

Approach to Cut Up – Large Intestine

Professor Ray McMahon
Manchester Royal Infirmary
University of Manchester
Tuesday 14 March 2017
RCOG, London



British Division of the
International Academy of
Pathology
www.bdiap.org

Approach to Cut Up - Large Intestine

Prof Geraint Williams
Wales College of Medicine
Cardiff University



8th BDIAP Seminar for Trainees in
Histopathology
Approach to Cut-Up: Macroscopic
examination as the precursor to accurate
microscopic interpretation

Lower GI tract

Professor Neil A Shepherd
Gloucester & Cheltenham

Kings Fund, London

3 March 2015

What we will consider in the 'lower GI' tract

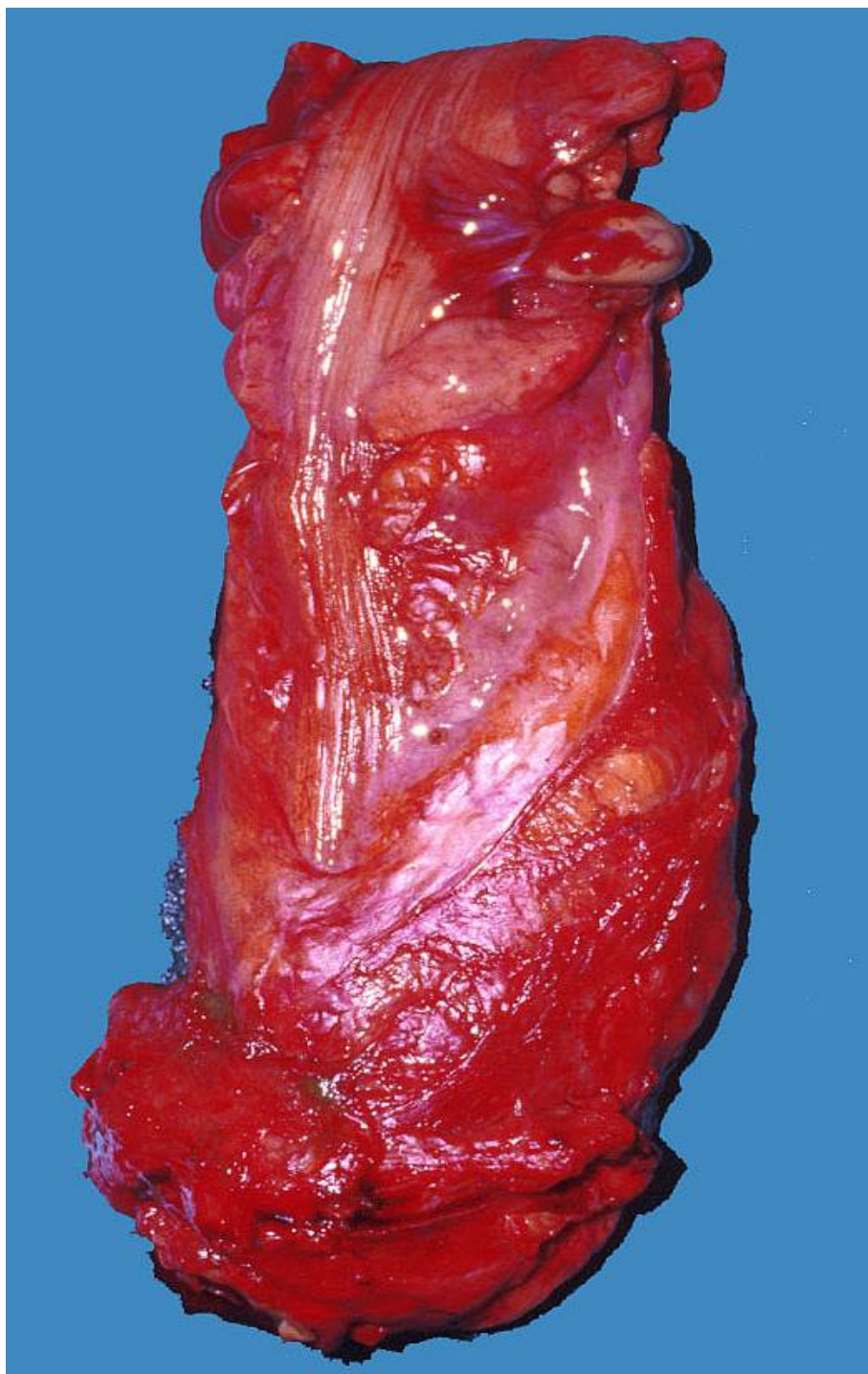
Resection specimens
Polyps and local resections

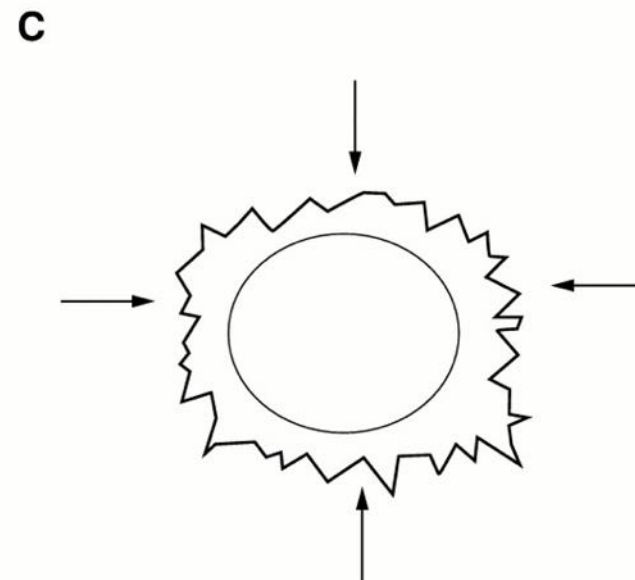
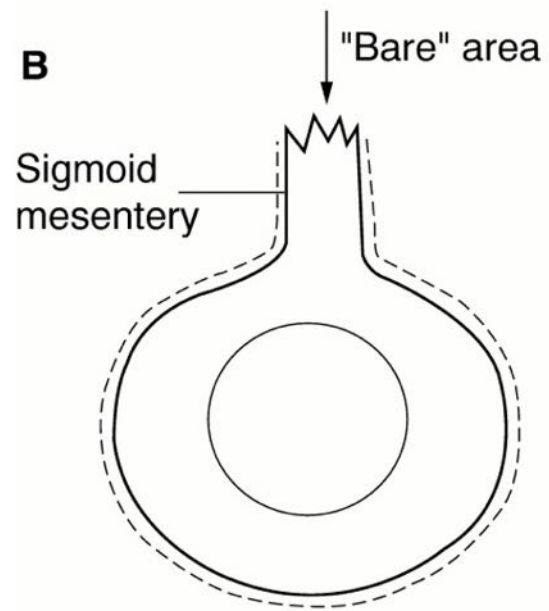
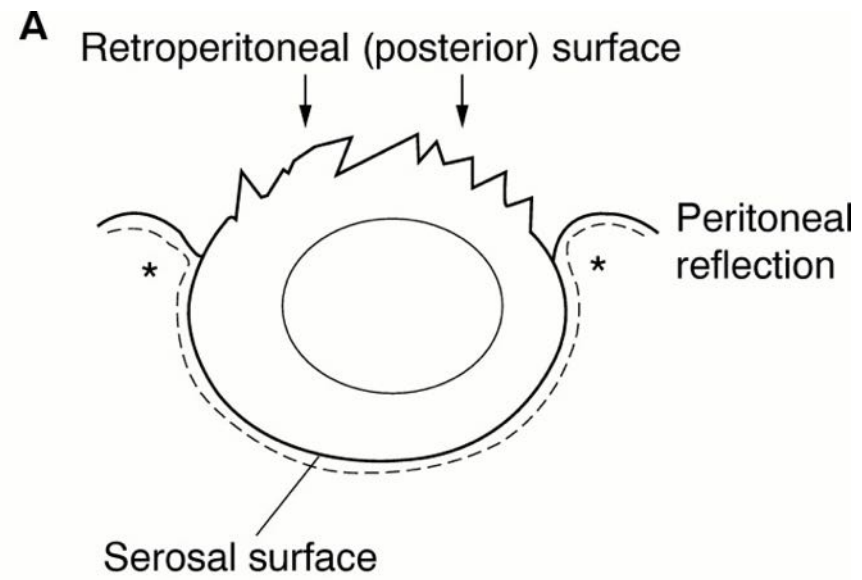
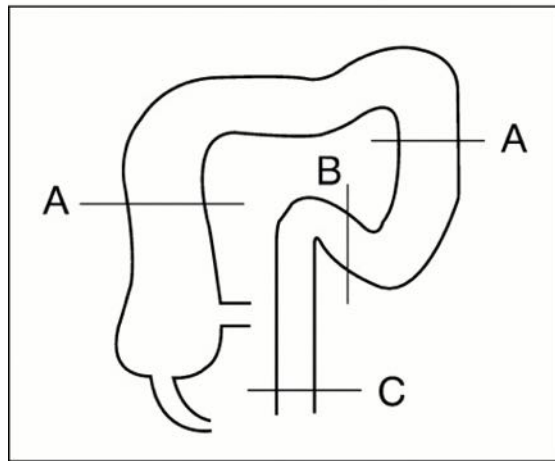
Inflammatory conditions
Other benign pathologies

Before you start

- Know your anatomy
 - the peritoneum and its reflections
 - the mesentery and omentum
 - the blood vessels
 - adjacent structures
 - bladder, prostate, seminal vesicles, uterus, ovaries







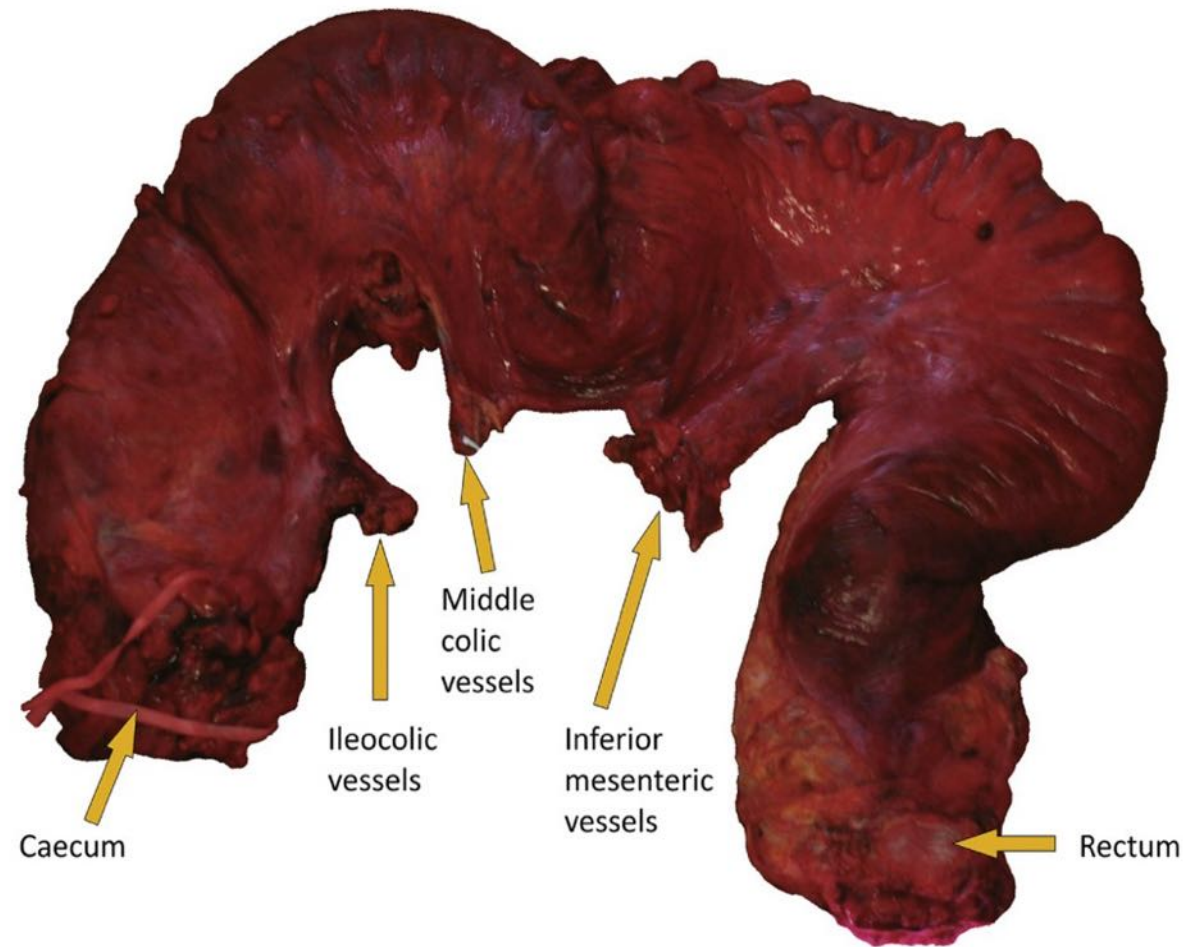


Figure 32.2 Fresh subtotal colectomy specimen for multiple colonic tumours: the mesentery has been removed intact and all three major vascular ties are seen.

