



# **CT(ASC) EXAMINATION**

## **2012**

### **Guidelines**

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## **A. GENERAL REQUIREMENTS**

### **1. ASC Membership**

Candidates must be financial members of the Australian Society of Cytology and must have maintained continuous membership of the society for a minimum period of the twenty-four months preceding the examination.

### **2. CT(ASC) Prerequisites**

To be eligible to sit the examination for CT(ASC), a candidate must meet each of the following prerequisites:

1. A candidate must have a tertiary qualification (degree or diploma) in medical laboratory science (or its equivalent) issued by an Australian university or equivalent. The CT(ASC) examination is directed to graduates of medical laboratory science programs. As such, it is expected that, in addition to cytology, candidates have a background in anatomy, histology and the histopathological basis of disease.

Applicants with other qualifications may apply to AIMS or NOOSR for an assessment of their qualifications. If these organisations determine that the qualifications are equivalent to an Australian university qualification, as defined above, they may apply to sit for the CT(ASC) provided that all the other prerequisites have been met.

AIMS

PO Box 2426

TOOWONG DC Qld 4066

NOOSR

GPO Box 9880

CANBERRA ACT 2601

2. A candidate must have at least two years full-time practical experience in cytology, or its part-time equivalent.

Two years is considered an absolute minimum for candidates to acquire the depth of knowledge and experience across the broad range of topics assessed by the examination.

Candidates are encouraged to consider allowing themselves more time to gain the knowledge expected of them prior to presenting for the examination.

3. Candidates must have screened a minimum of 4000 gynaecological cases at the time of application.

The 4000 cases can be composed of unmarked test or training slides as well as routine screening. Marked teaching slides are to be excluded from the total number of slides examined by the candidate.

4. Candidates are required to have screened a minimum of 2400 non-gynaecological slides at the time of application, comprising a minimum of 400 exfoliative cases and a minimum of 200 FNA cases.

The 2400 slides can be composed of unmarked test or training slides as well as routine screening. Marked teaching slides are to be excluded from the total number of slides examined by the candidate.

Final acceptance of any application is at the discretion of the Chief Examiner.

### **3. Fees**

\$250.00 examination fee is required with the application form. Cheques should be made payable to the Australian Society of Cytology Incorporated.

#### **4. Withdrawal - Refund of Fees**

Notification of withdrawal should be in writing. If the application is withdrawn prior to 1 June, there will be a refund of \$200.00; after 1 June, the refund will be \$175.00. If the candidate fails to attend the examination, or withdraws within 48 hours of the examination, there will be no refund of the fee.

#### **5. Photograph**

Candidates are asked to supply a passport-sized, recent photograph of themselves when lodging their application forms.

#### **6. Venues**

In 2012 the CT(ASC) examination will be held in Adelaide and Sydney. These may be subject to change at the discretion of the board.

Candidates are advised that nomination of a venue does not guarantee their acceptance to sit the examination at that venue. The venues will be finalised after receipt of all applications.

#### **7. Microscopes**

Microscopes will be made available, or candidates may provide their own. Please indicate on the application form if a microscope is required.

#### **8. Candidate Conduct**

Candidates are required to follow instructions given by examination supervisors. Disruptive or uncooperative behaviour reported by examination supervisors may result in a candidate's disqualification without appeal, at the discretion of the Chief Examiner. Please note that no dictionaries (including foreign language dictionaries) or mobile phones will be allowed for any of the examinations.

#### **9. Forms**

Please return your Application Form and certified documents (as specified in the application form) with examination fee and photograph (original, not photocopy) to:

Standard letters:

The Australian Society of Cytology  
P O Box 491  
NORTH ADELAIDE SA 5006

Parcels:

The Australian Society of Cytology  
1<sup>st</sup> Floor, 161 Ward Street  
NORTH ADELAIDE SA 5006

#### **10. Dates\***

Closing Date for Applications  
Confirmation of Application  
Examination

1 March 2012  
1 April 2012  
Saturday 23 and Sunday 24 June 2012

#### **11. Results and Prize\***

Results will be mailed by 1 September 2012. The candidate achieving the highest aggregate mark will be awarded the "Darrel Whitaker Medal" and a prize of \$500. The top candidate and runner up are eligible to receive free registration to an Annual Scientific Meeting within three years of sitting the exam. Certificates and prizes will be presented at the 2012 ASC Annual General Meeting or mailed later for those not attending the conference.

## 12. Examination Review\*

A candidate may request that their examination papers and results be reviewed by the board of examiners. Application must be made within 6 weeks of the examination results being released. All papers will be destroyed after this period. Examination material will not be returned to candidates under any circumstances.

**\* These dates are final. There will be no variation.**

## B. AIMS AND OBJECTIVES

### AIMS

The aim of the examination is to certify that the successful candidate has demonstrated competence in the theory and practice of diagnostic cytology.

### OBJECTIVES

- i) To provide a professionally recognised certificate of achievement which demonstrates skill, a high level of competence and interest in diagnostic cytology.
- ii) To foster continuous improvement in the standard of cytology practice in Australia.
- iii) To promote diagnostic cytology and reflect contemporary issues in that discipline.

*In setting the examination standard, the Board aims to set a level that is considered to be (the minimum) appropriate for a non-trainee working in a routine diagnostic laboratory in Australia. The examination will aim to test the routine duties and responsibilities undertaken in the profession of cytology.*

Note: Candidates are referred to the “Notes for Mentors” provided in the “Australian Society of Cytology National Cytologist Training Syllabus” for a discussion on competency based assessment and the expected level of knowledge.

## C. BOARD OF EXAMINERS

### CHAIR:

Dr Marion Saville

### CHIEF EXAMINER:

Ms Grace Tan

### MEMBERS:

Dr Bridget Cooke

Ms Shannon Masters

Ms Annette O’Leary

Ms Anne Meikle

Ms Joanne La Malfa

The Board of Examiners can be contacted at:

Standard letters:

The Australian Society of Cytology

PO Box 491

NORTH ADELAIDE SA 5006

[national.office@cytology-asc.com](mailto:national.office@cytology-asc.com)

Parcels:

The Australian Society of Cytology

1<sup>st</sup> Floor, 161 Ward Street

NORTH ADELAIDE SA 5006

## **D. 2012 CT(ASC) SYLLABUS**

The examination aims to test competence in the performance of regular day-to-day responsibilities of a medical scientist including screening, preliminary diagnosis, diagnostic problem-solving and communication with other health professionals.

