Gynaepathology reporting

What *really* matters

When and Why

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Cardiff

Histopathology reporting practice

A critical re-appraisal

Prostate biopsy report

Precise scientific data

B) (Left lobe) 6 cores of prostate are seen of which 4 are infiltrated by acinar invasive prostate adenocarcinoma of Gleason patterns 3 and 4. Gleason sum 3 + 4 = 7. Gleason pattern 4 accounts for 25%. WHO Grade Group 2. Background multifocal PIN.

The dimension of the tumour and the volume of tumour (given as a %) in each core is as follows: 2mm (12%), 0.2mm (1%), 0.2mm (1%), 3mm (16%).

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Lets focus on the big (pseudo-scientific?) picture

Pathology data

- **Why** do we collect data?
- **Who** do we collect data for?
- **What** data do we collect?

Pathology data

- **Why** do we collect data?
- **Who** do we collect data for?
- **What** data do we collect?

See handout for details

Pathology data

- **Why** do we collect data?
- **Who** do we collect data for?
- **What** data do we collect?
- **How** do we collect data?

Pathology data

- **Why** do we collect data?
- **Who** do we collect data for?
- **What** data do we collect?
- **How** do we collect data?
- **Do** we need to change?

Pathology data

- **Why** do we collect data?
- **Who** do we collect data for?
- **What** data do we collect?
- **How** do we collect data?
- **Do** we need to change?
- **How** do we change?

How do we collect data?

- **Accurate data**
  - ***Lengths and percentages***

Pathology measurements: examples

- **Lengths**
  - **Specimen** size
  - **Tumour** size (Macro and Micro)
  - Distance to **margins**

Pathology measurements: examples

- **Lengths**
  - **Specimen** size
  - **Tumour** size (Macro and Micro)
  - Distance to **margins**
- **Percentages**
  - % **necrosis** in RCC

Precise measurements

3. Sections of breast show two foci of a grade 1 invasive mammary carcinoma that I would consider to be of tubular/cribriform type. The first focus, seen macroscopically, measures 11.6 mm across. This is associated with intermediate grade ductal carcinoma in situ of cribriform pattern that lies within the invasive tumour. The tumour extends to 0.1 mm from the deep margin and 5.7 mm from the anterior margin. The other margins are further away. A second focus lies in the lateral part of the specimen. This measures 1.7 mm across is 15 mm away from the main tumour. It is 1.7 mm from the deep margin and 2.7 mm from the lateral margin. In addition, in the medial part of the specimen there is a separate focus of intermediate grade ductal carcinoma in situ of solid pattern that measures 1.3 mm across. This lies >5 mm from the deep and anterior margins, which are the nearest. No lymphovascular invasion is seen.

Tumour sizes: 1.7mm and 11.6mm

Distances from margin: 1.7mm, 2.7mm, 5.7mm …

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Distances from margin: 1.7mm, 2.7mm, 5.7mm …

Pseudo-precision?

Tumour size

What are we trying to determine?

Tumour size

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- Size in **slide**?

Pathology measurements

Causes of variation

- **In slide**
  - Difference between sections (levels)

Tumour size

What are we trying to determine?

- Size in **slide**?
- Size in **tissue block**?

Pathology measurements
Causes of variation

- **In slide**
  - Difference between sections (levels)
- **In block**
  - Unexamined material in block

Tumour size

What are we trying to determine?

- Size in **slide**?
- Size in **tissue block**?
- Size in **specimen**?

Pathology measurements
Causes of variation

- **In slide**
  - Difference between sections (levels)
- **In block**
  - Unexamined material in block
- **In specimen**
  - Sampling error

Tumour size

What are we trying to determine?

- Size in **slide**?
- Size in **tissue block**?
- Size in **specimen**?
- Size in **patient**?