Morson and Dawson's Gastrointestinal Pathology, Fifth Edition. Edited by Neil A. Shepherd, Bryan F. Warren, Geraint T. Williams, Joel K. Greenson, Gregory Y. Lauwers and Marco R. Novelli.
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Before you start

- know your anatomy
- learn surgeon-speak
 - operations
 - Hartmann's procedure
 - anterior resection, abdominoperineal excision
 - right and left hemicolectomy
 - acronyms
 - EMR, TEMS, TART, TME
 - others
 - pouches, columnar cuffs
 - ostomies
 - curative vs palliative

Before you start

- know your anatomy
- learn surgeon-speak
- get to know the endoscopists, surgeons and their support staff

Before you start

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- receive the specimen fresh (if possible)

Before you start

- know your anatomy
- learn surgeon-speak
- get to know the endoscopists, surgeons, and their support staff
- receive the specimen fresh (if possible)
- find out as much as you can about the case
 - request form
 - MDT records - diagnosis, stage, family history
 - pathology laboratory computer
 - previous treatment that might affect the pathology

Before you start

- know your anatomy
- learn surgeon-speak
- get to know the endoscopists, surgeons, and their support staff
- receive the specimen fresh (if possible)
- find out as much as you can about the case
- don't be coy about asking the surgeon to show you what he/she has done

Before you start

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- ask yourself “what does the clinician need to know?”

Before you start

- know your anatomy
- learn surgeon-speak
- get to know the endoscopists, surgeons, and their support staff
- receive the specimen fresh (if possible)
- find out as much as you can about the case
- don't be coy about asking the surgeon to show you what he/she has done
- ask yourself “what does the clinician need to know?”
- expect to report the histology yourself

The specimen

- wash out luminal contents carefully
- think about taking fresh tissue
 - microbiology (esp TB), EM, cytogenetics, biobanking
- consider inflating with formalin & immersing in fixative
 - diverticular disease
 - Crohn's disease
 - stricturing pathology
 - some tumours







Colorectal cancer – fix open or closed?

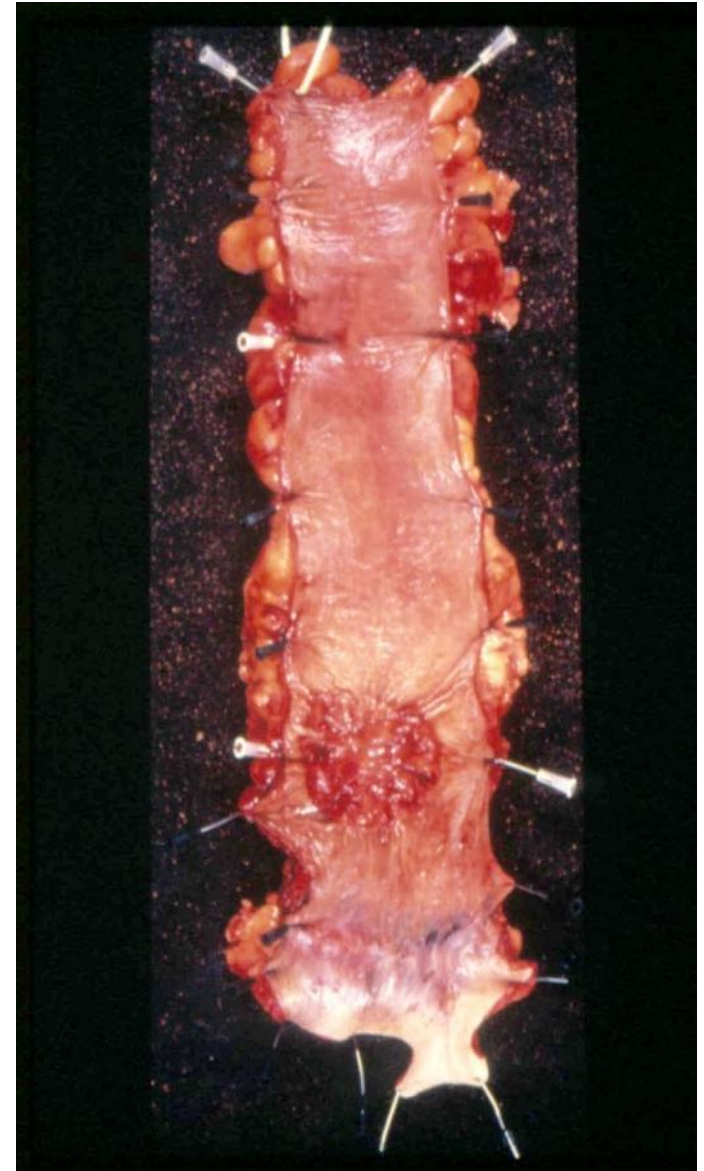


Treat every specimen on its merits

Tumours

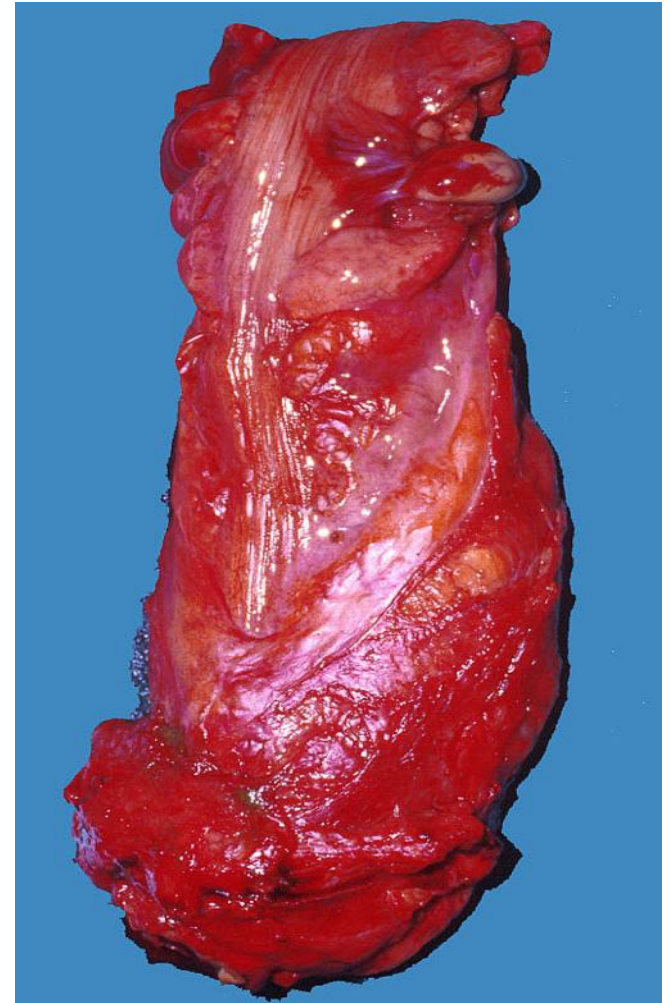
Decide whether to open the whole specimen along its length or to leave the tumour intact with a 'wick' of foam sponge or absorptive paper

- opening may be better in smaller, non-circumferential tumours and after neo-adjuvant therapy
- do so along the normal-appearing anti-mesenteric border
- try to avoid the tumour

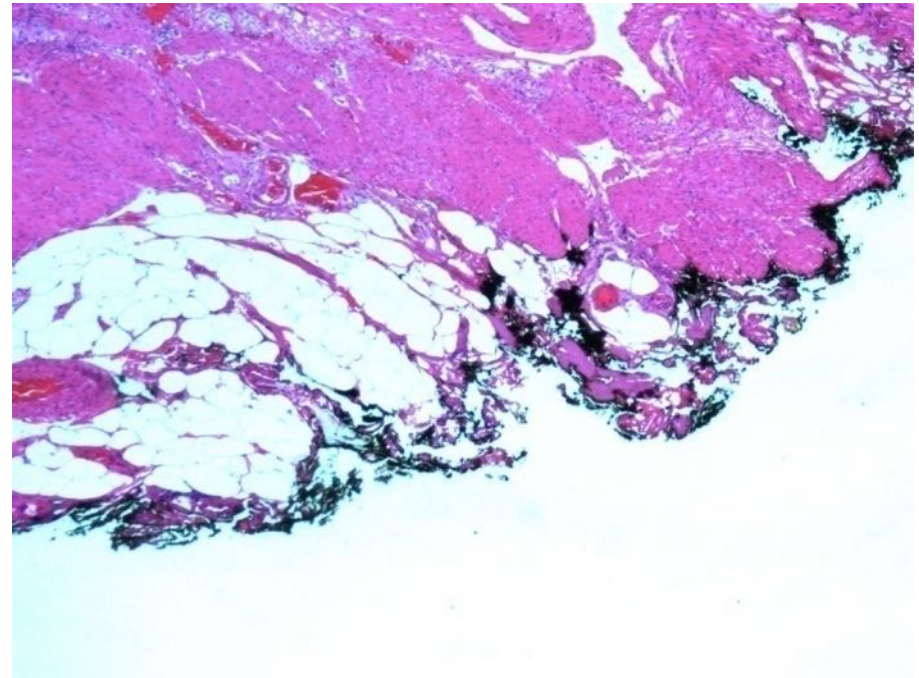
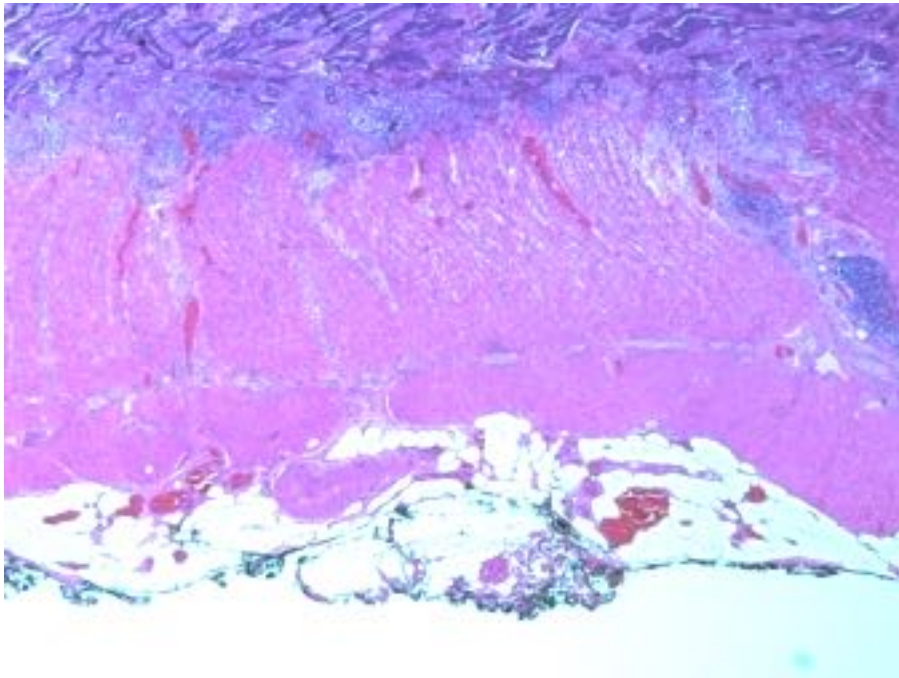


Tumours

- the circumferential surgical margin is all important, especially in rectal cancer
- longitudinal margins less important – if $> 3\text{cms}$, don't submit
- don't submit donuts unless $< 3\text{cms}$
- 'paint' the non-peritonealised 'circumferential' margin, NOT the serosal surface



The problem with paint.....