Candidates are strongly advised to practise both theoretical and practical aspects of the examination under exam-like conditions prior to sitting.

### **GENERAL**

1. Knowledge of the theoretical and practical aspects of specimen collection, preparation, staining and microscopy.
2. An understanding of the principles and applications of special techniques - such as automation, histochemistry, immunocytochemistry and electron microscopy - as relevant to diagnostic cytology.
3. Knowledge is required of:
  - basic cell structure and function, including some knowledge of cell ultrastructure,
  - the normal appearance of cells from various body sites,
  - the morphological changes that occur in disease processes.
4. A detailed knowledge of pathology is not expected, but some understanding of those pathological processes directly relevant to cytological diagnosis is required, including,
  - cell and tissue injury,
  - acute and chronic inflammation,
  - degeneration and necrosis,
  - repair and regeneration,
  - neoplasia,
  - drug and radiation cellular effects.
5. Knowledge of the principles and practice of quality assurance.
6. An understanding of population screening for the prevention of cervical cancer, particularly as practised in Australia.
7. The emphasis is on the interpretation of those specimens most commonly received in the routine diagnostic laboratory. However, the candidate is expected to be familiar with all types of cytological material, both gynaecological and non-gynaecological. Approximately 50% of the examination content will be devoted to gynaecological cytology and 50% to non-gynaecological cytology.  
Candidates should understand the theory of collection and preparation techniques for all specimen types, including fine needle aspiration (FNA) cytology.  
Knowledge of FNA cytology (including microscopic features) of common entities and less common but classical disorders encountered at sites such as breast, thyroid, lymph node, liver, pancreas, salivary gland and lung is expected.

## **GYNAECOLOGICAL CYTOLOGY**

1. Anatomy, histology and normal cytology of the female genital tract.
2. Hormonal influences on cytology.
3. Infections and inflammation.
4. Benign, non-inflammatory conditions.
5. Human papilloma virus changes.
6. Squamous and glandular precursor lesions of carcinoma of the cervix.
7. Malignant neoplasms of the cervix.
8. Normal and abnormal conditions of the endometrium.
9. Other female genital tract neoplasms (vulva, vagina, fallopian tube and ovary).
10. Fluid based preparation methods and interpretation.

## **NON GYNAECOLOGICAL CYTOLOGY**

Anatomy, histology and cytology of normal, benign and malignant conditions of:

1. Respiratory tract.
2. Body cavities and effusions, cyst and joint fluids.
3. Urinary tract.
4. Cerebrospinal fluid.
5. Breast, thyroid, lymph node, liver, pancreas and salivary gland.

## REFERENCES

Candidates are strongly recommended to refer to the **National Training Syllabus** developed by the Australian Society of Cytology. It is a very valuable study guide. It can be accessed by logging onto the Member's area of the ASC website.

Candidates should be familiar with the journals *Acta Cytologica*, *Diagnostic Cytopathology*, *Cytopathology* and *Cancer Cytopathology*.

The **current** editions of the following are highly recommended:

1. Bibbo M & Wilbur D. *Comprehensive Cytopathology*. (3<sup>rd</sup> edition) Saunders 2008
2. Cibas E, Ducatman B. *Cytology: Diagnostic Principles and Clinical Correlates* (3<sup>rd</sup> edition), Elsevier 2009
3. DeMay R. *The Art and Science of Cytopathology*. ASCP Press.
4. Geisinger K, Stanley M, Raab S, Silverman J, Abati A. *Modern Cytopathology*. Churchill Livingstone 2004
5. Gray W & Kocjan G. *Diagnostic Cytopathology* (3<sup>rd</sup> Edition). Churchill Livingstone/Elsevier 2010.
6. Keebler CM & Somrak T. *The Manual of Cytotechnology*. ASCP Press 1993
7. Koss LG. *Diagnostic Cytology and its Histopathologic Bases*. Lippincott. (5<sup>th</sup> edition with DVD, 2006)
8. Orell SR, Sterrett GF, Whitaker D. *Fine Needle Aspiration Cytology*. (4<sup>th</sup> edition) Elsevier Churchill Livingstone 2005

The following references are also useful:

1. ASC CD-ROM teaching sets.
2. ASC website links
3. Atkinson BF. *Atlas of Diagnostic Cytopathology* (2<sup>nd</sup> Edition) Saunders 2003
4. Bedrossian CWM. *Malignant effusions, a Multimodal Approach to Cytologic Diagnosis*. Igaku-Shoin; New York 1994
5. Bardales RH. *Practical Urologic Cytopathology* Oxford University Press 2002
6. Coleman DV & Evans D. *Biopsy Pathology and Cytology of the Cervix*. Biopsy Pathology Series, Chapman & Hall 1988
7. Commonwealth Department of Human Services and Health, Publications:
  - NHMRC Guidelines - Screening to prevent cervical cancer: guidelines for the management of asymptomatic women with screen-detected abnormalities (includes AMBS 2004). [www.nhmrc.gov.au/publications/synopses/wh39syn.htm](http://www.nhmrc.gov.au/publications/synopses/wh39syn.htm)