It's what's in the patient that counts

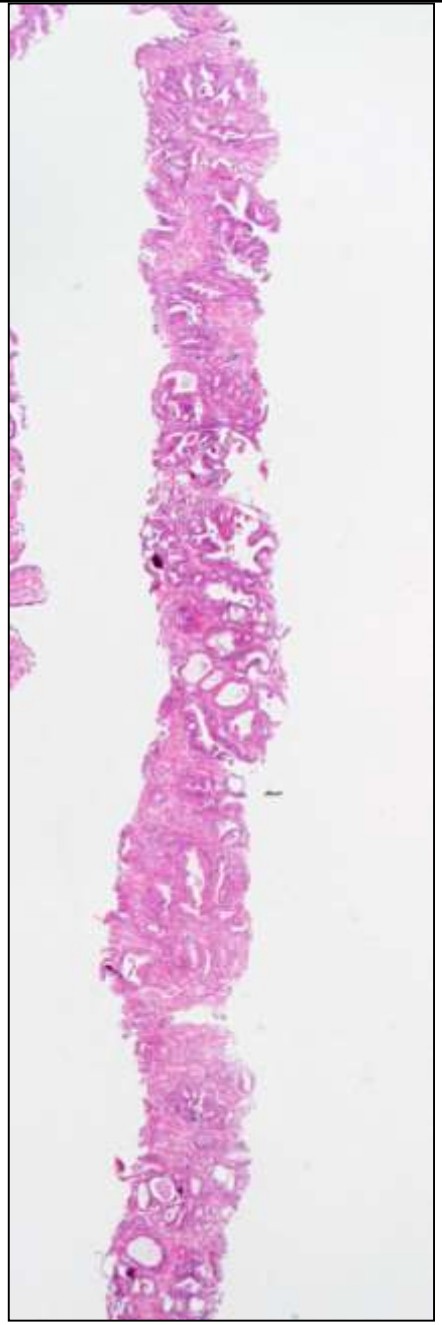
All others are surrogate estimates

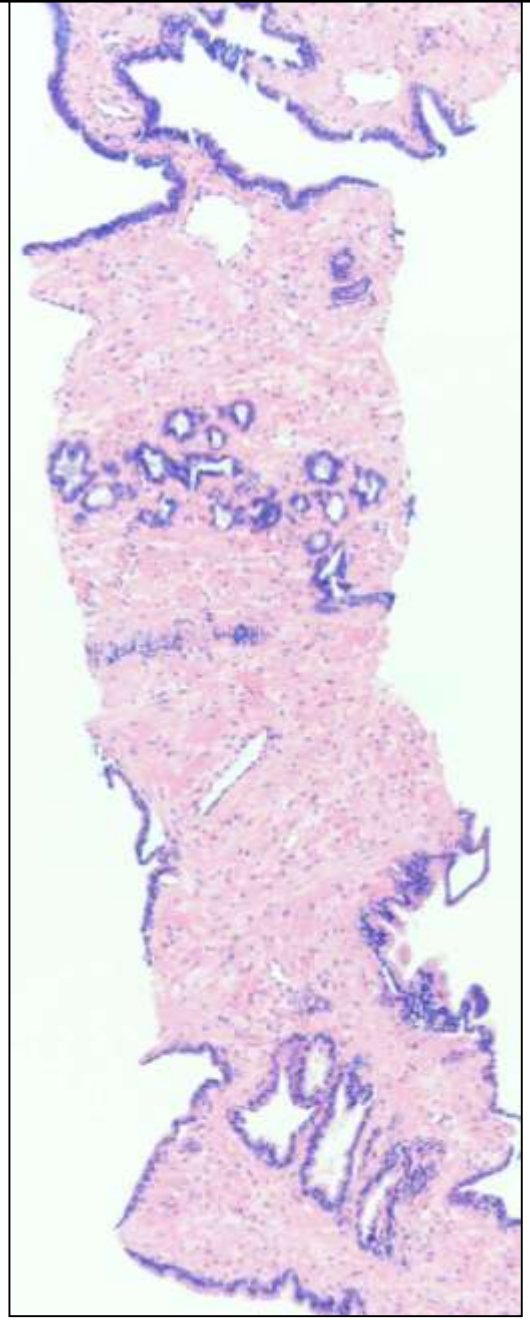
Measurements: *perfect precision not required*

