examination Date	Topic	Grade %

Barnes Hospital School of Cytotechnology

Record of Grades/Examinations

Student: _____

O = Oral Exam W = Written Exam P = Practical Exam

Examination Date	Topic	Grade %

Barnes Hospital School of Cytotechnology

Student: _____

Evaluator name/title: _____

Timeframe for evaluation: _____

I

. Academic Achievement

A. Average on examinations

B. Performance academic tasks

Rating Levels:

1. Unaceptable - Corrective action required.
2. Minimum performance - improvement needed
3. Acceptable performance - meets expectations
4. Above average performance - exceeds expectations
5. Exceptional performance

___ Completes assignments/presentations

___ Accepts responsibility, prepares for lectures, tests and assignments

___ Requires little supervision

___ Is cooperative and professional

II. Clinical Competencies

___ Uses technical knowledged to microscopically evaluate and mark cells

Barnes Hospital School of Cytotechnology

-2-

___ Correlates microscopic evaluation to histologic diagnosis where appropriate.

___ Practices good laboratory technique and laboratory safety.

A.

Communication/Interpersonal skills

___ Projects a positive image of self and school when interacting with professinal staff of the hospital and clinical sites.

___ Communicates easily and clearly with peers.

___ Expresses ideas clearly

___ Makes suggestions for program improvement.

Evaluator's comments:

Student's comments:

Student: _____ Date _____

Evaluator: _____ Date: _____

Barnes Hospital School of Cytotechnology

Clinical Instructor Student Evaluation

Student: _____ Rotation Length: _____

Please comment upon the extent to which the student:

1. Demonstrates a cooperative attitude and willingness to learn?

2. Attempts to meet the program's objectives by asking appropriate questions and seeking additional information.

3. Actively participated in continuing education functions i.e., interesting case discussions, teleconferences, check-samples.

4. Manages time wisely.

5. Accepts suggestions/criticisms.

6. Demonstrates accuracy in the cytologic evaluation of material presented.

Briefly describe the activities in which the student participated or observed.

Evaluator: _____ Date: _____

Barnes Hospital School of Cytotechnology

Student Development Plan

Student: _____ Date: _____

1. Areas for development

2. Agreed upon plan for development

3. Method for measuring development plan.

4. Timeframe for plan completion.

Program Director/Education Coordinator: _____

Student: _____ Date: _____

Barnes Hospital School of Cytotechnology

Project Evaluation

Student: _____ Date: _____

Evaluator: _____

The student research project will be evaluated on:

1. Adequacy of method.

2. Clarity of presentation - oral and written.

3. Appropriateness of topic selected.

4. Validity of conclusions based on material presented.

5. Completeness of references.

6. The contribution to cytotechnology or the value of the project.

Practice Screening Schedule

STUDENTS prescreen, mark abnormal cells, evaluate cellular pattern and write diagnosis on data sheet. A registered cytotechnologist rescreens students' slides, evaluates students' data sheet and write scores on sheets for Student Screening Data Sheet.

Daily slide Quota:

Gynecological

Month	Number of Slides
March	10
April	15
May	20
June	25
July	30
August	35
September	40
October	45
November	50
December/January	50

Student Evaluation Form

Clinical Affiliates

Student's Name _____

Month

Date/ Week of	GYN # Screened	% Accuracy	# Non-GYN Screened	% Screened

Accuracy rate below 90% for any reason requires remedial action/ counseling.

Student Evaluation Form

Clinical Affiliates

Student's Name _____

Month

Date/ Week of	GYN # Screened	% Accuracy	# Non-GYN Screened	% Screened

Accuracy rate below 90% for any reason requires remedial action/ counseling.

STUDENT SCREENING DATA SHEET

Date: _____ Student: _____

Case #	Adequacy	General Category	Description Dx	Reviewer

APPENDIX IV

TOPIC: CYTOLOGY OF BODY FLUIDS

Readings

A Manual for Cytotechnology, chapter 20.

Comprehensive Cytopathology, Bibbo, chapter 22

Diagnostic Cytology, Koss, Vol 2, chapters 25 & 26

Objectives:

The unit is designed to teach the student with the cytologic aspects pertaining to specimens obtained from body cavities: includes normal cytology and those changes associated with malignancy and other disease processes.

Expected outcomes:

Upon completion of this unit the student will be able to:

Describe the anatomy and histology of the pleural, peritoneal, and pericardial cavities.

Differentiate between transudates and exudates and name disease processes associated with each.

Discuss disease processes that affect the body cavities and list the criteria for identification of mesothelia cells including those changes of benign mesothelial cells resulting from pathologic conditions.

Identify cellular changes associated with primary tumors of the body cavities.

Know the cellular changes associated with metastatic tumors of the body cavities.