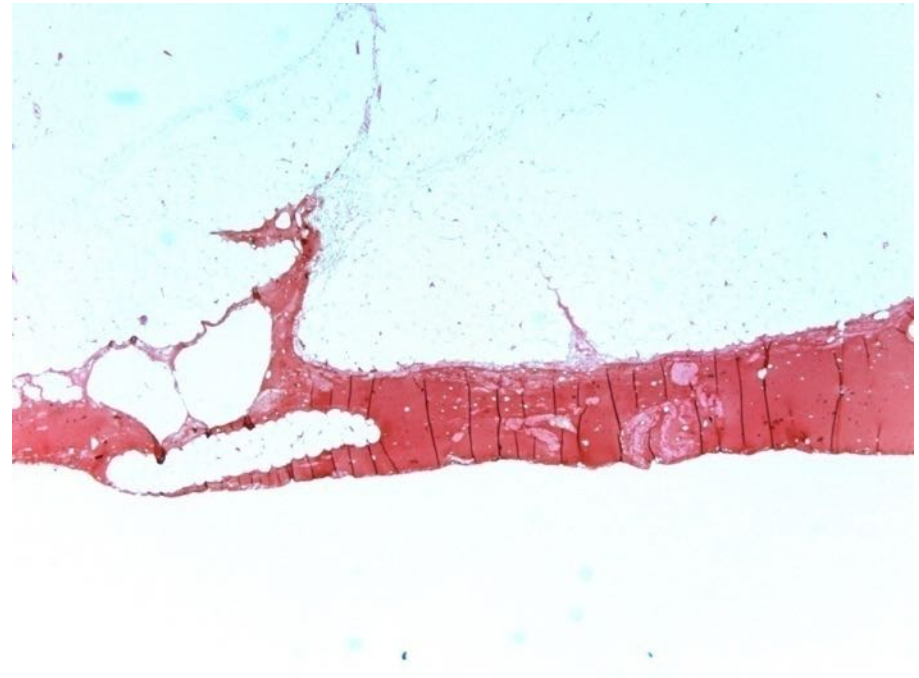
To paint or not to paint?

Only surgical resection margins should be painted

The intelligent, thoughtful and restricted use of paint on such surgical specimens is recommended

Ludeman and Shepherd 2005

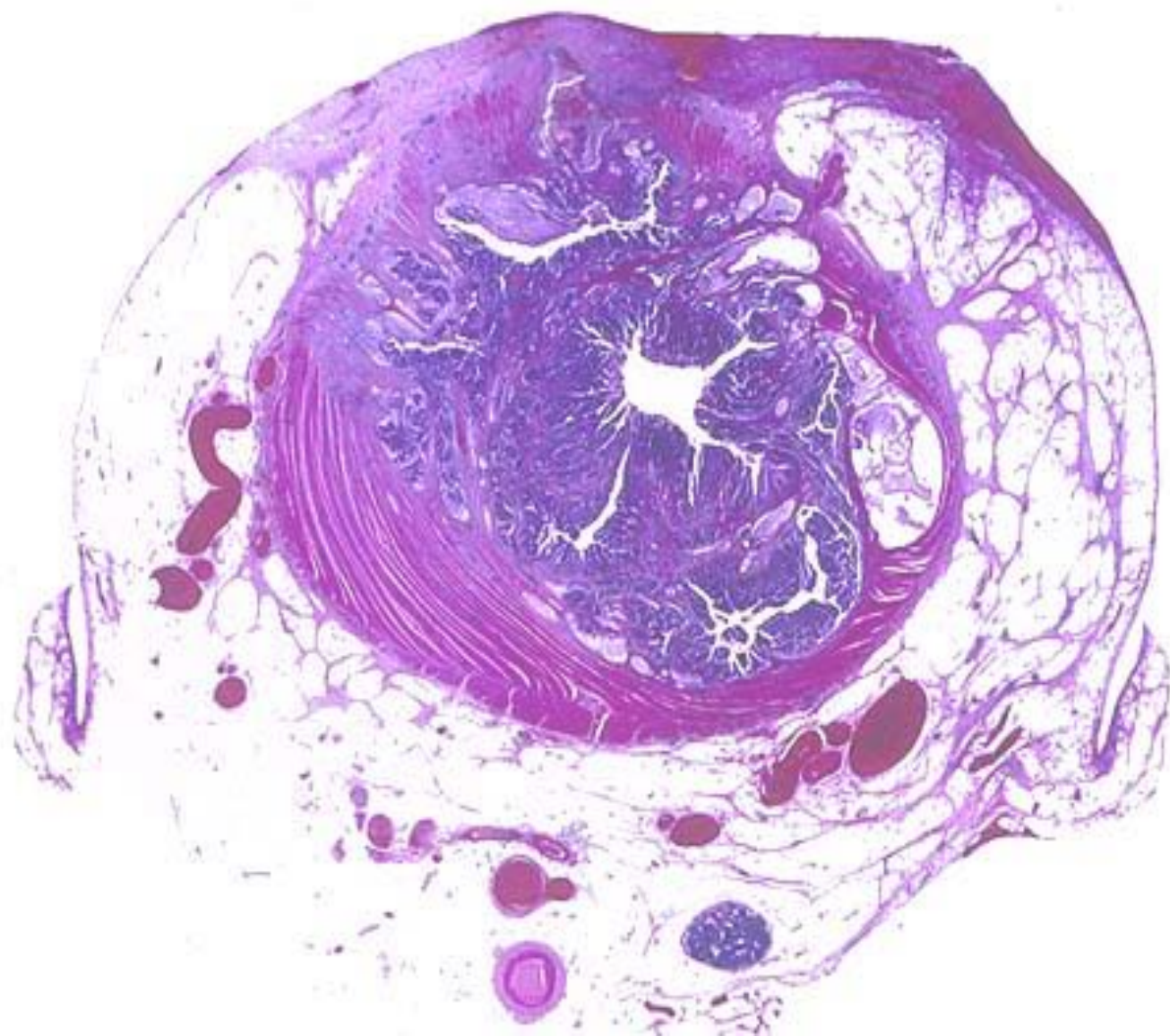
Good old coloured gelatin....

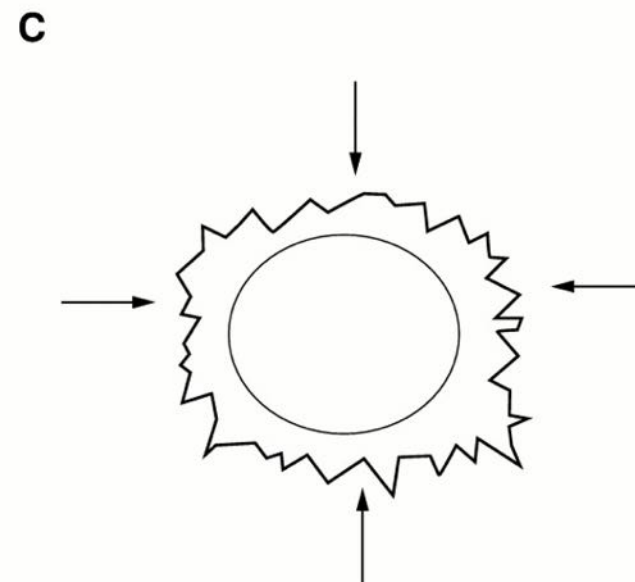
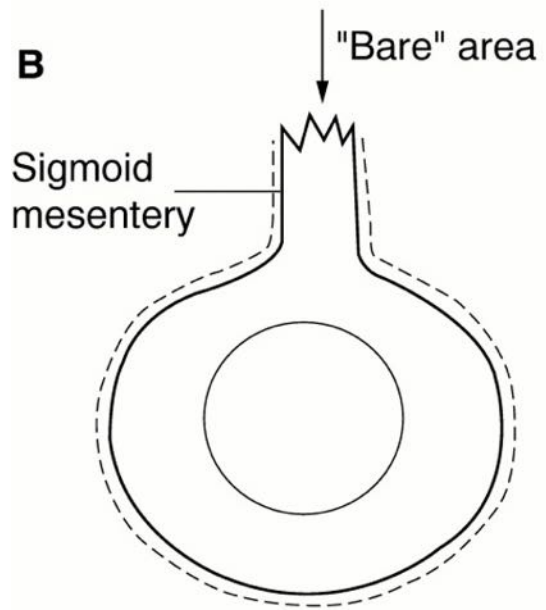
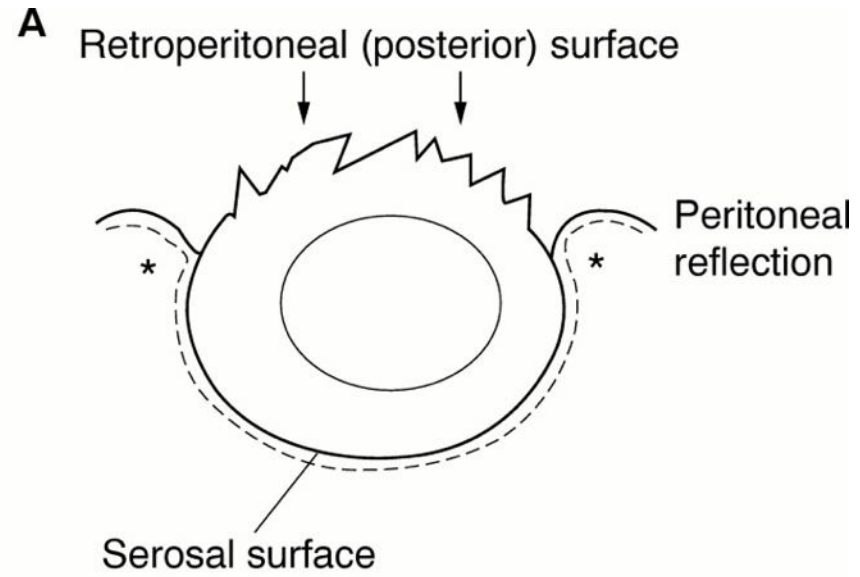
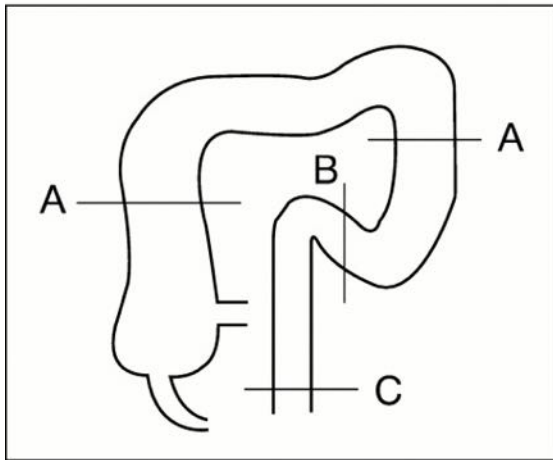