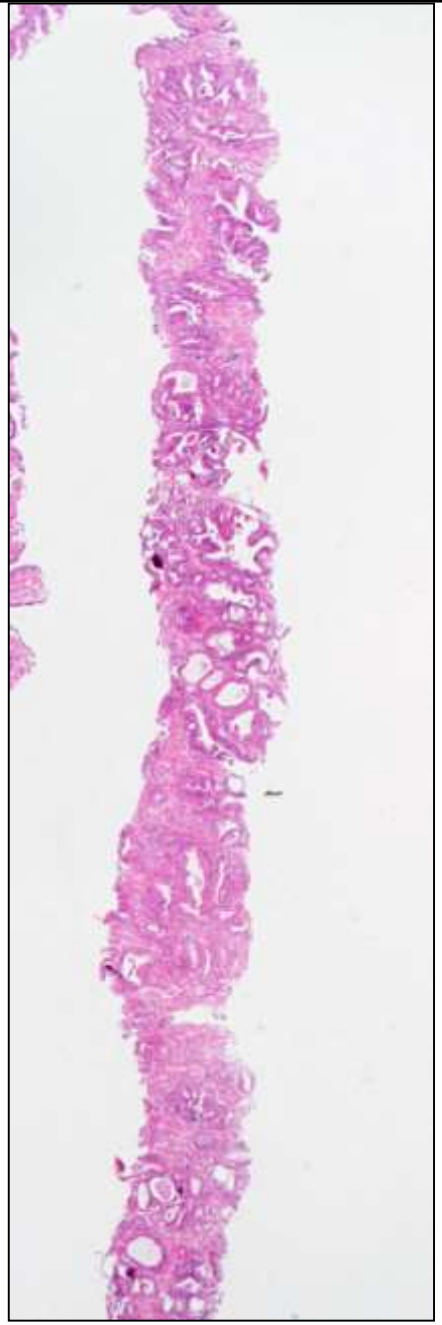
- **Size/distances (mm)**
  - **To nearest mm (or <1mm)**
    - "2.1mm" is meaningless
      - May be different in other levels or blocks
      - Cannot eyeball distinguish 2.1 from 2.3mm so would require measuring multiple levels/blocks!

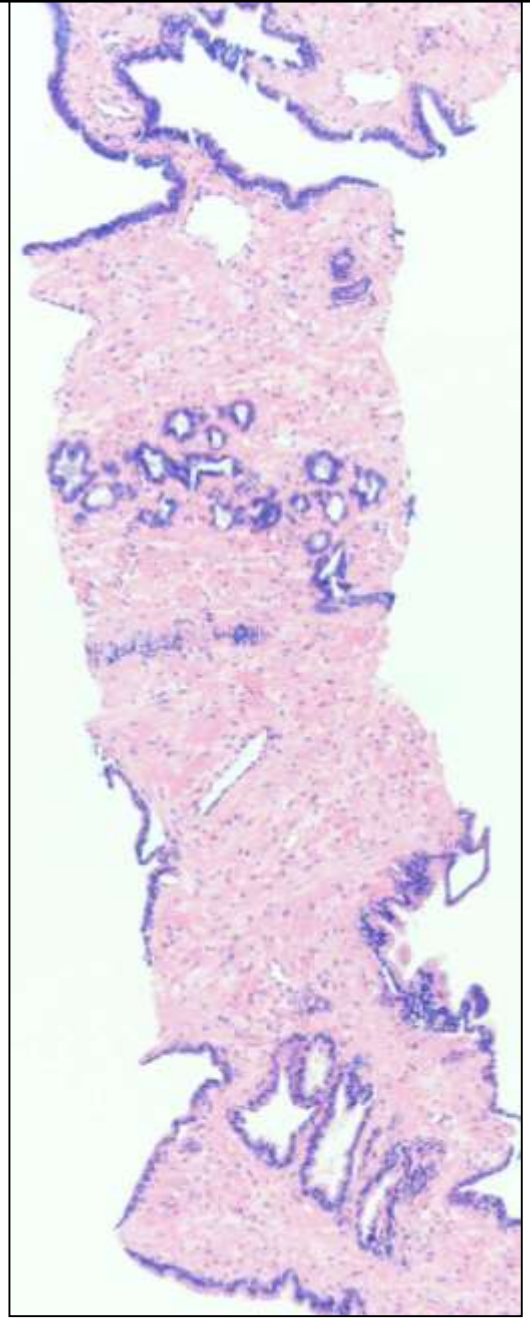
Measurements: *perfect precision not required*