- Performance Measures for Australian Laboratories Reporting Cervical Cytology. [www.health.gov.au/internet/main/publishing.nsf/Content/health-npaac-docs-perfmeas.htm](http://www.health.gov.au/internet/main/publishing.nsf/Content/health-npaac-docs-perfmeas.htm)
8. Cordatos K. 1002 Multiple Choice Questions in Cytopathology
  9. Holladay EB. *Cytopathology Review Guide* (2<sup>nd</sup> Edition) ASCP Chicago 2002
  10. IAC Kodachrome Teaching Sets
  11. Johnson WJ & Frable WJ. *Diagnostic Respiratory Cytology*. Masson.
  12. Kini SR. *Colour Atlas of Pulmonary Cytopathology*. Springer Verlag. 2002.
  13. Kocjan GIL. *Atlas of Diagnostic Cytopathology* (2<sup>nd</sup> Edition) Churchill Livingstone 1997.
  14. Kumar V, Abbas A, Fausto N, *Robbins and Cotran Pathologic Basis of Disease*. (7<sup>th</sup> edition) Elsevier 2005
  15. Meisels A, Morin C. *Cytopathology of the Uterine Cervix*. ASCP Press.
  16. Murphy WM. *Urine Cytopathology* ASCP Press 2002
  17. Naib ZM. *Cytopathology*. (4<sup>th</sup> edition) Lippincott Williams and Wilkins. 1995
  18. NSW Cervical Screening Program *Challenges in Cytology: Confronting Difficult High Grade Lesions*. (2002).
  19. Robbins SL & Kumar V. *Basic Pathology*. W B Saunders Co.
  20. Robboy SJ, Anderson MC and Russell P. *Pathology of the Female Reproductive Tract* (2002) Churchill Livingstone London
  21. Schmidt W (Ed). *Cytopathology Annual*. Williams & Wilkins.
  22. Spriggs AI & Boddington MM. *Atlas of Serous Fluid Cytopathology*. Kluwer 1989
  23. Wheeler PR, Burkitt HG & Daniels VG. *Functional Histology: A Text and Colour Atlas*. Churchill Livingstone.
  24. Wied GL, Bibbo M, Koss LG and Rosenthal DL. *Compendium on Diagnostic Cytology* (8th Ed). Tutorials of Cytology, Chicago, International Academy of Cytology 1997.
  25. Woods AE & Ellis RC. *Laboratory Histopathology: A Complete Reference*. Churchill Livingstone.
  26. [www.micro.magnet.fsu.edu/primer/index.html](http://www.micro.magnet.fsu.edu/primer/index.html)

All internet addresses checked 10 September 2011.

## **E. 2012 CT(ASC) EXAMINATION FORMAT**

This examination consists of five (5) sections. Candidates must achieve a pass in all sections of the paper. Specific guidelines and examples follow in Section F (microscopy) and Section G (theory).

Note to candidates and mentors:

The National Training Syllabus for Cytologists is available for members at the ASC website ([www.cytology-asc.com/members/syllabus/syllabus.asp](http://www.cytology-asc.com/members/syllabus/syllabus.asp))

Candidates and mentors should use the syllabus to prepare for the examination. Candidates will not be examined on topics that are not covered in the syllabus.

### **MICROSCOPY**

#### **1. GYNAECOLOGICAL MICROSCOPY SECTION**

Of two hours duration and consisting of ten slides. Twelve minutes are allocated for each slide, with a warning given after ten minutes.

#### **2. NON-GYNAECOLOGICAL MICROSCOPY SECTION**

Of two hours duration and consisting of ten cases. Twelve minutes are allocated for each case, with a warning given after ten minutes.

### **THEORY**

#### **3. RECOGNITION IMAGE TEST**

Of approximately 50 minutes duration and consisting of 50 questions. Ten booklets, each containing five images and multiple choice questions will be circulated. Candidates will have five minutes to complete the set of five questions, with a warning given at 3 minutes.

#### **4. MULTIPLE CHOICE THEORY SECTION**

Of one hour duration and consisting of 50 questions.

#### **5. WRITTEN THEORY SECTION**

Of two hours duration (ten minutes perusal time will be allowed) and consisting of four questions of equal value. Each of the four questions may consist of several parts of short answer type. All questions, including parts, are compulsory.

## TIMETABLE

<p><b>SATURDAY</b> <b>23 June 2012</b></p>	10:00am - 12:00pm	<p>MICROSCOPY PAPER 10 Gynaecological Questions</p>
	1:00 - 2:00pm	<p>RECOGNITION IMAGE TEST 50 Questions</p>
	2:30 – 3:30pm	<p>MULTIPLE CHOICE THEORY PAPER 50 Questions</p>
<p><b>SUNDAY</b> <b>24 June 2012</b></p>	10:00am - 12:00pm	<p>MICROSCOPY PAPER 10 Non-Gynaecological Questions</p>
	1:00 - 3:10pm	<p>WRITTEN THEORY PAPER 4 Questions</p>

## **F. GUIDELINES FOR REPORTING GLASS SLIDES**

There are two microscopy examinations, each of two hours duration and consisting of ten cases. Twelve minutes are allocated for each case, with a warning given after ten minutes. At the conclusion of the allotted time, candidates are required to stop working on the current case (both microscopy and writing), and to promptly pass the slide(s) to the next candidate. Candidates may recommence on the instruction of the examination supervisor.

Candidates must screen each slide and provide a written report. The report must include a diagnosis and a description of the cytological features upon which the diagnosis is based, with marks awarded for both the diagnosis and description. Provision is made for comments and recommendations where appropriate. Answers must be clearly legible. Attention should be given to correct spelling and grammar, particularly with regard to technical language.

The cases used in the examination are selected to represent a specific diagnosis, entity or presentation. It is expected that candidates provide a definitive diagnosis. It is recognised that circumstances exist in non-gynaecological cytology where a departure from normal appearances can be recognised, but a definitive benign/malignant classification is not possible. For such cases, candidates are expected to submit a report consistent with usual reporting practices.

The description should reflect the contents of the slide and should support the specific diagnosis. Candidates are required to identify the various cell types present and provide a more detailed description of the features of:

- pathogens
- benign cellular changes
- abnormalities and
- cells scrutinised to exclude an abnormality, even if those cells are ultimately determined to be a normal component.

Candidates are permitted no more than two diagnostic errors (false positive, false negative or indecisive) in each of the microscopy examinations.

## GYNAECOLOGICAL SMEARS

### Reporting Format:

Candidates should report gynaecological smears using the Australian Modified Bethesda System (AMBS 2004). The answer sheet is structured to assist candidates in formatting the report.

The terminology and examples can be found in the NHMRC Guidelines "Screening to prevent cervical cancer: guidelines for the management of asymptomatic women with screen-detected abnormalities" (Section 4: "Terminology". Appendix 5: "Examples of Reports").