COLORECTAL CANCER AND THE PERITONEAL SURFACE

The relationship of the peritoneum to the rectum



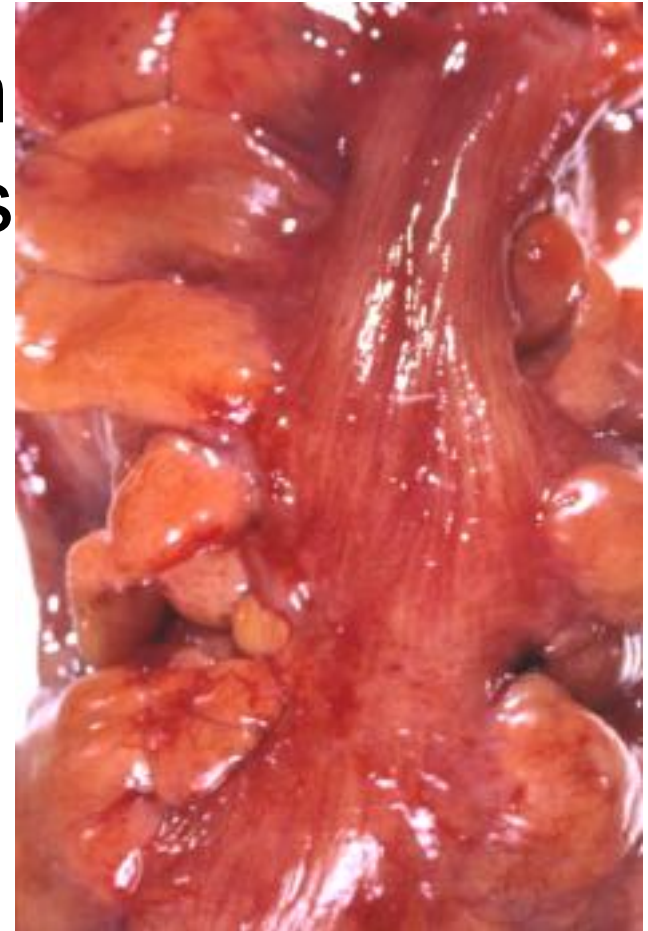






Macroscopic assessment of peritoneal involvement in colorectal cancer

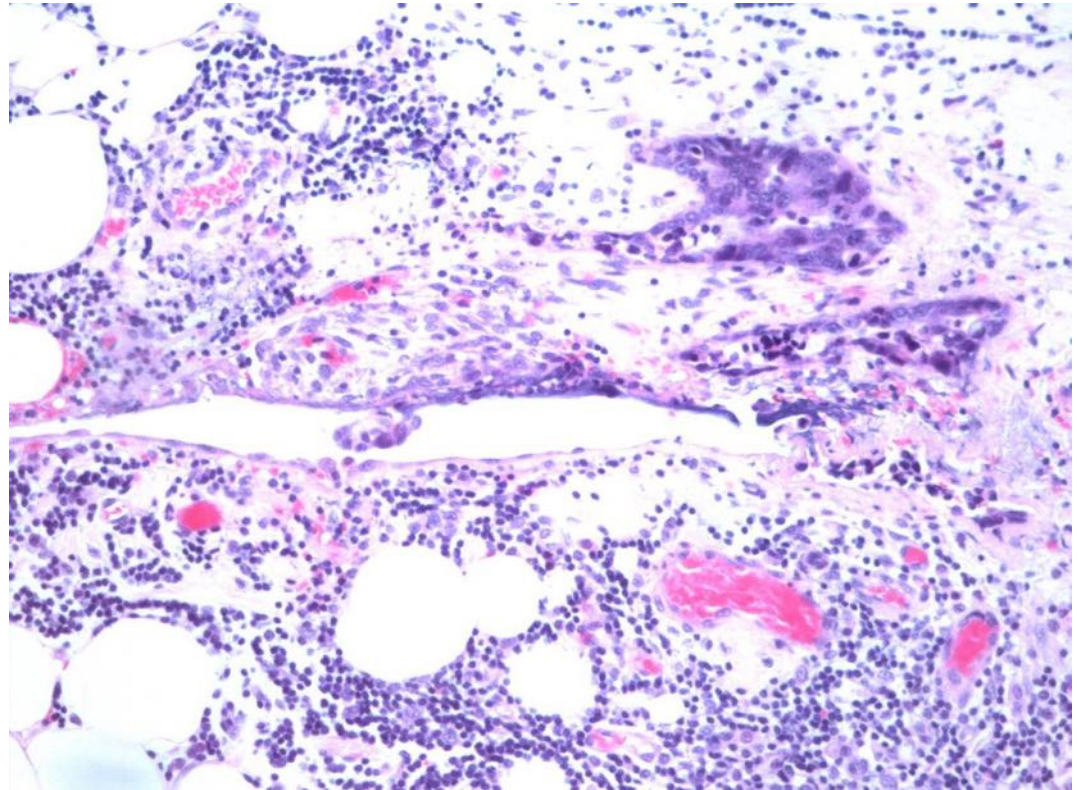
- where does it occur?
unusual on flat surfaces: much more likely in fat-lined crevices
- how to assess it?
at least two blocks of most likely areas
may need levels



Peritoneal involvement in colorectal cancer

where does it
occur?

- in the crevices...



RCPATH datasets & guidelines

- first dataset (P Quirke, GT Williams), 1998
- second revision (GT Williams, P Quirke, NA Shepherd), 2007
- third revision (MB Loughrey, P Quirke, NA Shepherd), 2014
- wide consultation with ACPGBI, NCRI, BSG, BDIAP, NHS Bowel Cancer Screening Pathology Group & the membership of the College
- a long gestation!

RCPATH colorectal cancer dataset, 2nd revision (2007)

G T Williams, P Quirke, N A Shepherd

It is therefore recommended that pathologists audit their reports at regular intervals (perhaps yearly) to ensure that their overall results are not significantly different from what might expected. Three standards are recommended for this purpose, namely that in a series of at least 50 resection specimens:

- a) the median number of lymph nodes examined is 12*
- b) the frequency of serosal involvement is at least 20% for colonic cancers and 10% for rectal cancers*
- c) the frequency of extramural vascular invasion is at least 25%*

We believe there is a reasonable evidence base to suggest that the mean harvest of lymph nodes should be at least 12 but accept that there is less evidence base for the two other outcome measures. Nevertheless, we believe that this is a start at setting such standards and evidence will follow to allow us to adjust these levels in the future.

RCPATH colorectal cancer dataset, 3rd revision (2014)

M B Loughrey, P Quirke, N A Shepherd

- The median number of lymph nodes examined should be greater than 12.
- The frequency of serosal involvement should be at least 20% for colonic cancers and 10% for rectal cancers.
- The frequency of venous invasion, including intramural (submucosal and intramuscular) and extramural, should be at least 30%.

These are minimum standards with many good centres in the UK finding 18 lymph nodes as a median count, 30–40% serosal involvement and venous invasion in over 40% of cases.

Gloucestershire BCSP QA visit, October 2013:

Colorectal cancer quality standards

Parameter	median lymph node harvest	PI colon	PI rectum	EMVS
Quality standard	12 or more	> 20%	> 10%	> 25%
Pathologist A	25	36%	14%	51%
Pathologist B	19	49%	8.3%	42%
Pathologist C	19	33%	27%	48%

LYMPH NODE HARVESTS

RCPATH colorectal cancer dataset, 3rd revision (2014)

M B Loughrey, P Quirke, N A Shepherd

- The median number of lymph nodes examined should be greater than 12.
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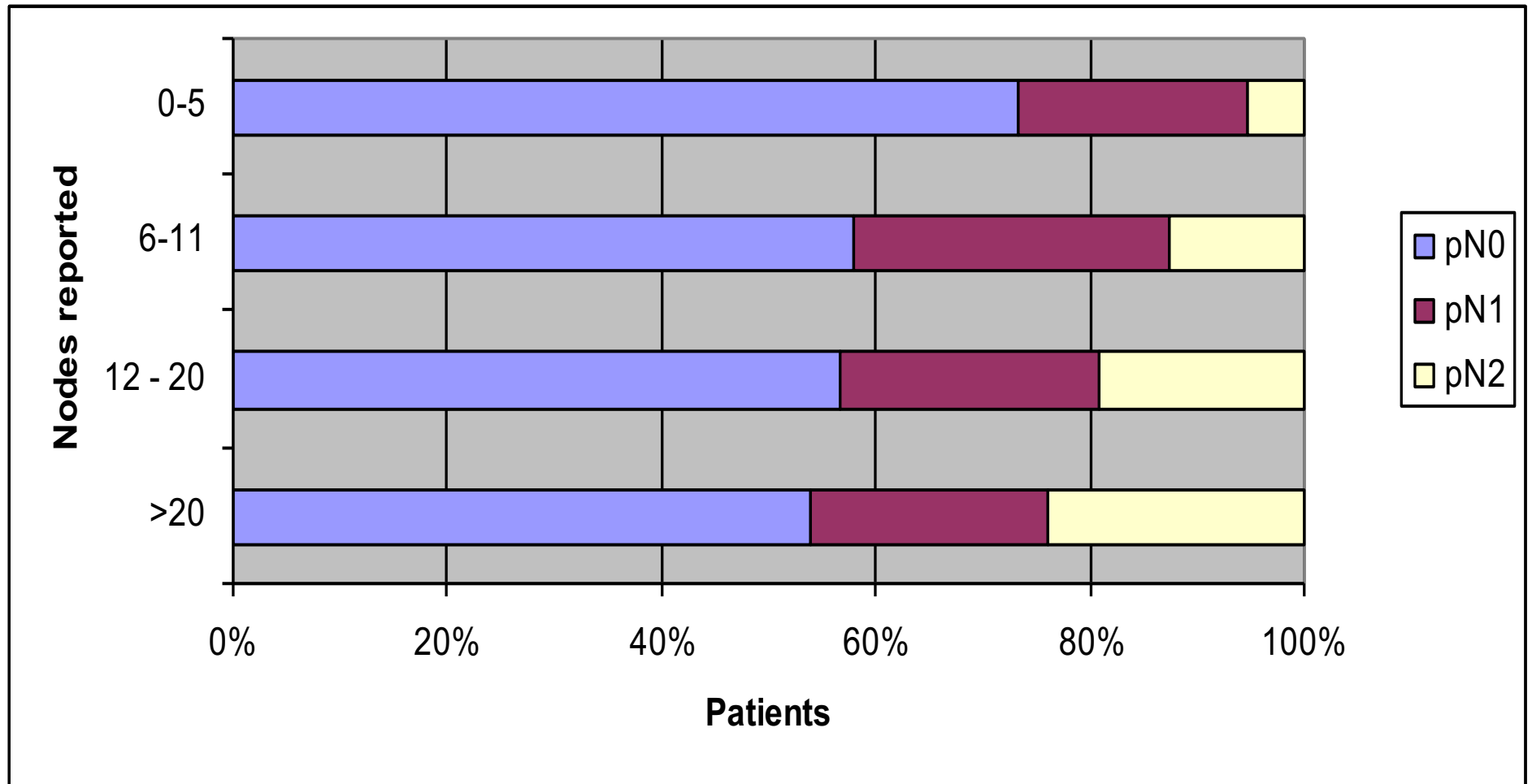
These are minimum standards with many good centres in the UK finding 18 lymph nodes as a median count, 30–40% serosal involvement and venous invasion in over 40% of cases.

The influence of the number of lymph nodes on the proportion of involved nodes in rectal cancer



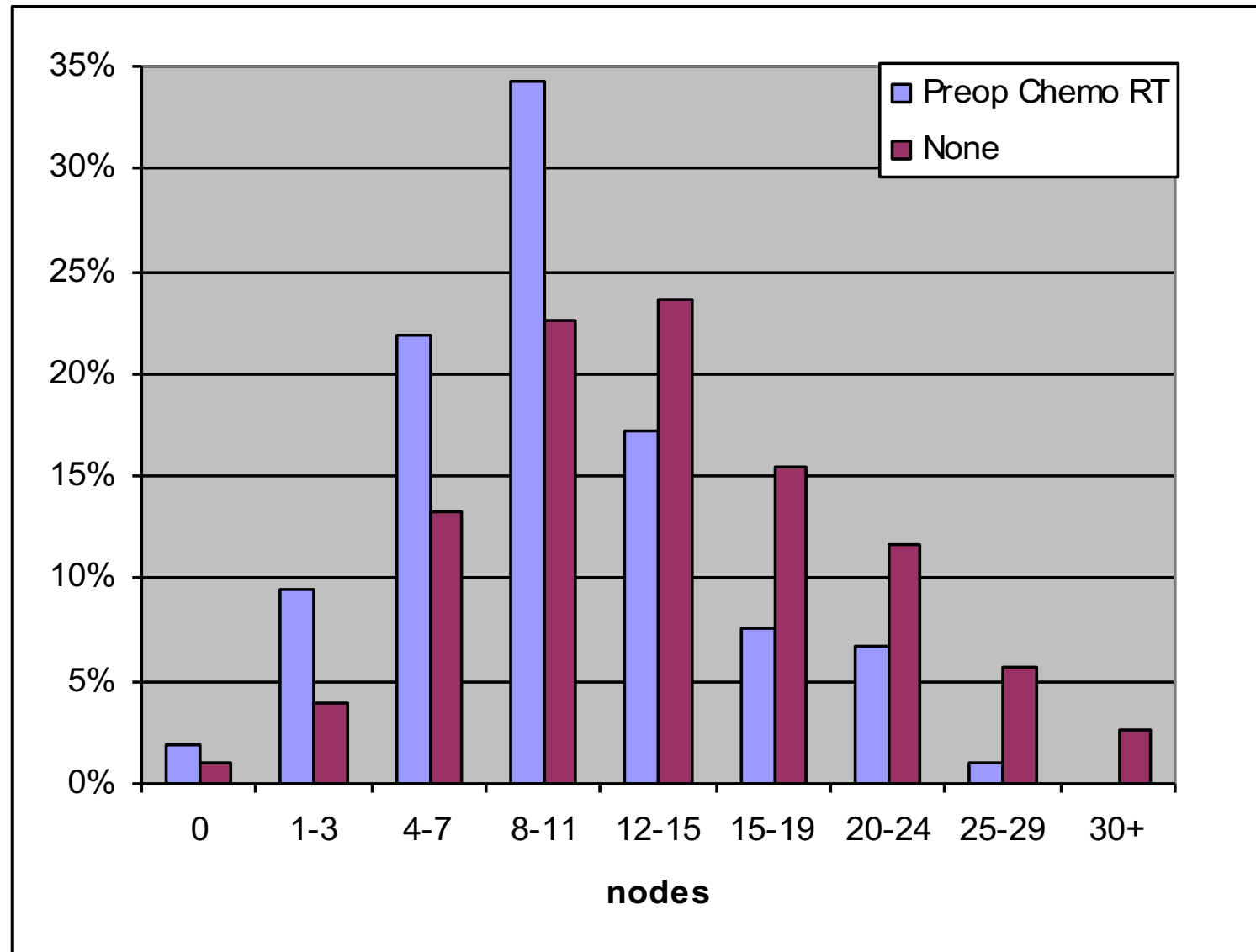
Hermanek et al, 1993

Influence of number of nodes on pN status: South & West colorectal cancer LN audit