- **Size/distances (mm)**
  - **Use field diameter of objective lenses**

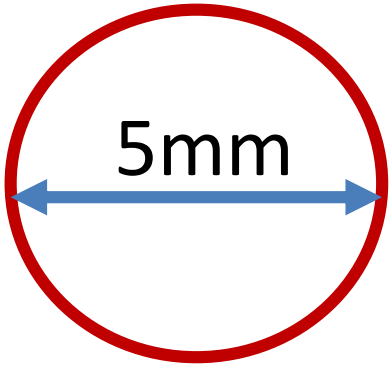




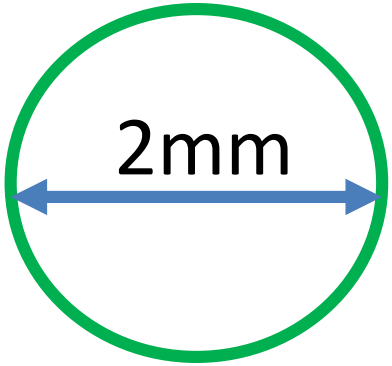


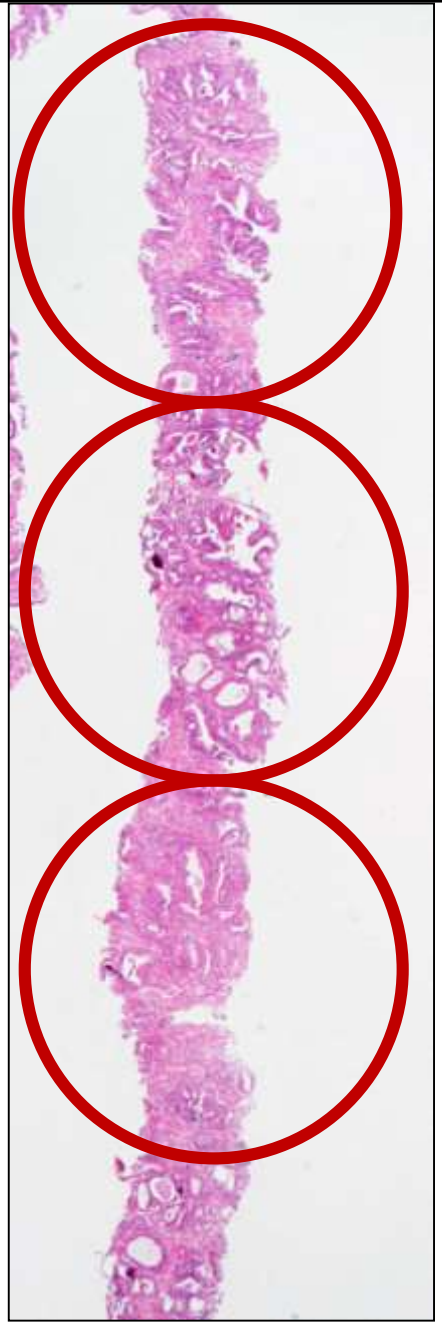


x4

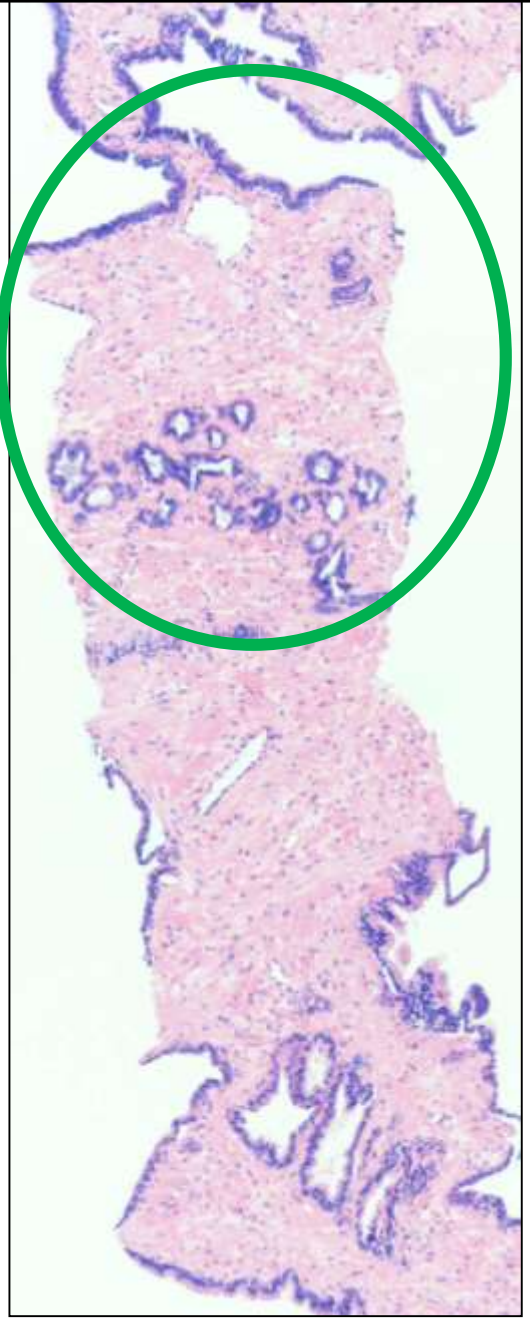


x10



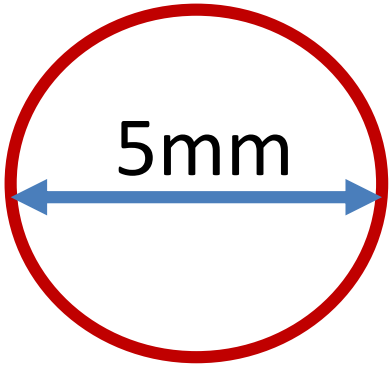


16mm



1mm

x4



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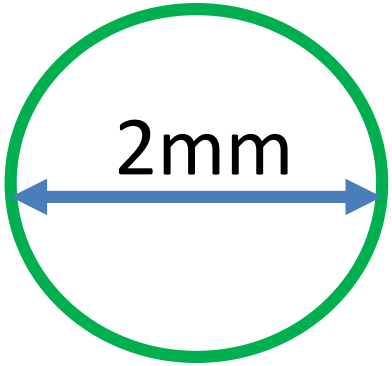

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  - **Well clear margins:**

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- **Size/distances (mm)**
  - To nearest mm (or <1mm)
  - **Well clear margins:** >5mm/10mm?

Pathology measurements: examples

- **Percentages**
  - % **necrosis** in RCC

Is percentage necrosis logical?

- Depends on sampling protocol

Is percentage necrosis logical?