Be aware of the criteria for differentiation of tumor type for metastatic carcinomas of the body cavities.

Define the clinical procedures for obtaining body fluids for the cytologic evaluation.

TOPIC: GLANDULAR NEOPLASMS OF THE UTERINE CERVIX

Readings:

Bibbo, chapter 10

Red Manual, pp 126-130

Objectives:

This unit is designed to acquaint the student with the biological significance, cytologic presentation and differential diagnoses of glandular neoplasms of the uterine cervix.

Performance Objectives:

Upon completion of this unit the student should be able to:

Define the glandular neoplasia in the uterine cervix.

Recognize the histologic presentation of glandular neoplasia in the cervix.

Discuss the criteria for identification of glandular neoplasms in the cervix.

State the median age of occurrence.

Differentiate normal endocervical epithelium and malignant epithelium.

Adenocarcinoma and adenosquamous carcinoma of the uterine

cervix are assuming a greater importance to the cytotechnologist.

Primary adenocarcinoma of the cervix is divided into two subgroups: 1) Well differentiated adenocarcinoma and 2) poorly differentiated adenocarcinoma. The degree of differentiation is based upon nuclear appearance.

Nuclear features include: Well differentiated adenocarcinoma

Nuclear Size:

Twenty-five percent (25%) nuclei less than that of normal endocervical cells. When this is present it is one of the most diagnostic features. Forty percent (40%) nuclei are 1-1.5 the size of normal endocervical cells, 35% may have nuclear enlargement or may have variations in nuclear size.

Nuclear Shape:

One half (1/2) have round nuclei

One third (1/3) have oval nuclei

One sixth (1/6) have irregularly shaped nuclei

Degree of Chromasia:

One third (1/3) normal/slight hyperchromasia

Fifty percent (50%) moderate hyperchromasia

Eleven percent (11%) marked hyperchromasia

Chromatin Pattern:

Finely granular

Fifteen percent (15%) of cases may exhibit a coarsely granular pattern.

Sixty percent (60%) even chromatin distribution

Forty percent (40%) irregular chromatin distribution

Nucleoli:

Usually absent or small

Twenty five percent (25%) of cases may exhibit prominent nucleoli in some of the nuclei.

May be single, but most often multiple.

Usual configuration is other than round.

POORLY DIFFERENTIATED ADENOCARCINOMA:

Nuclear Size:

Marked variation 8-25 microns within same group of cells.

Nuclear Shape:

Sixty two percent (62%) round

Thirty four percent (34%) irregular (oval shape is rare)

Degree of Chromasia:

Fifty percent (50%) slight or absent hyperchromasia

Forty percent (40%) moderate hyperchromasia

Ten percent (10%) marked hyperchromasia

Chromatin Pattern:

Two thirds (2/3) irregular distribution

One third (1/3) even distribution

Three fourths (3/4) finely granular

One fourth (1/4) moderately granular

Rare - coarsely granular

Nucleoli:

Variation abounds

Multiple nucleoli common, with round shapes, but nucleoli may be altogether absent.

Adenoma Malignum:

This rare type of adenocarcinoma generally exhibits the features of poorly differentiated adenocarcinoma may also retain a deceptively normal appearance.

Features Include:

Flat coherent monololayers/multilayered sheets and three dimensional clusters.

Acinis formations evident with crowding/overlapping.

Cells - small cuboidal to large and columnar. Changes may be subtle or frankly malignant.

Nuclei:

Round/oval

Vesicular

Chromatin:

Fine to coursely dispersed

May exhibit chromatin margination

Nucleoli:

Occasionally prominent

Multiple and irregular to single and large

Clear Cell Adenocarcinoma:

May be predisposed to this type of carcinoma if female fetus was exposed to dilethylstilbestral during pregnancy.

Features Include:

Enlarged nuclei

Prominent round disproportionate nucleoli

Hyperchromasin is not constant and may be absent.

Bare nuclei may be present

Cells occur singularly and in loose sheets

Cytoplasm is abundant, pale and cyanophilic.

BEWARE: it is important to distinguish clear cell adenocarcinoma from atypical squamous cells and those cells of repair/regeneration.

Adenocarcinoma in Situ Well Differentiated (AIS)

Background:

Two thirds (2/3) have inflammatory background

One half (1/2) have bloody background

Twenty percent (20%) exhibit degenerative changes

Appearances:

Well differentiated AIS has tightly crowded sheets of malignant cells and is present in only 60% of poorly differentiated AIS. A diagnostic feature of AIS is the presence of short strips of cells, with pseudostratified nuclei, extending off the edges of crowded sheets.