Weekes & Shepherd, 2007

Influence of neo-adjuvant therapy on rectal LN harvest

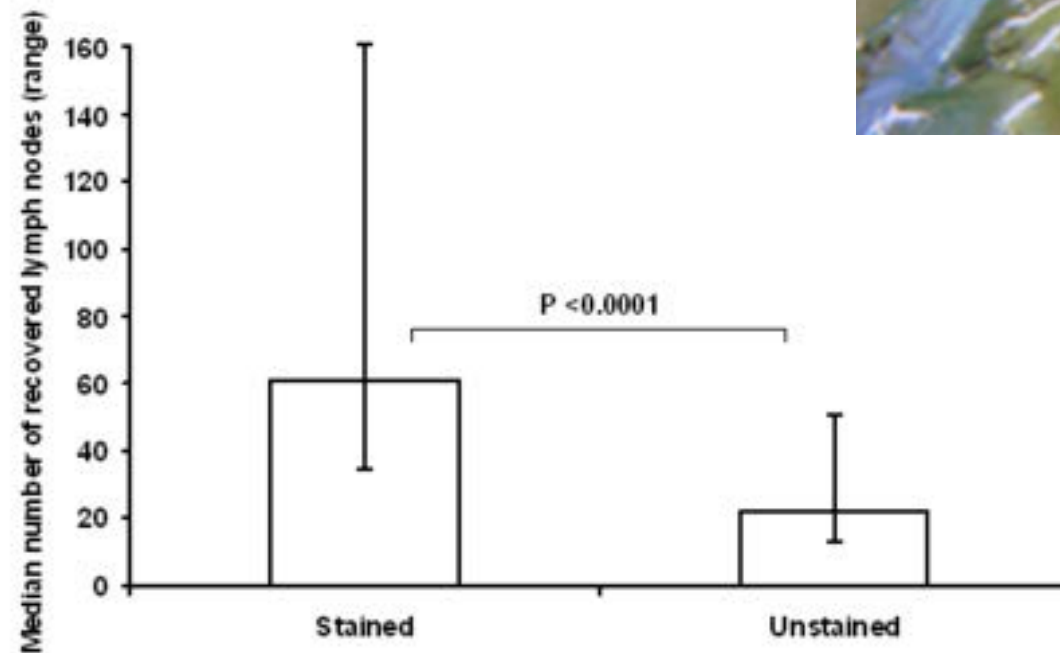


Weekes & Shepherd, 2007

What can we do to improve?

- time and motivation of pathologists and/or dissecting BMSs
- methods to improve identification of nodes:
 - fat clearance
 - tattooing
 - intra-arterial injection

Postoperative intra-arterial methylene blue injection of colorectal cancer specimens increases the number of lymph nodes recovered



Tornroos et al, 2011

What can we do to improve?

- time and motivation of pathologists and/or dissecting BMSs
- methods to improve identification of nodes:
 - fat clearance
 - tattooing
 - intra-arterial injection
- if your rates are low.....

Lymph node harvests in colorectal cancer

- lymph node involvement (hence numbers) is the most important determinant of the decision to institute adjuvant therapy
- lymph node numbers themselves are prognostically informative
- be suspicious when you see the word 'sample'
- UK pathologists are now all being assessed using this simple and readily auditable parameter

Pathologists assessing the quality of rectal surgery

muscular plane
(1 or poor)

Poor bulk to mesorectum with defects down to muscularis propria and/or very irregular CRM



intramesorectal plane
(2 or moderate)

Moderate bulk to mesorectum but irregularity of mesorectal surface. Moderate coning of the specimen toward distal margin. At not site is MP visible except at the levator insertion. Moderate irregularity of CRM

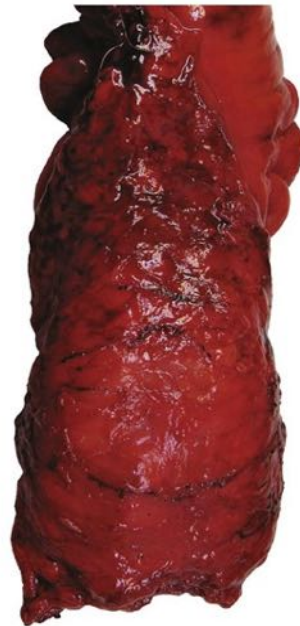


mesorectal
(3 or good)

Intact mesorectum with only minor irregularities of the smooth mesorectal surface. No defect deeper than 5mm. No coning at distal margin. Smooth CRM on sectioning.



(a) Mesorectal plane



(b) Intramesorectal plane



(c) Muscularis propria plane

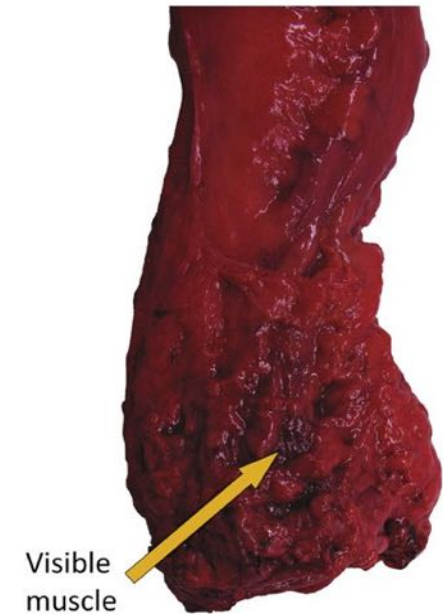


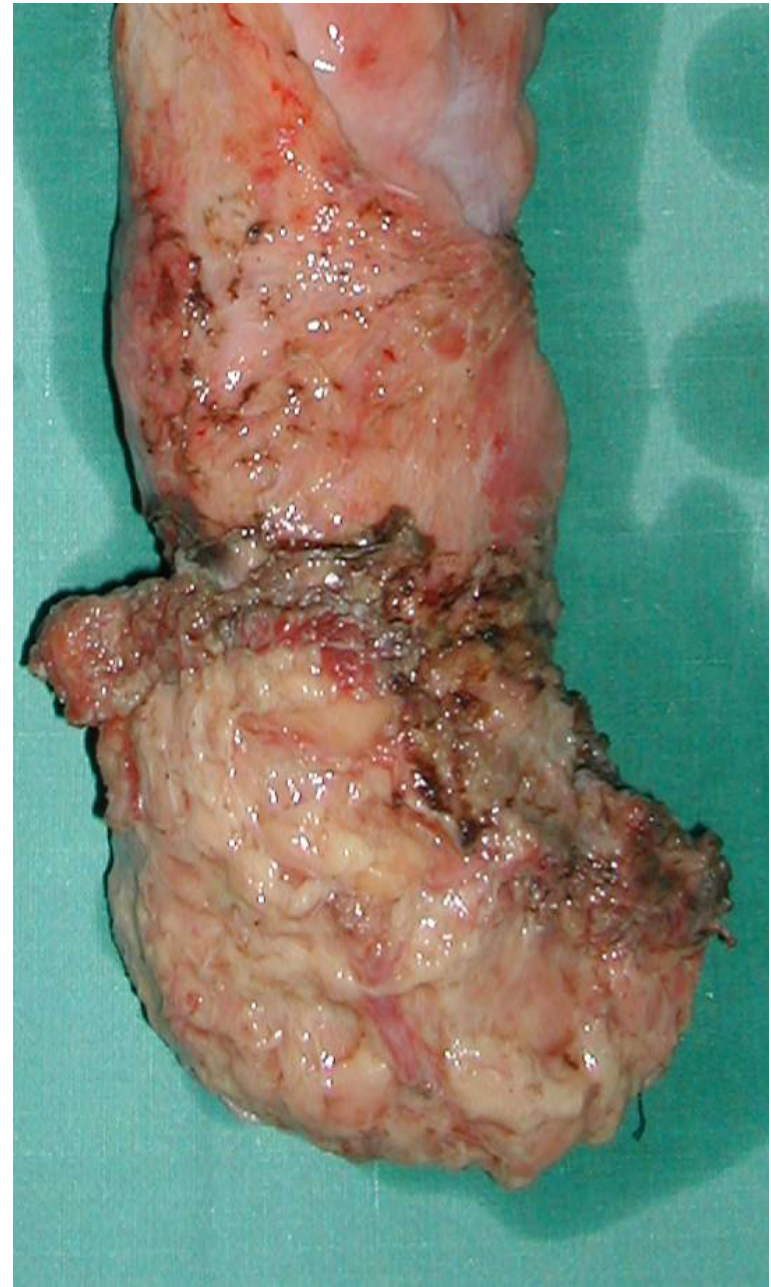
Figure 32.3 Grading the plane of surgery for the mesorectum: note the intact mesorectal envelope lined by shiny mesorectal fascia in the mesorectal plane (a); significant defects should be graded as intra-mesorectal (b) or muscularis propria (c) if they extend down to the muscle layer.

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MRC CRO7: *Sebag-Montefiore et al, 2008*

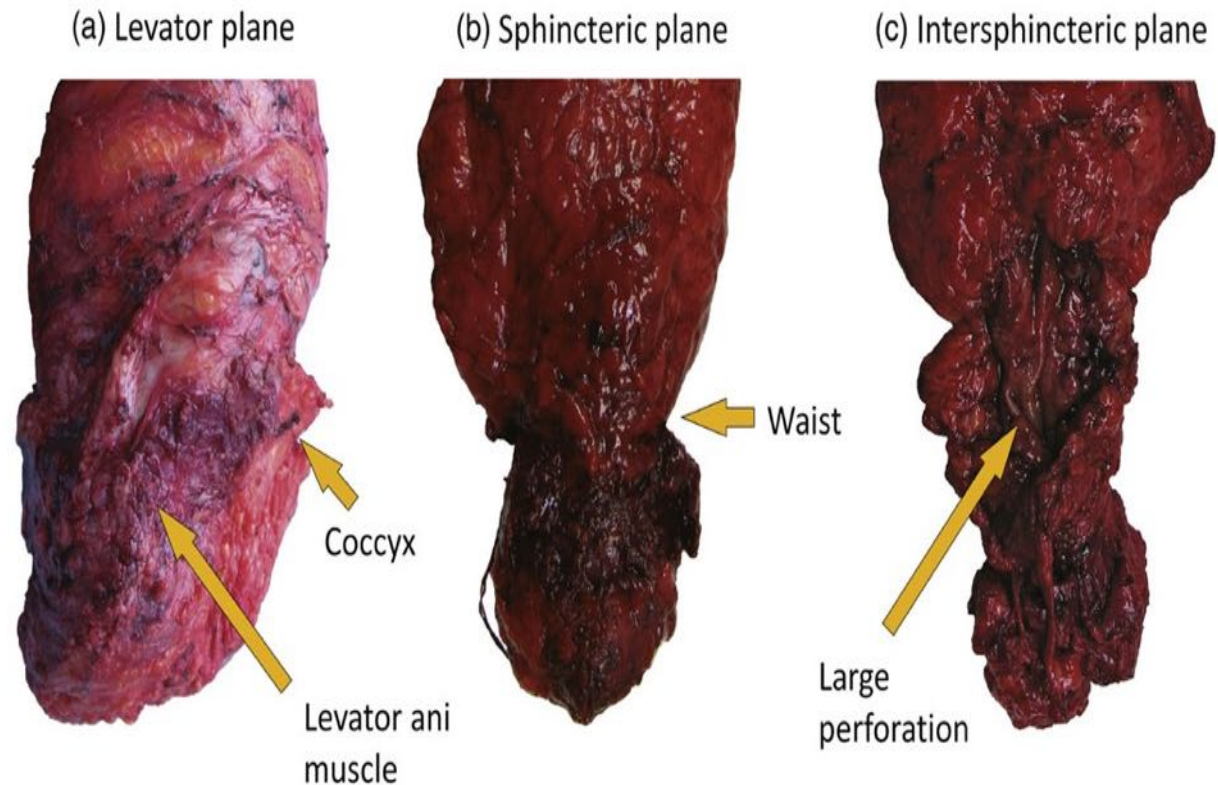
plane by pathology	pre-operative DXR	selected post-operative DXR based on CRM positivity	total
muscular plane (1 or poor)	9.0%	18.7%	14.0%
intramesorectal plane (2 or moderate)	4.5%	11.0%	7.8%
mesorectal plane (3 or good)	1.3%	6.1%	3.7%

figures are 3 year local recurrence rates



APR specimens

Figure 32.4 Grading the plane of surgery around the anal sphincters in abdomino-perineal excisions of the rectum and anus. (a) Note the adherent levator muscle in the levator excision that prevents the waisting seen (b) when following the sphincteric plane. (c) Any defects into the sphincter muscles, submucosa or lumen should be classed as an intersphincteric excision.



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How many blocks?

- Tumour blocks (4-6) to allow assessment of
 - histological type and differentiation
 - extramural spread and its extent in mm
 - tumour closest to serosal surface (NB crevices)
 - tumour in relation to non-peritonealised CRM (especially anteriorly in the rectum)
 - extramural venous invasion
 - involvement of adjacent organs

Standardise descriptions?