### Specimen type and site

Indicate conventional Pap smear versus liquid-based versus other.

Indicate the site of origin of the specimen.

NB. All slides will be conventional Pap smears in 2012.

### Category of results

A one-line category/result. This should include a broad category for the diagnosis (e.g. High-grade squamous intraepithelial lesion) Categories should correspond to those recommended by the AMBS 2004.

- **Unsatisfactory**
- **Negative**
- **Squamous abnormalities:** Possible low-grade squamous intraepithelial lesion, Low-grade squamous intraepithelial lesion, Possible high-grade squamous lesion, High-grade squamous intraepithelial lesion, Squamous cell carcinoma.
- **Glandular abnormalities:** Atypical endocervical cells of undetermined significance, Atypical glandular cells of undetermined significance, Possible high-grade glandular lesion, Endocervical adenocarcinoma-in-situ, Adenocarcinoma.

### Slide Description and Specific Diagnosis

Candidates are required to provide a description of the slide's contents.

- **Description and Diagnosis:** The description should reflect the contents of the slide and should support a specific diagnosis. The specific diagnosis should be as precise as possible. For squamous abnormalities the CIN terminology is preferred. Where possible the differentiation of malignant cases and the origin of glandular malignancies in cervical smears (eg endocervical, endometrial) should be designated.
- **Endocervical Component:** A statement regarding the presence or absence of an endocervical component is required for cervical smears.
- **Smear Adequacy:** The AMBS (2004) now only requires a comment regarding inadequacy. The reasons for classifying cases as inadequate should be clearly stated.

### Management Recommendation

A recommendation, in line with the NHMRC Guidelines (see References), should be made for all cases.

## **Descriptive Report**

### General Features:

Background  
Inflammation  
Hormonal Pattern - If incompatible with age and/or history.  
Squamous population  
Presence/Absence of endocervical cells  
Presence/Absence of squamous metaplasia  
Presence/Absence of endometrial cells  
Organisms

### Specific features of cells scrutinised:

Cellular Arrangement | Architecture:

Single, sheets, clusters, syncytial-like, papillary/acinar arrangements

Cell:

Size, shape, borders

Cytoplasm:

Stain, texture, density, vacuolation

Other Differentiating Features:

Mucin, cilia, keratinisation

Nucleus:

Size, shape, N/C ratio, position of nucleus, chromatin pattern, nuclear membrane

Nucleoli:

Number, size, position

## EXAMPLES OF SATISFACTORY DESCRIPTIONS

Note that the examples:

- a) describe the smear background,
- b) identify the cells present, and
- c) provide a more detailed description of the diagnostic features.

### SLIDE NO 1

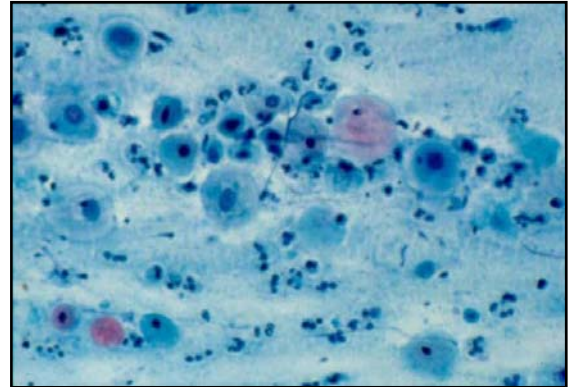
#### Cervical Smear, Female Age 52 years

##### Category (Result)

Negative for intraepithelial lesion or malignancy.

##### Descriptive Report

Atrophic smear with proteinaceous background. Single cell presentation with some pyknosis and karyolysis. Inflammation minimal. An endocervical component has not been detected. No cellular evidence of neoplasia.



##### Management Recommendation

Repeat smear in 2 years is recommended.

### SLIDE NO 2

#### Cervical Smear, Female, Age 34 years

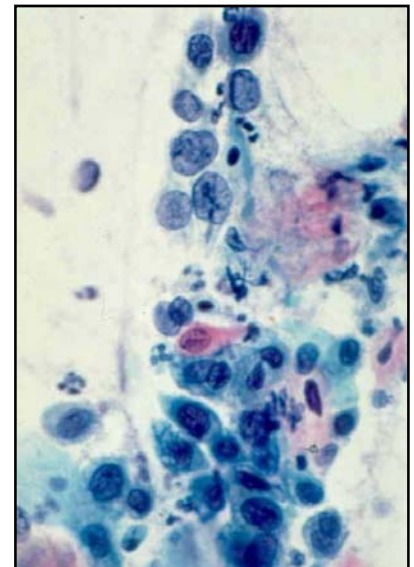
##### Category

High-grade squamous intraepithelial lesion:

##### Descriptive Report

Flora normal. Inflammation is absent and there is a clean background. Hormonal pattern compatible with age. An endocervical component is present. There are aggregates and single abnormal squamous cells throughout the smear. The cells are round to polygonal in shape with a high N/C ratio. Where present, the cytoplasm is basophilic and variable in density. The nuclei vary in size and shape. Some have an irregular outline and a coarse chromatin pattern. Occasional bare nuclei are present.

These changes are consistent with cervical intraepithelial neoplasia grade III.



##### Management Recommendation

Colposcopic examination is recommended.

OR

Further investigation is recommended

### SLIDE NO 3

#### Cervical Smear, Female, Age 36 years

##### Category

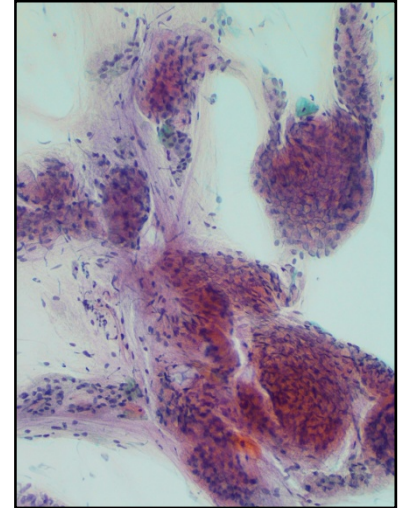
Unsatisfactory

##### Diagnosis

There are insufficient squamous cells

##### Descriptive Report

The background is bloodstained and contains proteinaceous material. An endocervical component is present. Numerous endocervical cells are present and these occur both singly and in large sheets. The sheets display a honey comb arrangement with granular cytoplasm, palisading at the edges. The chromatin is finely granular with occasional small nucleoli. There are only scant intermediate squamous cells which are present in insufficient numbers for evaluation.