Isolated cell strips

Pallisading/pseudostratified nuclei

Rosettes with gland openings

Nuclear shape is oval

Ninety percent (90%) moderate hyperchromasia

Ten percent (10%) marked hyperchromasia

Chromatin:

Twenty five percent (25%) finely granular

Seventy five percent (75%) moderately granular with even distribution

Nucleoli

Small round usually in 50% of cases.

Poorly Differentiated AIS:

Nuclear Size:

Fifty percent (50%) 8-15 microns

Fifty percent (50%) greater than 14 microns

Rare is the size 25 microns

Nuclear Shape:

Predominantly oval to round

Degree of Chromasia:

Fifty percent (50%) slight to no hyperchromasia

Fifty percent (50%) moderate hyperchromasia

Chromatin Pattern:

Fifty percent (50%) finely granular

Fifty percent (50%) coarsely granular

All have even distribution of chromatin. Variation from normal vesicular pattern is an important feature.

Nucleoli:

Almost universally present. They are small to medium sized and prominent in increasing order of likelihood. Multiple nucleoli are rare.

Tips:

Endocervical cells are particularly prone to inflammatory changes and with changes associated with trichomonas. But normal endocervical cells retain the "honeycomb" or "picket fence" appearance when shed. They do not show pseudostratification. Beware of degenerative changes. Beware of confusion with those cells of repair/regeneration which may mimic malignancy. Many adenocarcinomas of the uterine cervix, as well as adenosquamous carcinomas are missed on cytologic screening. Whether this is due to screening errors or sampling errors has not been completely determined. However, since these lesions (AIS) can not be recognized or localized by colposcopic means it is important that an accurate cytologic evaluation is made. The treatment for squamous carcinoma in situ is different from the treatment of AIS alone or in coexistence.

Comparison of AIS, Microinvasive & Invasive

Features	AIA	Micro Invasive	Invasive
Average age	32	41	49
# Abnormal cells	Abundant	Abundant	Abundant
Cell Sheets	Always Present	Always Present	Always Present
"Rosette" Strips	Present	Present	Present
Abundance of cells	Absent	Present	Present
Syncytia	Absent	Present	Present
Papillary Formations	Infrequent	Common	Often Seen
Dissociation of cells	Rare	Often seen	Common
Nuclear Shape	Oval/Round	Oval/Round/ Bizarre	Round/Bizarre
Nuclear Size	Variable	Variable/ Pleomorphic	Marked Pleomorphic
Nucleoli	Absent/ prominent occ. multiple	Small/ prominent may be multiple	Small often multiple
Background	No tumor diathesis	Some have tumor diathesis	1/3 have tumor diathesis
Associated Squamous Atypia	Yes - in 50% of cases	Yes - in 50% of cases	Yes- in 20% of cases

APPENDIX V

Laboratory Exercises

TOPIC: CYTOLOGY OF BODY FLUIDS

Session A:

1. Multiheaded microscope session.

2. Individual microscope session.

3. Double headed microscope session.

Objectives:

1. Following the multiheaded microscope session students should be able to:

   a. Recognize criteria for normal mesothelial cells when presented cytologically.

   b. Identify cells of inflammation in body fluids.

   c. Identify cells from primary tumors of body cavities.

   d. Identify cells assocaited with metastatic disease when encountered cytologically in body fluids.

e. Recognize cells present in synovial fluids.

2. Individual Microscope sessions: Students will apply the observations made during the multiheaded microscope session and from the didactic portion using unmarked glass slides to identify and mark cells that may exhibit the following:

a. Normal mesotheliaL cells.

b. Cells of malignant mesotheliomas.

c. Reactive mesothelial cells

d. Inflammatory cells.

e. Cells of metastatic tumor

(1) Type
(2) Source

3. The final laboratory exercise will be a one-on-one session discussing the observations made by the student during the individual laboratory session. This is not a test. It is simply an extension of the laboratory session and is designed to assist the student in the learning process with personalized instruction.

APPENDIX VI

General Instructions

Study Sheet Use and Slide Screening

Briefly scan the entire slide. Read the requisition to determine the clinical presentation. Note the patient's age, last menstrual period, gravida and reason for testing. Check the card file to see if there have been previous tests on this patient. (You may wish to review previous slides). Check the accession number on the slide label against the accession number on the requisition.

Now begin to screen the slide(s). As you look at the smear ask yourself:

a. What is the background of the smear? Is bacteria present? What kind?

b. Are inflammatory cells present? What kind? What does this mean?

c. Are the cells you see compatible with the age and LMP of the patient? What does this mean?

d. Is there a mixed cell pattern or are all the cells of one kind? What is the significance of this?

Frequently, the absence of a cell population will answer a question you may have about the smear.

e. Does the smear contain:

(1) Opportunistic organisms?

(2) Protozoa?

(3) Evidence of viral infection?

f. Is the smear adequate for diagnosis? Are there:

(1) A sufficient numbers of cells present?