A right hemicolectomy specimen consisting of 47mm of terminal ileum, caecum with a 58mm appendix and 138mm of proximal colon. Although the ileo-caecal valve appears moderately prominent diffusely, suggesting lipo-hyperplasia, there is also a localised fatty nodule 11mm in diameter on the supero-posterior aspect of the valve, suggesting a lipoma. In the caecum is a polypoid tumour 34mm in axial length and 42mm in transverse diameter. There are no other polyps or tumours. [*The Shepherd approach*]
NOT 200mm of bowel.....

BUT personal preference is absolutely fine

Block-taking

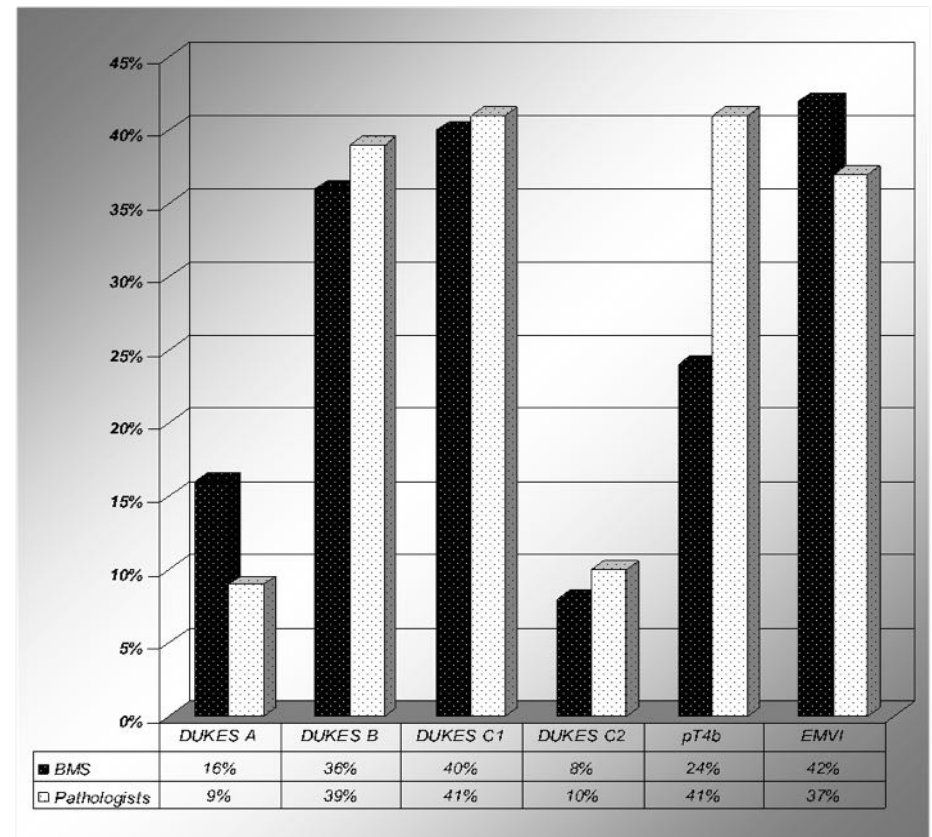
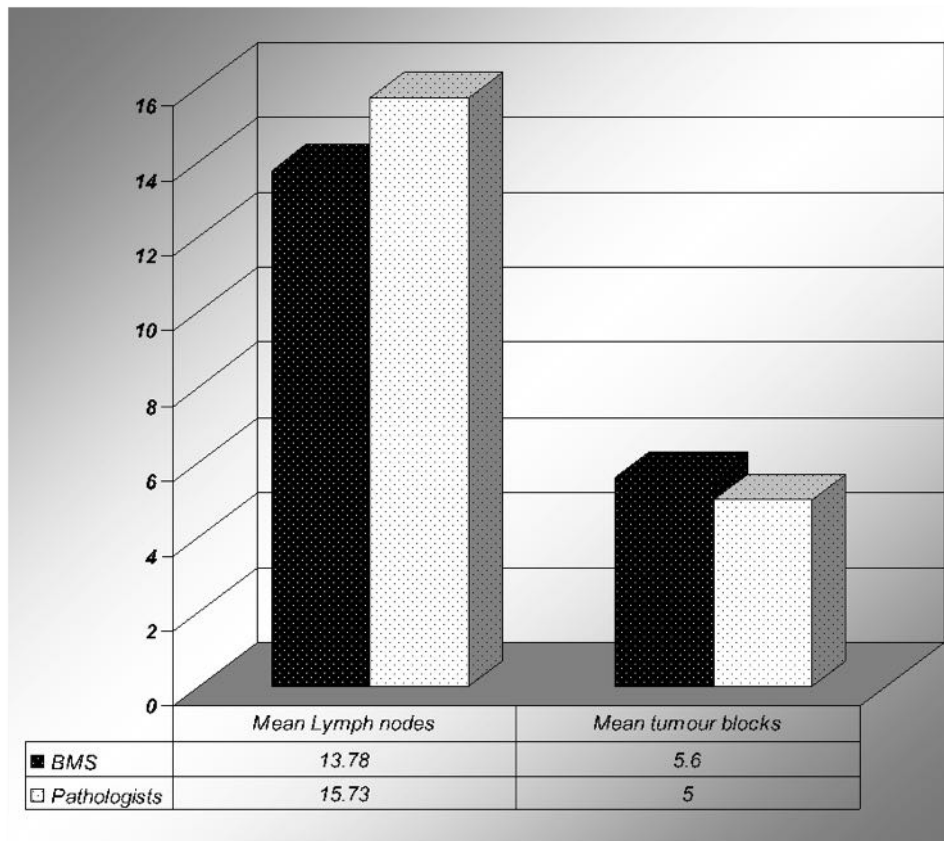
- standardised block-taking can abrogate the need for block keys (eg appendix, gall bladder, standard cancer resections)
- it should always be possible to identify where a particular block has been taken from (and hopefully why)
- a pathologist reviewing a case should be able to find his/her way around
- also helpful when molecular testing is required (K-Ras, MMR etc)

Introduction of BMS (technician) cut-up

- the vast majority of UK consultant histopathologists support biomedical scientist (BMS) cut-up to some degree
- utilisation of BMS cut-up is rather limited and patchy at present. Reasons cited are cost, staffing levels and concerns related to quality, boundaries of staff roles and the effect on training
- further measures taken by the Institute for Biomedical Sciences to extend training and examination of BMS cut-up to include more complex specimens will help provide assurance on quality and standards

Audit of enhanced BMS cut-up role in colorectal cancer reporting

DSA Sanders, AP Smith, RA Carr, SE Roberts, S Gurusamy, EJV Simmons



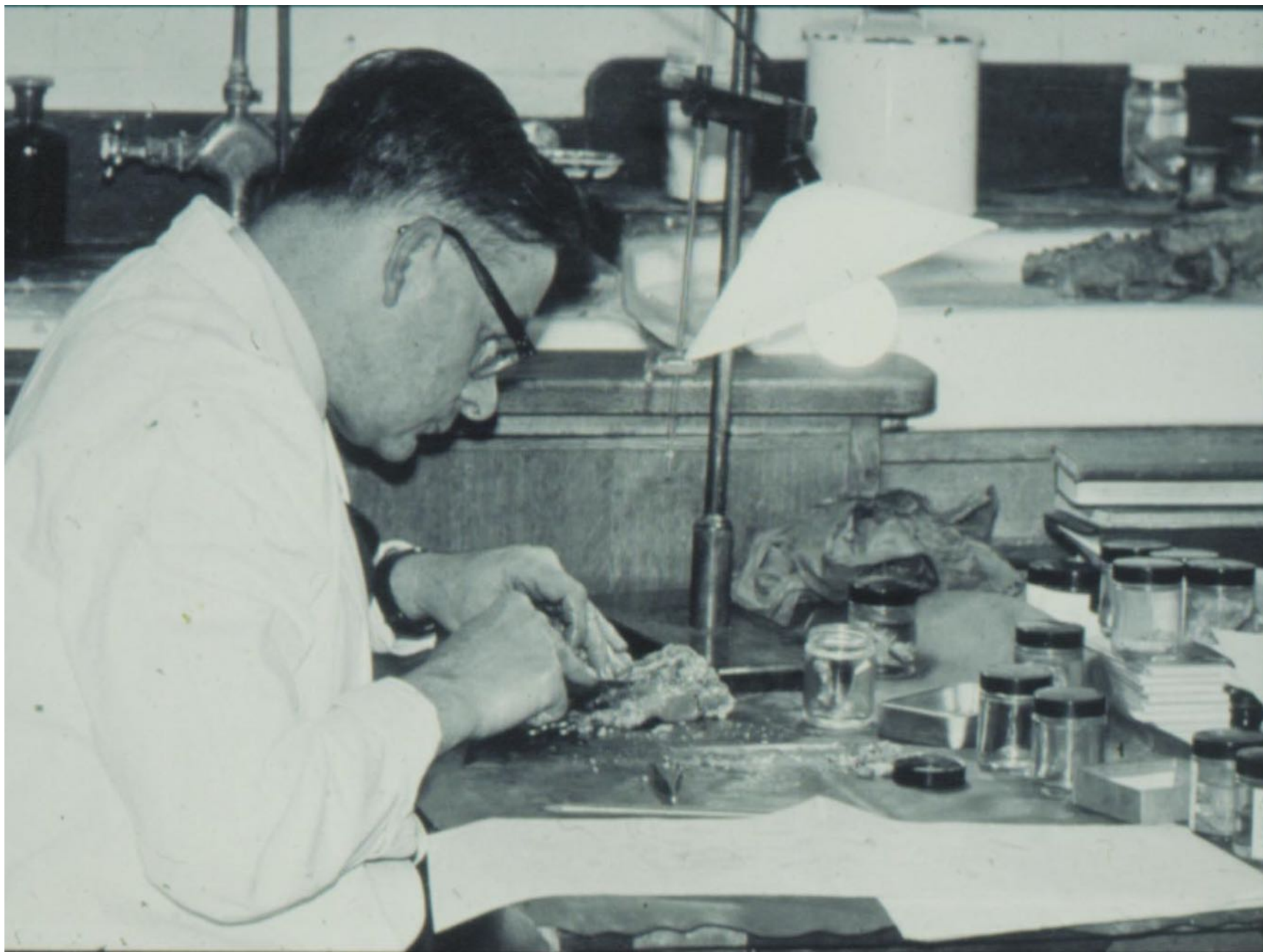
After the cut-up is done, what evidence is there of its efficacy?

- Quality of macroscopic description
 - digital dictation
 - standard dictation
 - scribe and dictate at the time of final report
- Quality is all important
 - don't show anatomical and surgical ignorance
 - standardise descriptions
 - may abrogate the need for tedious block keys:

Gall bladder: A = fundus and cystic duct margin; B = cross section of body

Appendix: A = LS of tip and XS of base margin; B = cross sections of 'body'

- Photography
 - standard for many cancers, TEMS
 - useful for certain diseases, eg CIBD