##### Management Recommendation

Repeat smear in 6-12 weeks is recommended.

### SLIDE NO 4

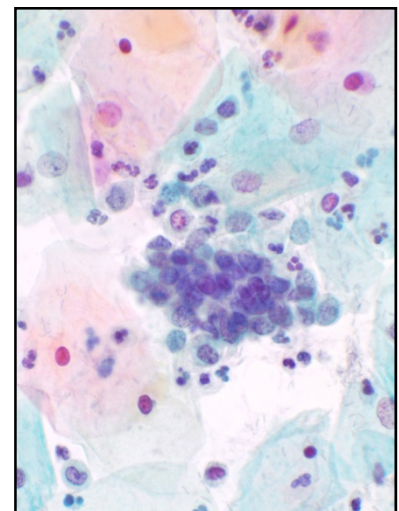
#### Cervical Smear, Female, Age 47 years, HSIL on cone biopsy 1 year ago

##### Category

Negative for intraepithelial lesion or malignancy.

##### Descriptive Report

The background is clean. Benign superficial and intermediate squamous cells are identified. An endocervical component is present. Aggregates of small cells with high N/C ratio are identified. Cytoplasm is scant, basophilic and ill-defined. Nuclei are uniform in size and approximate the size of intermediate cell nuclei. Nuclear shape is variable due to moulding. Chromatin is stippled and evenly distributed. Nucleoli are not identified. The features are consistent with shed endometrial cells.



##### Management Recommendation

Repeat smear and HPV typing in 12 months is recommended.

## **F. GUIDELINES FOR REPORTING GLASS SLIDES (continued)**

### **NON-GYNAECOLOGICAL SPECIMENS**

Candidates are expected to assess the following points when screening a slide and describe those considered relevant to the diagnosis. The descriptive report should reflect the contents of the slide and should support the diagnosis.

#### General Features:

##### Quality of Specimen

Comment if the specimen is not satisfactory. (This applies especially to specimens from the respiratory tract.)

##### Inflammation

Cell type, amount

##### Micro-organisms

Identify and describe organisms considered clinically significant

Bacteria, fungi, protozoa, parasites, viral changes

##### Background

##### Cell content

Identify the usual cellular elements of the specimen

#### Specific features of cells scrutinised:

##### Cellular Arrangement/Architecture:

Single, sheets, clusters, syncytial-like, papillary/acinar arrangements

##### Cell:

Size, shape, borders

##### Cytoplasm:

Stain, texture, density, vacuolation

##### Other Differentiating Features:

Mucin, cilia, keratinisation

##### Nucleus:

Size, shape, N/C ratio, position of nucleus, chromatin pattern, nuclear membrane

##### Nucleoli:

Number, size, position

#### Diagnosis:

Where possible the differentiation of the lesion (if malignant) should be designated.

#### Comment: (Where applicable)

This might include a discussion of a differential diagnosis if appropriate - however, a decision should still be made regarding the slide.

Provide information regarding any additional tests and their results which could aid in the diagnosis. e.g. special stains, immunocytochemistry and electron microscopy. This is not necessary if a confident diagnosis is possible on cytology.

## EXAMPLES

Note that the examples:

- describe the smear background,
- identify the cells present, and
- provide a more detailed description of the diagnostic features.

### SLIDE NO 1

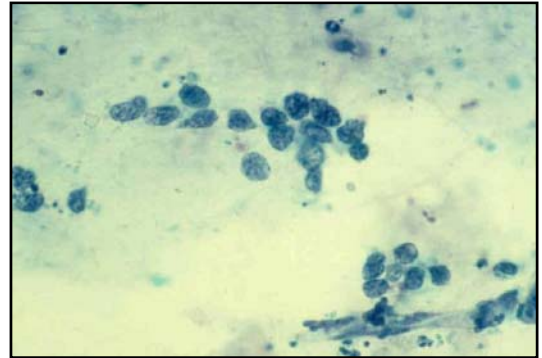
**Bronchial Washing, Male, Age 63 years**

#### Diagnosis

Small cell carcinoma.

#### Adequacy

Adequate specimen.



#### Descriptive Report

Degenerate blood is scattered throughout the background with nuclear debris evident around the cell groups. Inflammation is minimal. Cells/nuclei are arranged in loose disintegrating syncytial-like groups. Cytoplasm is either very scanty or absent. The nuclei show size and shape variation with evidence of nuclear moulding. The chromatin is very coarse and irregularly distributed. Pulmonary macrophages and bronchial columnar cells are also noted.

#### Comment

Not applicable

### SLIDE NO 2

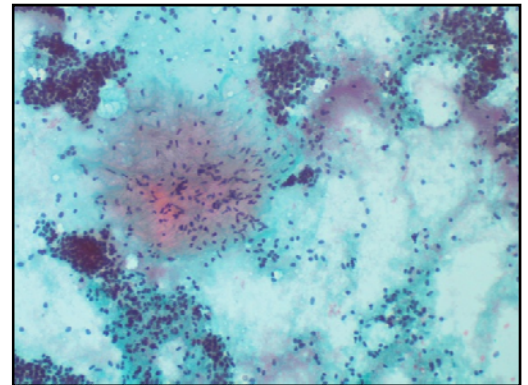
**FNA Breast, Female, Age 32 years**

#### Diagnosis

Benign – Consistent with fibroadenoma

#### Descriptive Report

The specimen is highly cellular. Large, branching sheets of cohesive ductal epithelial cells are present. The sheets of ductal cells are orderly, with minimal crowding. The cytoplasm is delicate. Nuclei are round to oval with smooth membranes and finely granular chromatin. Nucleoli are evident. A bimodal pattern is noted, with myoepithelial cells overlying the sheets of ductal cells. Numerous bare, bipolar nuclei occur throughout the smear background. Stromal tissue fragments are identified.