(2) Are endocervical cells present? Squamous metaplastic cells present?

(3) Does inflammation obscure cellular detail? Does blood?

(4) Is smear to thick to adequately evaluate cytologic detail?

(5) Is smear well-stained? If not - why not?

(6) Is coverslip affixed properly? No air bubbles?

(7) Is heavy "cornflaking" obscuring cellular detail? What causes this?

(8) Is excessive air-drying artifact present?

g. Has patient had:

(1) Hormonal therapy

(2) Birth control pills

(3) IUD

(4) Cryosurgery

(5) Chemotherapy

(6) Radiation therapy

(7) Other indications of immunosuppression

(8) Diabetes

(9) Pregnancy

h. Are endometrial cells noted? Is this compatible with patient's age/menstrual history?

i. Are the cells that are present within normal limits?

j. Are there cells present that you can not identify? Look around. Can they possibly be the same cells you see in abundance on the smear? (Cells, like people, tend to keep company with the same sort).

k. Carefully evaluate the cells you see and note:

(1) Staining characteristics

(2) N/C ratio

(3) Nuclear changes

(a) Sharp edges on nuclear membrane.

(b) Clumped/margination of chromatin

(c) Annucleation

(d) Hyperkeratosis/parakeratosis

(e) Degenerative changes

(4) Cytoplasmic changes

(5) Do cells meet the criteria for malignancy? If yes

which criteria?

l. Have you dotted/encircled all the cells that confirm your opinion? Have you dotted all the cells that you question even if all of them do not confirm your opinion?

Herpes Simplex Box 8

There are characteristic cellular changes associated with herpes simplex that occur during the various stages of the virus. Some of these are

Stage One:

Nuclear enlargement and/or multinucleation is accompanied by increase granularity and clumping of the chromatin material. Presumably, the interchromatin spaces are occupied by the viral primary bodies and associated proteins.

Stage Two:

In addition to nuclear enlargement and prominent multinucleation, there is a margination of the chromatin beneath the nuclear membrane. The nuclei take on a smudged "ground glass" appearance, and are basophilic or cyanophilic.

Stage Three:

The viral inclusions lose their content of nuclear protein seemingly shrinking from the nuclear membrane to appear as an eosinophilic mass surrounded by a halo in a nucleas with marginated chromatin. Ballooning cytoplasm with multiple vacuolization or nuclear degeneration usually follows, indicating an irreversible cellular injury.

Look through the slides in this box. Do you see cells indicating Herpes? Dot them. In which stage are the cells you have dotted? Be prepared to discuss the following:

1. Clinical presentation of primary vulvar herpes.

2. Clinical significance of herpes in the pregnant women and at delivery.

3. The relationship of herpes with abortion/cervical carcinogenesis.

4. Name the two types of Herpes simplex virus and the common sites for the lesions of both types.

5. What is the most common avenue for the transmission of the virus?

6. Where does the virus lie dormant?

7. What may trigger revitalization of the virus?

Other Viruses:

In addition to Herpes simplex the other viruses that may inflect the vulva/vagina are:

1. Herpes Zoster: This virus may infect the vulva and extend to the vagina often causing acute pain and pruritus. The scraping of the base of a vesicle will produce cells similar to the ones obtained in the scraping of herpes simplex lesions. The only possible slight difference is the abundance of small, single, infected mononucleated parabasal cells with scanty, dense cytoplasm and

round, central nuclei with prominent, intranuclear granular inclusions surrounded by a halo. The multinucleated cells are identical in the two viral infections.

2. Cytomegalovirus (CMV): This not so rare disease can be primarily localized in the genital tract, or it can by systemic. In the smear the changes are limited to young, columnar, secretory, endocervical cells lining the lateral endocervical glands rather than the endocervical canal.

   The infected cells ar hypertrophic with scanty, but thick, purple stained cytoplasm. The nucleus is enlarged with the chromatin compressed to the periphery. Single large, cyanophilic intranuclear granular inclusions with prominent halos, that give the cells an "owl-eye-like" appearance. These cells are diagnostic of CMV.

3. Adenovirus: Genital infection is rare and gives no clinical symptoms. The diagnosis is usually made first during examination of a routine PAP smear.
   The infected cells are mainly basal endocervical in type, mononucleated, and shed singly or in clusters. Their cytoplasm is not affected and looks normal except for some degenerative vacuoles during the late stages of infection.

   Their nuclei are often slightly enlarged and contain multiple, small, lobulated and eosinophilic (early stage) inclusions or large, single

(late stage) basophilic amorphous inclusions. A definite perinclusion halo, which is necessary for differentiation from an abnormally prominent nucleolus, should always be present.

The maternal genital infection may be the source of a congenital infection of the newborn.

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