H J R 'Dick' Bussey, St Mark's Hospital, London, 1936

What we will consider in the 'lower GI' tract

Resection specimens
Polyps and local resections

Inflammatory conditions
Other benign pathologies

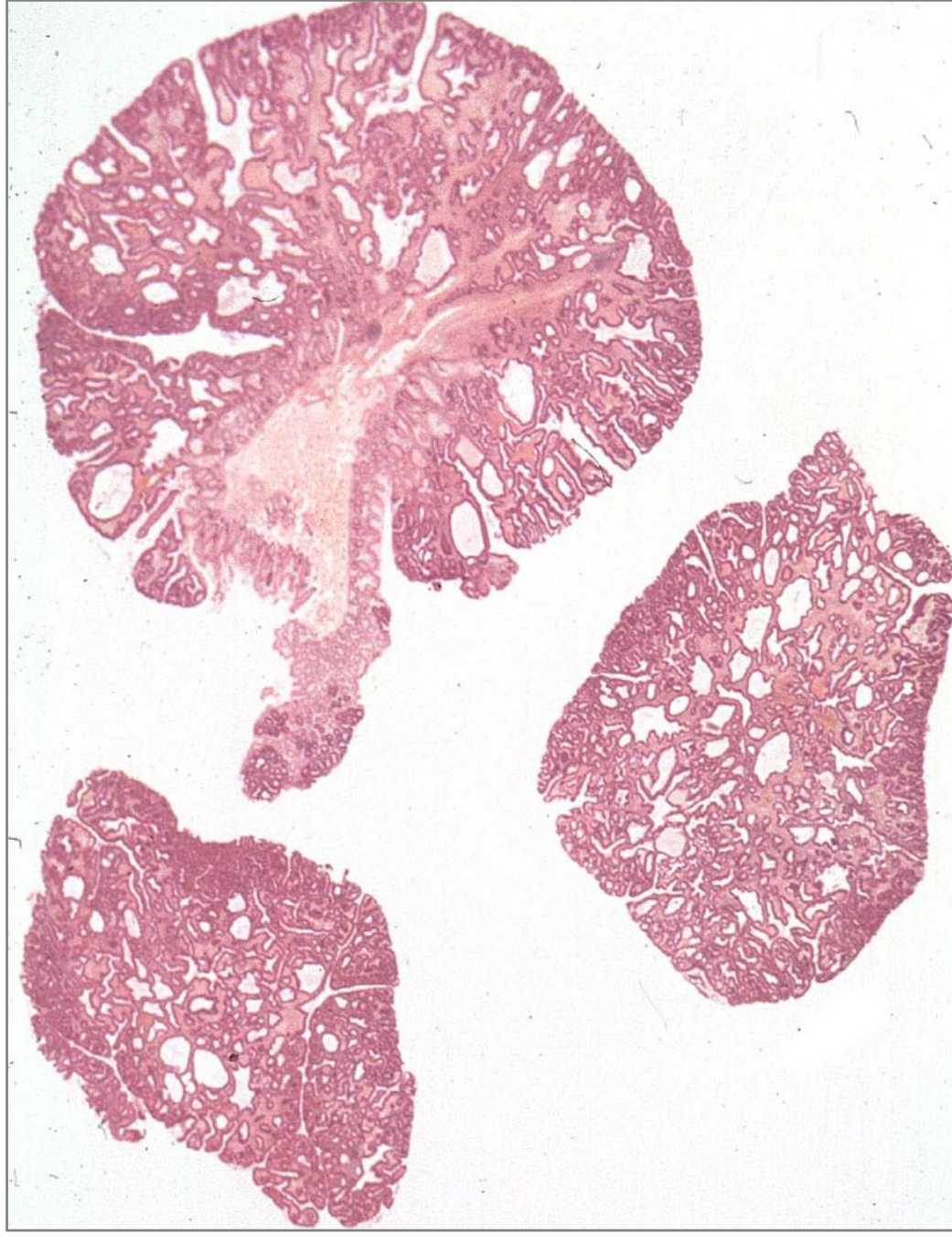
Local excisions

- polypectomy
- endoscopic mucosal resections
- transanal endoscopic microsurgical excision of rectal tumours (TEMs)

Local excisions

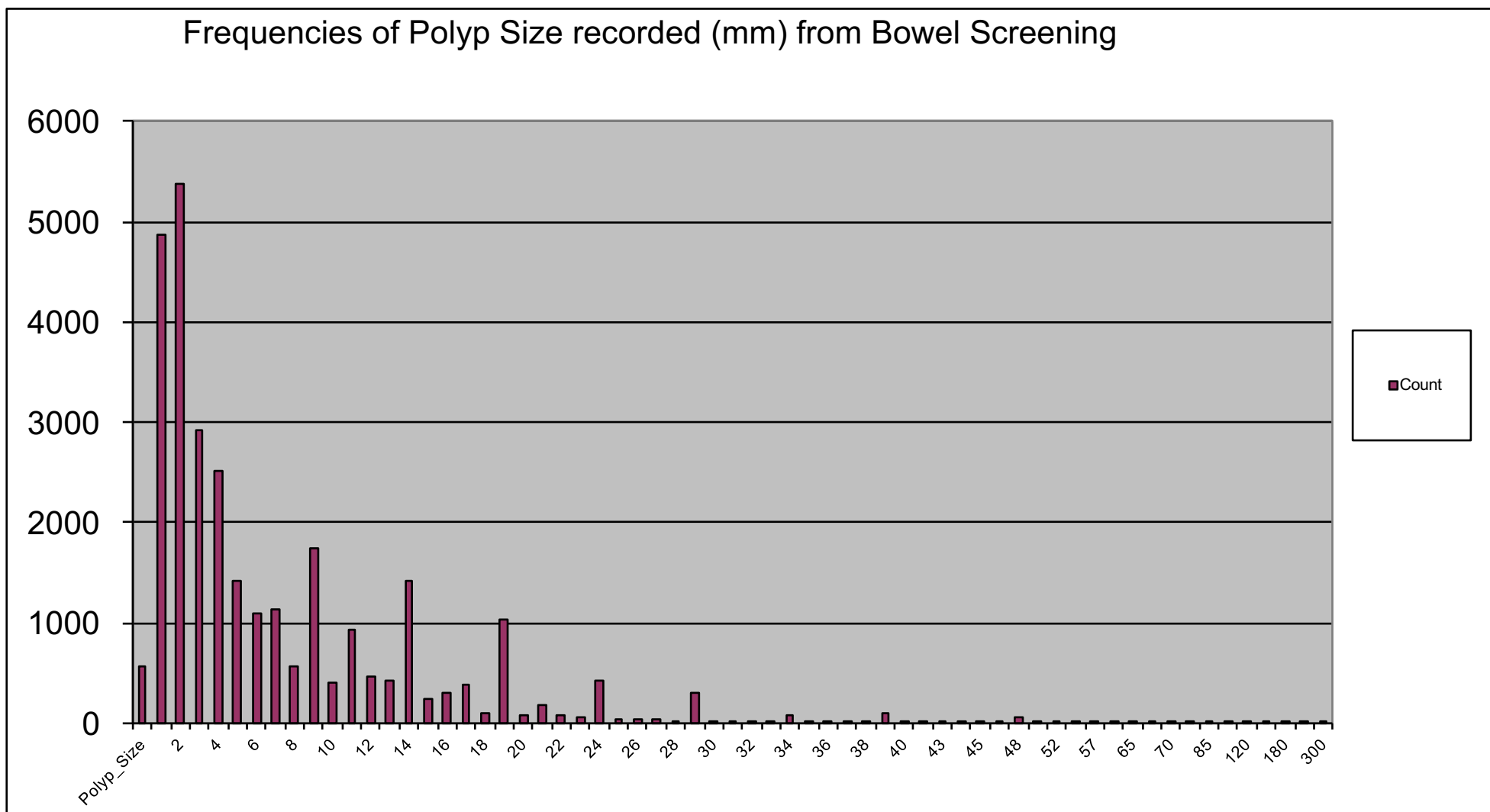
- orientation is vital
- embed the whole of the lesion to allow assessment of margins
- work with endoscopic & surgical colleagues and their staff to obtain properly presented specimens

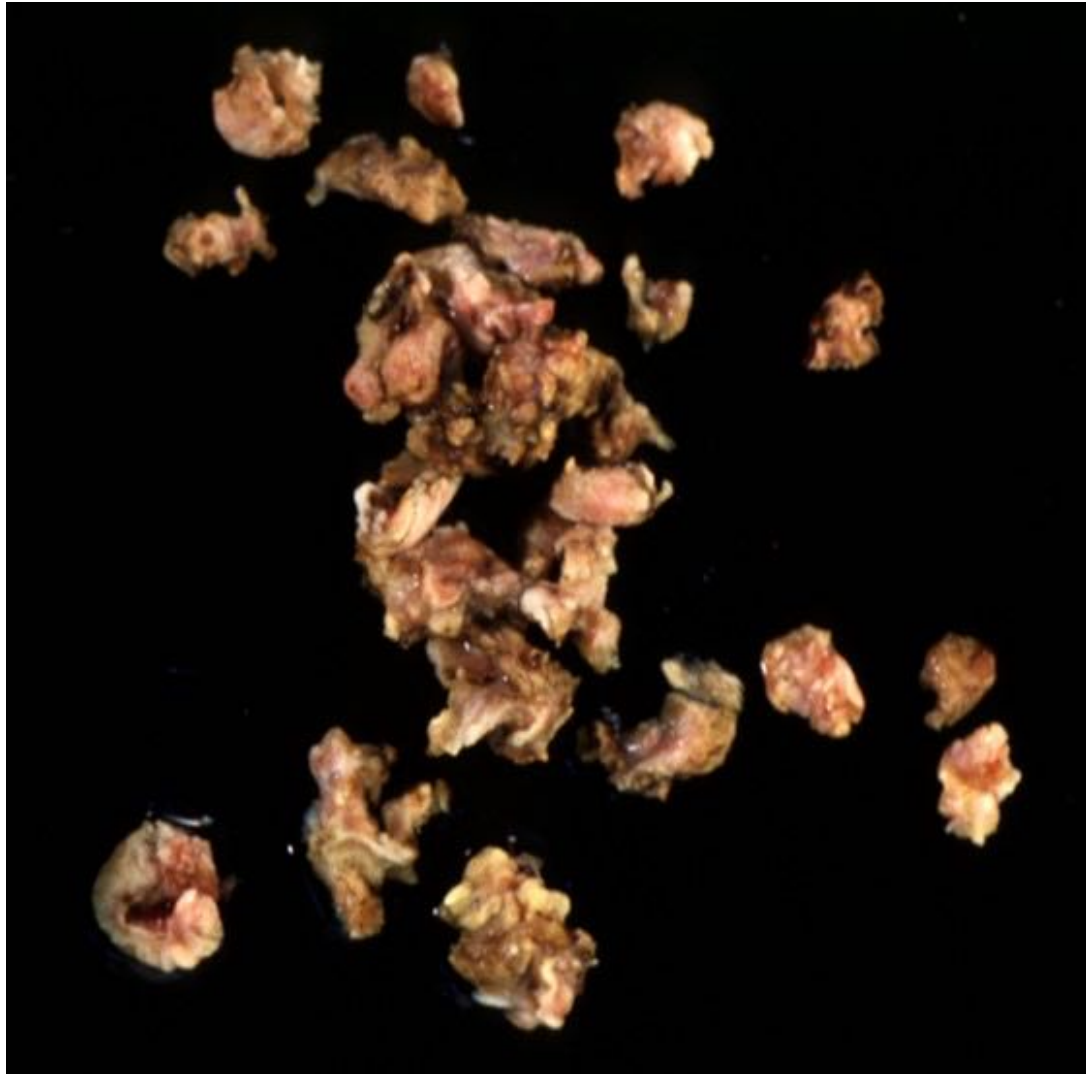




Polyp measurement in BCSP

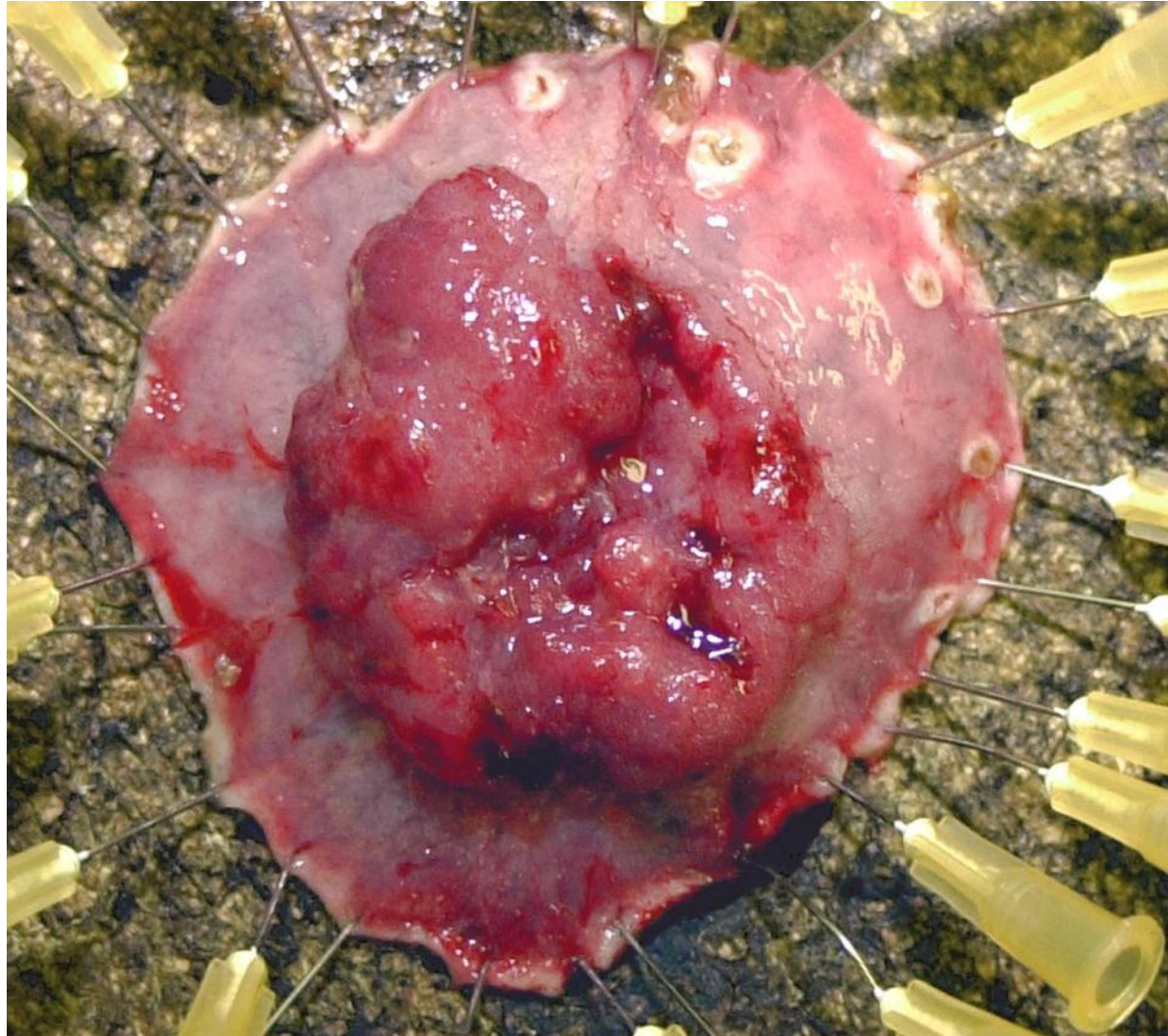
Terminal digit preference





TART.....