#### Comment:

Not applicable

## G. GUIDELINES FOR THEORY PAPERS

The pass mark for each theory component of the examination is 50%.

In response to candidate enquiries, examples of questions from past papers are provided.

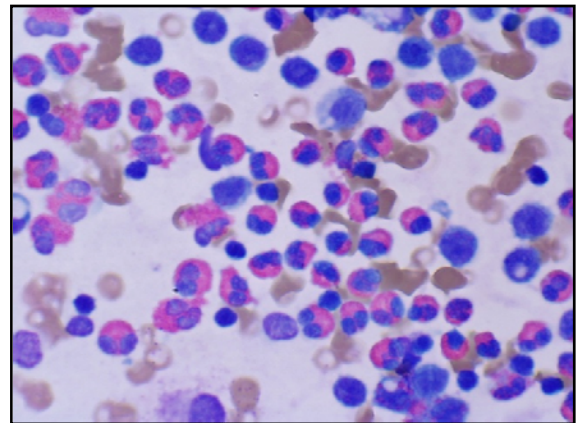
### RECOGNITION IMAGE TEST

Each question is based on an image of an object, situation or microscopic material. Most questions require that the candidate examine the image and, having correctly interpreted the image, answer a multiple choice question related to that image, as per the examples below:

#### PLEURAL FLUID (GIEMSA STAIN)

These cells when detected in increased numbers in a pleural effusion are usually:

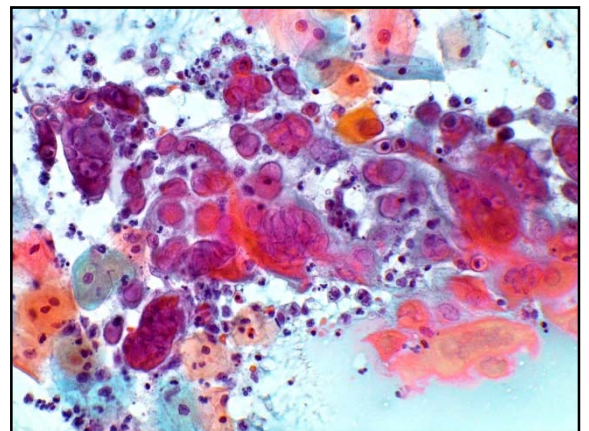
- a) Of unknown causation
- b) Suggestive of a parasitic infection
- c) Suggestive of a hypersensitivity reaction
- d) Suggestive of asthma
- e) Suggestive of Hodgkin's lymphoma



#### CERVICAL SMEAR (PAPANICOLAOU STAIN)

The patient is 28 years of age and pregnant. Which of the following statements is correct?

- a) The patient is at risk of choriocarcinoma.
- b) There is an increased risk of miscarriage.
- c) The patient should undergo immediate colposcopy with definitive treatment deferred until after delivery.
- d) Vitamin supplementation should be recommended.
- e) Delivery by caesarean section may be indicated.



## MULTIPLE CHOICE THEORY PAPER

Large numbers of eosinophils found in a sputum sample are most often associated with:

- a) Asthma
- b) Pneumothorax
- c) Parasitic infection
- d) Bronchitis
- e) Pneumonia

Which of the following cells may be confused with an endometrial stromal cell?

- a) Endocervical
- b) Eosinophil
- c) Parabasal
- d) Histiocyte
- e) Trophoblast

## WRITTEN THEORY PAPER

Ten minutes perusal time is allowed prior to commencing the paper. During this time, candidates may make notes on the question paper. Writing in the answer booklets during the perusal time is not permitted. Two hours are permitted for the examination.

In response to enquiries concerning the level of approach candidates should adopt when preparing for the written theory paper, the questions from two past papers are provided. Examples of satisfactory answers that were submitted by candidates are also provided for two questions from previous examinations. Future candidates and their mentors may find these to be a useful guide when studying and practising exam-writing techniques.

Essay writing skills are necessary and should be practised in exam-like conditions prior to the exam. There are many sites on the web which can assist with essay writing. Two useful sites which define commonly asked instruction terms are:

1. <http://www.mantex.co.uk/2009/08/22/writing-essays-analysing-questions/>
2. <http://www.lc.unsw.edu.au/olib.html>
  - ↳ Essay and assignment writing
  - ↳ Exam skills

All internet addresses checked 10 September 2011.

# CT (ASC) EXAMINATION

2010

## WRITTEN THEORY PAPER

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### QUESTION 1

Describe the process of squamous metaplasia in the uterine cervix. Outline the significance of squamous metaplasia in developing cervical neoplasia. Describe the features of squamous metaplasia as identified in a cervical smear and discuss diagnostic pitfalls.

### QUESTION 2

- a) Briefly discuss the recommendations for a woman whose smear shows LSIL (according to the Australian Guidelines for the Management of Asymptomatic Women with Screen Detected Abnormalities).
- b) What is the significance of the presence of glandular cells in a vault smear?
- c) Define an "Unsatisfactory Pap Smear". Write short notes on strategies to minimise/reduce unsatisfactory smears.
- d) Describe the cytomorphological features of Human Papillomavirus (HPV) infection in cervical smears.
- e) Describe the cytomorphological features of *Trichomonas vaginalis* and associated cellular changes in cervical smears.

### QUESTION 3

Pleural fluid drained from an elderly female was submitted for cytology. On examination, the smears were seen to be of high cellularity and composed predominantly of large, single cells with enlarged nuclei and prominent nucleoli.

- List the possible diagnoses and describe the characteristic cellular features that may assist in establishing a presumptive diagnosis.
- Describe the appropriate use of ancillary tests in establishing a more definitive diagnosis.

### QUESTION 4

- a) What is the significance of colloid in FNA of thyroid?
- b) List the conditions that can lead to a false positive diagnosis in FNA of breast.
- c) Describe the cytologic findings (in respiratory specimens) expected from a patient with asthma.
- d) Compare and contrast the preparation methods for bronchoalveolar lavage (BAL) and bronchial washings.
- e) Write brief notes on urothelial carcinoma in-situ.

