

## ORGANIZATIONAL ASPECTS IN AN ANATOMICAL PATHOLOGY QUALITY ASSURANCE PROGRAMME

J. MAYNARD

Chairman, Anatomical Pathology QAP Committee, Royal College of Pathologists of Australasia

### INTRODUCTION

Since 1968 The Royal College of Pathologists of Australasia (RCPA) has been conducting Histopathology Surveys with the intention of testing the diagnostic ability of surgical pathologists in Australia and New Zealand.

Until 1980 these surveys were conducted on a once-a-year basis and confined to a simple diagnosis. The organizer, who was appointed for 4 years, presented the results at the Annual Meeting of the College, together with a printed booklet of the findings and diagnosis.

A more formal approach to quality assurance in anatomical pathology was adopted in 1980, together with the other disciplines of clinical chemistry, medical microbiology, immunology, haematology and blood bank serology. A chairman was appointed for 3 years and thereafter the appointment was a 6 yearly one. The description of these first 3 years has been described by Cooke. In the following years, from 1983 onwards, the author has been coordinator and has expanded and developed the initial concepts.

### AIMS OF QUALITY ASSURANCE

The aims of the quality assurance programme (QAP) are to:

1. test the diagnostic skills of pathologists in routine anatomic pathology.
2. test the processing, cutting and mounting proficiency of technical staff.
3. test the staining of both haematoxylin and eosin, and special staining proficiency of technical staff.
4. assess and document usual laboratory practice, including safety, for many of the routine procedures in the laboratory.
5. assess clarity of communication and reporting methods.
6. provide educational updates in areas of deficiency.

### METHODS

The following methods were adopted: *Diagnostic Skills of Pathologists* were tested by examining reports returned by pathologists after processing the tissue or examining the slide submitted. These reports were assessed in the light of the opinions from a consultative panel of 6 experts provided prior to the test slides being sent to the individual participant laboratories.

#### *Range of materials:*

Table 1 lists the organ systems and pathological processes present in the quality assurance material.

#### *Sources of suitable test material:*

The test material was obtained from the routine tissue submitted through a hospital laboratory.

#### *Ensuring stability of material:*

Stained slides, unstained slides, wet tissue fixed in formalin and fixed impression smears were all used for material. If stained or unstained slides were used, every 20th section was examined to see that the pathological process remained constant. If wet tissue was used, then it was combined with a staining exercise and the slides had to be returned by the participant.

#### *Transport and packing:*

This was done with care and only two breakages have been reported in 3 years. No infectious or hazardous material was sent through the postal system. Extreme care has to be taken to make sure the results and slides are returned to the correct participant.

#### *Assessment of Technical Proficiency:*

Table 2 indicates the special stains and wet tissue sent to participants. This was evaluated

Address for reprint requests: Dr. J. Maynard, Director of Pathology, Dandenong and District Hospital, David Street, Dandenong, Victoria 3175. Australia.

TABLE 1  
ORGAN SYSTEMS AND PATHOLOGICAL PROCESSES PRESENT IN RCPA QAP MATERIAL

<b>LYMPH NODES and SPLEEN</b>		<b>BREAST</b>	
Para-aortic, metastatic adenocarcinoma	AP4/84	Breast, mucinous adenocarcinoma	AP1/84
Spleen, Gaucher's Disease	AP5/84		
Spleen, sarcoidosis, trauma, rupture	AP7/83	<b>RESPIRATORY</b>	
L.N. Hodgkin's mixed cellularity	AP11/84	Lung, necrotizing sarcoid granulomatosis	AP10/83
L.N. Hodgkin's lymphocytic depletion	AP4/85	Pulmonary hamartoma	AP13/84
L.N. reactive hyperplasia (AIDS)	AP7/85	Lung – adenocarcinoma	AP14/84
Tonsils, lymphoid hyperplasia, actinomycoses	AP1/86	<b>GUT</b>	
L.N. Cervical – toxoplasma	AP3/86	Appendix, serosal inflammation	AP1/83
Thymus, thymoma	AP10/86	Appendix, endometriosis, acute focal appendicitis	AP13/83
<b>SKIN and SUBCUTANEOUS TISSUE</b>		Salivary gland, pleomorphic adenoma	AP6/83
Skin, foot, viral wart/silver nitrate	AP8/83	Parotid, adenolymphoma (Warthin's)	AP3/84
Skin, MB ulcerans with chronic leg ulcer	AP9/83	Rectal mucosa, juvenile polyp	AP2/84
Umbilicus, vitello intestinal remnant	AP11/83	Sigmoid colon, pneumatosis coli	AP8/84
Branchial cyst	AP12/84	Colon, ulcerative colitis	AP9/85
Subcutaneous tissue – gouty tophus	AP12/85	Liver, adenocarcinoma with metastasis to breast	AP11/85
Subcutaneous tissue, neurilemmoma	AP6/85	Gall bladder, chronic cholecystitis	AP4/86
Skin, malignant melanoma	AP9/86	Stomach, inflammatory fibroid polyp	AP12/86
<b>GYNAECOLOGIC PATHOLOGY</b>		<b>URINARY SYSTEM</b>	
Endometrium, choriocarcinoma	AP2/83	Kidney – tuberculosis	AP5/85
Endometrium, menstrual phase	AP5/83	Kidney, renal oncocytoma	AP7/86
Ovary, clear cell carcinoma	AP7/84	<b>MALE SEX ORGANS</b>	
Endometrium – hydropic abortion	AP9/84	Prostate, carcinoma	AP3/83
Ovary, sclerosing stromal tumour	AP13/85	Testis, seminoma with extension to cord	AP3/85
Uterine wall, fibromyoma	AP2/86	Testis, rhabdomyosarcoma	AP5/86
<b>BONE AND CONNECTIVE TISSUE</b>		Testis, embryonal carcinoma	AP11/86
Extra-abdominal desmoid	AP4/83	<b>ENDOCRINE</b>	
Rib, plasmacytoma	AP6/84	Thyroid, giant cell thyroiditis of De Quervain	AP12/83
Muscle forearm, myositis ossificans	AP1/85	Muscle and thyroid – adenoid cystic carcinoma	AP2/85
Retroperitoneal mass – angiomyolipoma	AP8/85	Parathyroid adenoma	AP6/86
Scapula, malign. fibrous histiocytoma	AP10/85	<b>POST MORTEM TISSUE</b>	
Meniscus, ochronosis (alkaptonuria)	AP13/86	Myocardium – amyloidosis	AP10/84
		Brain, meningitis	AP8/86