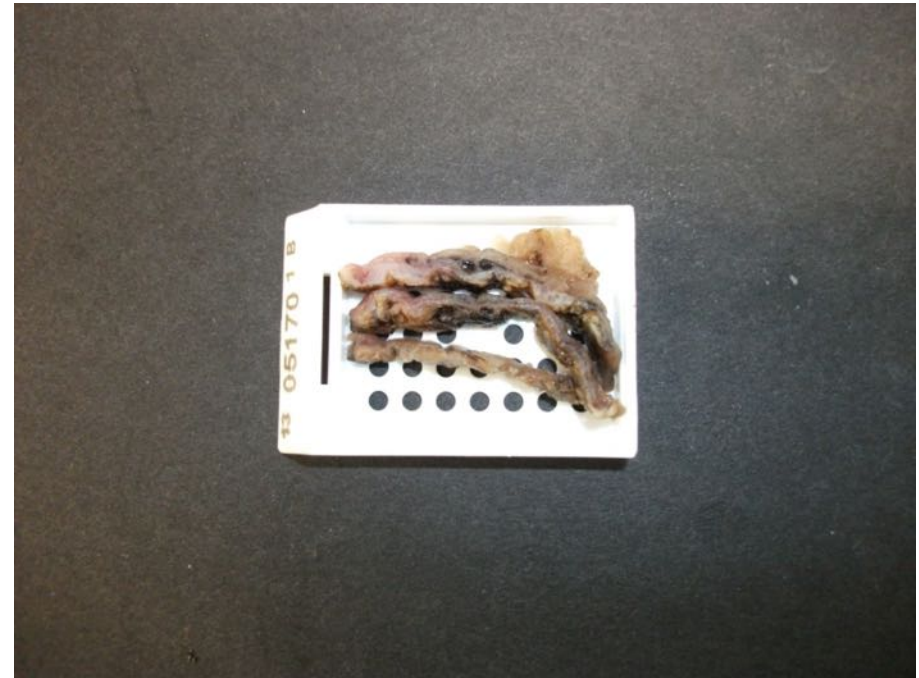
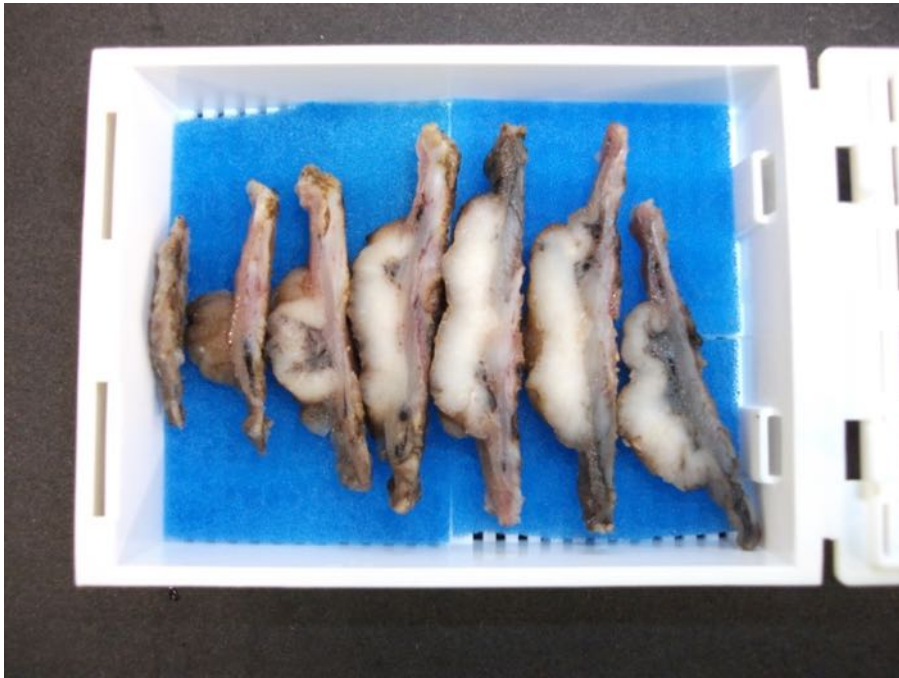
TEMS



A rectal TEMS



A rectal TEMS: economy of blocks (and work for BMSs and you!)



What we will consider in the 'lower GI' tract

Resection specimens
Polyps and local resections

Inflammatory conditions
Other benign pathologies

Inflammatory bowel disease

macroscopic pathology is just as important as microscopic pathology to differentiate UC, CD and indeterminate colitis

Table 35.1 Macroscopic differences in the pathology of ulcerative colitis and Crohn's disease in the large intestine

Ulcerative colitis	Crohn's disease
Disease in continuity	Disease usually discontinuous
Rectum almost always involved	Rectum normal in 50%
Terminal ileum involved in 10%	Terminal ileum involved in 30%
Granular and ulcerated mucosa (no fissuring)	Discretely ulcerated mucosa; cobblestone appearance; fissuring
Often intensely vascular	Vascularity seldom intense
Normal serosa (except in acute fulminating colitis)	Serositis common
Muscular shortening of colon; fibrous strictures very rare	Shortening due to fibrosis; fibrous strictures common
Never internal spontaneous fistulae	Enterocutaneous or intestinal fistulae in 10%
Inflammatory polyps common and extensive	Inflammatory polyps less prominent and less extensive
Dysplasia and malignant change well recognised	Malignant change possibly less common
Anal lesions in less than 25%; acute fissures, excoriation and oedematous anal tags less common	Anal lesions in 75%; anal fistulae (often multiple); anal ulceration

Fat-wrapping in Crohn's disease



Ulcerative colitis

- ‘Ulcerative colitis goes up to where it stops’

The late Professor Bryan Warren

- the caecal patch lesion of UC



Indeterminate colitis

- diagnosis made only in resection specimens
- 10-20% of colectomies, especially 'fulminant' colitis
- some features of UC and Crohn's
- generally behave as UC
- cautious positive approach to pouch surgery



What we will consider in the 'lower GI' tract

Resection specimens
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Other benign pathologies

Intestinal resections for ischaemia

- It is important to confirm ischaemic change but also determine the cause of the ischaemia:
 - mechanical
 - arterial
 - venous
 - vasculitis
 - obscure vascular pathologies
- assessment of margins, the interface of 'normal' & ischaemic macroscopically and frank infarcted segments
- AND the mesentery – multiple transverse blocks, including surgical tie-offs

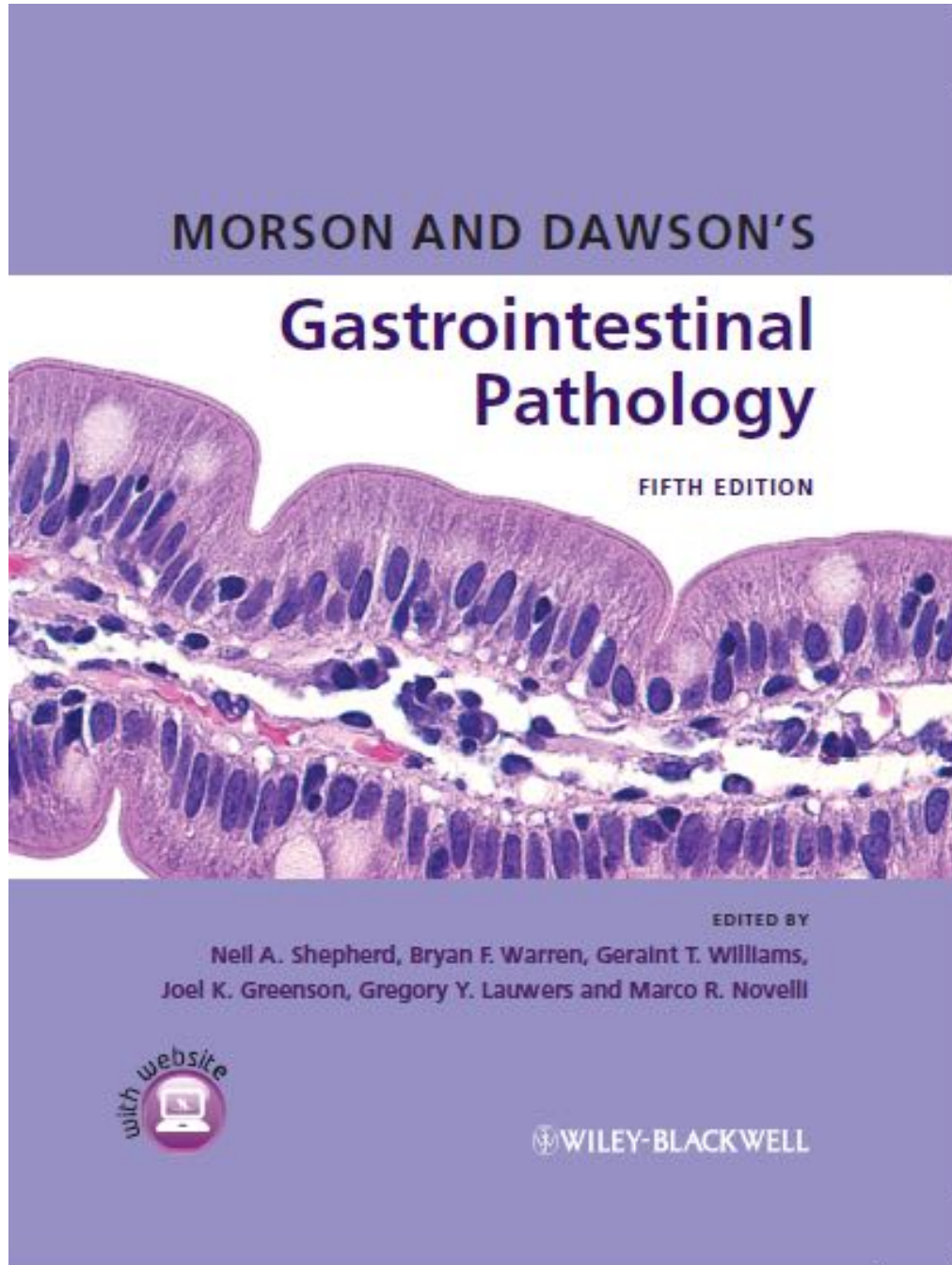
Take home messages

- appropriate receipt, preparation, photography and macroscopic dissection of specimens are critical for accurate intestinal pathological practice
- the quality of pathology is all important in colorectal cancer management
- the macroscopic assessment of CRC is just as important as the microscopic analysis
- pathologists are being assessed by standards in CRC reporting, two of which are strongly influenced by the macroscopic assessment
- the differential diagnosis of inflammatory bowel disease is critically dependent on the macroscopic pathological features
- please take post-operative specimens and ischaemic bowel resections seriously

More take home messages

- clean, tidy, 'standardised' assessment
- good macroscopic description showing anatomical and surgical knowledge
- economy of blocks
- accurate measurement in millimetres with no terminal digit preference
- sensible use of gelatin rather than paint may be possible
- photography is cheap and easy
- BMS cut-up increasing when appropriate and suitably trained
- microscopy cannot undo a poorly performed and executed macroscopic assessment, dissection and description

Further reading



Datasets and guidelines

Colorectal cancer, v3

July 2014

at:

www.rcpath.org

Acknowledgements

Neil Shepherd
Maurice Loughrey
Phil Quirke
Bryan Warren
Geraint Williams

Royal College of Pathologists

Thank you for listening!

Any questions?