# CT (ASC) EXAMINATION

2011

## WRITTEN THEORY PAPER

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### QUESTION 1

Small single cells in cervical smears have many origins. Discuss these and include problems in the differential diagnosis with cervical intraepithelial dysplasia.

### QUESTION 2

- a) Compare and contrast the cytologic features of adenocarcinoma of the cervix and adenocarcinoma of the endometrium.
- b) Discuss the causes of false negative cervical cytology and suggest appropriate minimization strategies.
- c) Describe the cytological appearances in pap smears after irradiation therapy.
- d) "The importance of clinical information cannot be underestimated." Discuss this statement in relation to cervical cytology.
- e) Briefly discuss tubal metaplasia.

### QUESTION 3

A 58-year old female presents with palpable breast lump. Mammography reveals a round, well-circumscribed lesion. Briefly discuss the most likely differential diagnoses, including clinical, radiological and cytological features.

### QUESTION 4

- a) Describe the cytological findings in common benign ovarian cysts.
- b) Describe the cytological appearances of a granulomatous process and the possible aetiologies.
- c) Compare and contrast the merits of Papanicolaou stain versus Romanovsky stains in non-gynaecological and FNA preparations.
- d) 45 year old man presented with a cervical lymph node. The initial cytological criteria suggest a differential diagnosis of small cell carcinoma and non-Hodgkin's lymphoma. Discuss the ancillary techniques that will assist in the diagnosis.
- e) Discuss 3 benign entities that may mimic malignancy in sputum and/or bronchial washing.

## EXAMPLES OF SATISFACTORY ANSWERS

**Question:** Discuss the role of Fine Needle Aspiration cytology as part of the triple test of a screen detected breast lesion (palpable and non-palpable). Your answer should include the cytological features of common entities.

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Fine needle aspiration (FNA) cytology plays a feature role in the triple test for screen detected lesions, both palpable and non-palpable. FNA may be performed under radiological guidance for non-palpable lesions or directly with palpable lesions.

The triple test involves:

- Clinical examination
- Radiological examination (mammogram, ultrasound)
- Pathological examination (cytology and histology)

To enable the test to be successful and more accurately interpreted, strong co-operation between the clinician, radiologist and pathologist is necessary. The triple test approaches high levels of sensitivity and specificity when all three procedures are combined. When all procedures are malignant, the likelihood of a malignant lesion is > 99%. If all the parameters are benign, the likelihood of a woman having breast cancer is < 1%. However, if results are discordant, surgical biopsy is required to resolve the diagnosis. The chance of a woman having breast cancer is significantly increased if one of the modalities is suspicious of malignancy.

All three disciplines use versions of the following categories.

- 1) Technically unsatisfactory
- 2) Benign
- 3) Atypical- indeterminate
- 4) Suspicious- favour malignant
- 5) Malignant

The reporting categories for different lesions should also be fairly consistent in order to achieve a successful outcome.

The accuracy of the FNA cytology is dependent upon the experience of the pathologist and the quality of the aspiration. Accuracy increases when the pathologist performs the aspiration for palpable lesions, or is present to assess the cellularity of the aspiration obtained radiologically.

Limitations associated with FNA include:

- High inadequacy rates
- Inability to differentiate between in-situ and invasive ductal carcinoma
- Difficulty in diagnosing low grade carcinomas (eg low grade ductal CIS, tubular carcinoma),
- Inability to diagnose specific benign lesions
- Difficulty in diagnosing when nuclear atypia is present, and
- Difficulty in differentiating papillary and proliferative lesions.

FNA cytology of non-palpable lesions has largely been replaced by core biopsies. Core biopsies have fewer limitations and are more confidently interpreted by most pathologists.

## Benign lesions

Common presentations include:

### CYSTS

- Often low cellularity
- Macrophages
- Apocrine cells (apocrine metaplasia), either in sheets or singly.
  - The distinguishing feature of apocrine cells is their abundant dense finely granular cytoplasm.
- Inflammatory cells (variable)
- Cyst debris

Any residual mass should be aspirated

### FIBROADENOMA

- High epithelial cellularity
- Sheets of cohesive ductal epithelium
- Stag-horn like branching groups of ductal epithelium
- Bare bipolar nuclei (myoepithelial cells) in background and within epithelial groups
- Fragments of fibrotic or fibromyxoid stroma

Atypical fibroadenomas may be difficult to interpret.

### FIBROCYSTIC CHANGE

Very common disease in women, but not always able to be specifically diagnosed in FNA specimens

- May have low or high epithelial cell yield:
- Flat regular ductal sheets
- Sheets of apocrine metaplasia
- Myoepithelial cells within epithelial groups
- Bipolar nuclei in the background
- Foam cells /macrophages

### PAPILLARY LESIONS

Cytology cannot accurately differentiate intraductal papillomas/florid papillomatosis from papillary carcinomas. Formal excision should always be recommended.

Features include:

- Cellular smears
- Branching epithelial and finger-like fragments
- True papillary fragments with a fibrovascular core maybe present
- Palisading columnar cells
- Macrophages
- Bare bipolar nuclei (variable)

## Malignant lesions

### DUCTAL CARCINOMA

- High cellularity
- Loose cohesive groups
- Syncytial groups with loss of polarity
- Single cells with intact cytoplasm
- Absence of bare bipolar nuclei
- Enlarged nuclei with raised N/C ratio, irregular nuclear membranes & hyperchromasia
- Nucleoli may be prominent
- Tumour diathesis may be present

FNA cytology cannot generally differentiate DCIS from an invasive lesion.

Features seen with DCIS, comedo type are:

- Moderate to high cellularity
- Irregular fragments and single cells
- Macrophages
- Tumour debris

Features of DCIS, non-comedo type have no diathesis

### LOBULAR CARCINOMA

Account for 5 – 10% of invasive lesions

- Scant to moderate cellularity
- Single cells, small groups inc. linear arrangements
- Intracytoplasmic lumens, mucin vacuoles, signet ring cells
- Cytoplasm may be scanty
- Nuclei are small with variation in size and chromasia
- Nuclear moulding
- Presence of small nucleoli
- No bipolar bare nuclei.