Note: AP refers to code number for Anatomical Pathology QAP material.

TABLE 2  
RANGE OF SPECIAL STAINS AND WET TISSUE SENT IN THE RCPA QAP

	<b>PART II SPECIAL STAINS</b>	Fixation techniques	2/1983
	Iron and fungal stain controls	Frozen sections	3/1983
	H & E, AFB & Controls AP9/83	Stains and reagents, use and storage	1/1984
	H & E, Elastin (own choice)	Waste disposal	2/1984
	AP10/83	Tissue Processors – paraffin	3/1984
	L.N. imprints, one for Romanovsky	Embedding	1/1985
	+ W.T. for H & E	Paraffin section microtomy	2/1985
P	U/S myocardium for amyloid	Staining and mounting of	3/1985
	+ H & E (AP10/84)	routine paraffin sections	
	Haemosiderin stain and control (AP14/84)	Gram stain and picric acid	1/1986
	H & E and AFB (AP5/85)	Decalcification	2/1986
	H & E and PAS (AP9/85)	<b>CLARITY IN COMMUNICATION</b>	
	Trichrome connective tissue stain (AP10/85)	Send in last 2 colonic adenocarcinoma reports	1/1983
	H & E and lipid stain (AP11 and 13/85)	Send in 2 malignant melanoma reports	2/1983
	Gram stain-(M1/86), H & E (AP2/86)	Safety – Infective material and staff precautions	2/1985
	PTAH (AP5/86), H & E and glial fibres (AP8/86)	Safety – Hazard. subs, protect, clothing, regulations	3/1985
	Perls' (AP13/86), H & E (AP12/86)	Safety – Warning signs, Questionnaire on safety, infection, and fire	1/1986
	<b>LABORATORY PRACTICE</b>	Procedure manuals and staff responsibilities	2/1986
C	Periods of keeping tissue, blocks, slides		1/1983

on an individual basis when the slides were returned.

**Criteria and methods for assessing technical results:**

Slides were assessed by staff using criteria indicated in Tables 3 and 4.

**Reports to participants:**

These reports were sent to participants together with the new survey. Results were divided into 2 sections, one for diagnosis, the other for technical and laboratory practice. Reports included detailed breakdowns of diagnoses received and detailed commentary on technical and laboratory practice tested. Bibliography was provided with each case. Histograms and pie diagrams were used to illustrate breakdown of diagnosis and methods.

Participant interest was maintained by providing new concepts on management of common diagnosis and new ideas and hints on technical and laboratory procedures.

Target values and consensus means were determined in the case of diagnosis testing by the consultant panel and in the case of technical

procedure testing by consensus means and comparison of laboratory score with this consensus mean.

TABLE 3  
HAEMATOXYLM AND EOSIN  
– CRITERIA FOR SECTION QUALITY

1. Uniform thickness.
2. Absence of
3. Absence of chatter.
4. Absence of compression.
5. Completeness of section.
6. Absence of folds.
7. Absence of air bubbles under the section.
8. Absence of other

Each of the above points was marked thus:

- 3 points – excellent
- 2 points – good
- 1 point – adequate
- 0 points – inadequate

Therefore the highest score possible is 24 points.

TABLE 4  
**HAEMATOXYLIN AND EOSIN**  
 - CRITERIA FOR STAIN QUALITY

1. Depth of nuclear **stain/crispness** and delicacy.
2. Depth of cytoplasmic stain.
3. **Nuclear/cytoplasmic** contrast.
4. Cytoplasmic components contrasted adequately.
5. Complete dehydration.
6. Complete clearing.
7. Labelling - RCPA Case Number eg. (AP8/86).
8. Mounting.

Each of the above points was marked thus:

- 3 points - excellent
- 2 points - good
- 1 point - adequate
- 0 points - inadequate

Therefore the highest score possible is 24 points.

#### **Confidentiality**

Only the programme co-ordinator is able to identify individual participants' results. Slides with labels on are covered before **marking** technical quality is performed.

Reports on individual participants' laboratory stationery are assessed and diagnoses listed. Reports and slides together with the main report are double checked for identity and correctness before being mailed.

No results of individual laboratories are made available to any other person by the programme co-ordinator. It is the laboratory's own responsibility to release the results to government or inspecting agencies if required by legislation.

**Action Sheets** are provided with all results returned. Individual action sheets for pathologist diagnosis and for technical results are provided. These are to aid the laboratory in acting on deficiencies shown in the survey and also to provide the director of the laboratory with an easy to read summary of what action his staff have taken, and also provides a means of seeing that the laboratory rates satisfactory with its peers.

**Improvement of performance** has occurred in the technical field over the years and the number of laboratories scoring high results has increased with fewer low scores now occurring. Detailed results are obtainable by subscription to the survey

The approach of the **RCPA/QAP** in Anatomical Pathology is unique in the world and to my knowledge there is no other survey which looks at technical laboratory procedures in addition to diagnosis.

#### SUGGESTED READING

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