In conclusion, FNA cytology is a useful tool in the diagnosis of screen detected lesions. However, superior results associated with stereotactic core biopsy for non-palpable lesions have resulted in FNA cytology being largely replaced in many diagnostic centres (eg England). In the hands of experienced radiologists and pathologists it is a fast, simple safe, cost effective and accurate test. The limitations of FNA cytology always need to be acknowledged.

## QUESTION

- a) List the advantages and disadvantages of liquid based cytology.
  - b) Outline the advantages and disadvantages of the Royal College of Pathologists of Australasia Quality Assurance Program's gynaecological slide rotation.
  - c) Describe the cytomorphological features of *Candida sp* and associated cellular changes in conventional cervical smears. Briefly outline the look-alikes.
  - d) Describe the morphological features used to distinguish between adenocarcinoma in-situ of the endocervix and directly sampled lower uterine segment.
  - e) Discuss the roles of "Pap Test Registers".
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### **(a) List the advantages and disadvantages of liquid based cytology.**

#### Advantages:

- Entire specimen may be transferred from sampling device into vial
- Enhanced cell preservation – cells fixed within vial
- Randomisation of cells in suspension, resulting in representative sub-sample on slide
- Cells better displayed on slide due to:
  - Reduction of blood, inflammatory cells and mucus on slide
  - Monolayer preparation
- Reduction in number of unsatisfactory smears
- Cells distributed over smaller area of slide
- Ability to prepare multiple slides
- Ability to prepare cell block
- Ability to perform ancillary testing (HPV, Chlamydia etc)
- Permits automated screening modalities

#### Disadvantages:

- Cost to laboratory and patient
- Greater demands on laboratory personnel to operate and maintain equipment
- Additional lab safety risks
- Architectural and morphologic appearances altered
- Loss (or reduction) of background elements
- Additional spatial requirements – instrumentation, reagents, consumables, specimens

**(b) Outline the advantages and disadvantages of the Royal College of Pathologists of Australasia Quality Assurance Program's gynaecological slide rotation.**

Advantages:

- allows all labs to gain exposure to material they may not routinely get in their lab.
- allows a method for RCPA to examine labs and assess if consistency is happening from lab to lab.
- allows results to be used as further teaching within labs as results may be obtained very quickly.
- allows RCPA to assess potential areas of continued education.
- allows labs to compare themselves against other labs.
- allows labs to assess work being signed out by their screeners & pathologists.
- allows detection of problem areas & allows continuing education to be done on those problem areas.
- aids in calculation & adherence to 'performance measures'.

Disadvantages:

- reporting may be done under non routine conditions and therefore give unrealistic results
- expensive and complicated to run.
- may not be beneficial for individual screeners in big labs as they may only see one QAP every 5 years.
- may be insufficient to really test a laboratory

**(c) Describe the cytomorphological features of *Candida sp* and associated cellular changes in conventional cervical smears. Briefly outline the look-alikes.**

*Candida* is a dimorphic fungus growing as both fungal and hyphal elements. The fungal spores are small and round, often with budding and may appear singly or in clusters. Pseudohyphae can appear as segmented filaments with branching chains of elongated buds. These can often appear as hyphal spearing through epithelial cell clumps as "kebab effect". Staining is usually pale pink with Pap staining.

*Candida* associated changes include nuclear enlargement and increased cytoplasmic eosinophilia, vacuoles (moth-eaten cytoplasm) and perinuclear clearing. An inflammatory exudate may be seen. These changes may also be seen with *Trichomonas* infection. Changes of nuclear enlargement and perinuclear haloes may also be mistaken for LSIL (koilocytes).

Look alikes of *Candida sp* may include:

- Degenerate red blood cells (yeast forms)
- Mucus strands may be mistaken for hyphae but lack segmentation
- *Leptothrix* – thin filamentous bacteria, but lack segmentation
- Fungal contaminant e.g. *Aspergillus sp* but has "true" septate hyphae and conidiophores that *Candida* lacks.
- *Actinomyces sp.* – furry balls with radiating filamentous structures

**(d) Describe the morphological features used to distinguish between adenocarcinoma in-situ of the endocervix and directly sampled lower uterine segment.**

Directly sampled lower uterine segment (LUS) cells are an important differential in the diagnosis of adenocarcinoma in-situ (AIS) of the endocervix, the comparative morphological features can be described in the following categories:

	<b>LUS</b>	<b>AIS</b>
Cytoplasm	Inconspicuous	Abundant, feathering at edges of groups
Cell shape	Small, round or oval	Columnar to cuboidal
Nuclei	Round-oval, finely granular, uniform	Elongated, fine-coarse chromatin, hyperchromasia, peripheral, anisonucleosis, crowded, pseudostratified
Arrangement	Small and large groups, tubules, sheets, cohesive (stroma and glands, biphasic)	Isolated strips, strips off sheets, rosettes, crowded groups – piling up of cells
Stroma	Present, capillaries in larger fragments	Absent

**(e) Discuss the roles of “Pap Test Registers”.**

- Collection of Pap smear results
- Collection of cervical biopsy results
- Correlation of this data (i.e. for HPV testing)
- Send reminder letters to patients requiring a Pap smear
- Send questionnaire to referring practitioner requesting further follow up data if no biopsy results have been received if Pap smear was reported as HGEA
- Resource of information for both laboratories and Pap smear takers re patient histories etc
- Provide education to community
- Provide laboratories with Performance Standards data:
  - % of smears reported as negative, Possible LGEA, LGEA, Possible HGEA, HGEA
  - % of HGEA reported by Pap smears with a subsequent biopsy report
  - % of unsatisfactory smears
  - % of smears collected by nurse practitioners and GPs versus gynaecological specialists
- Registry will submit data to Commonwealth so that trends and population shifts become known e.g. underscreened populations, age groups, downward/upward trends in high grade abnormalities
- Provide data on number of smears with endocervical cells etc