- **Depends on sampling protocol**
  - 1 of 5 blocks from necrotic area: 20%
  - 3 of 5 blocks from necrotic area: 60%

Tumour grading/staging

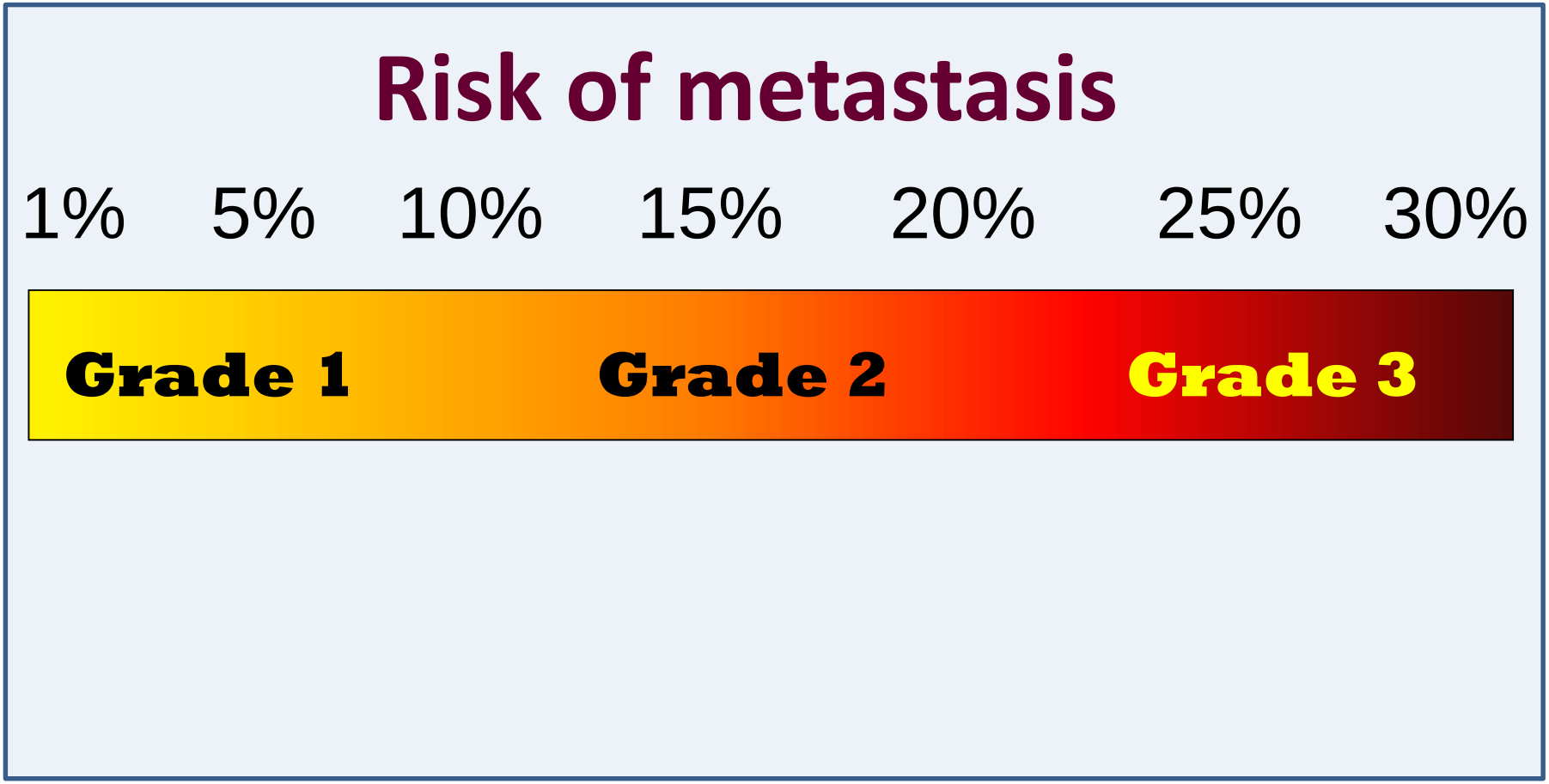
- A clinical continuum with arbitrary cut-offs

Endometrial cancer grading

- A **morphological** continuum

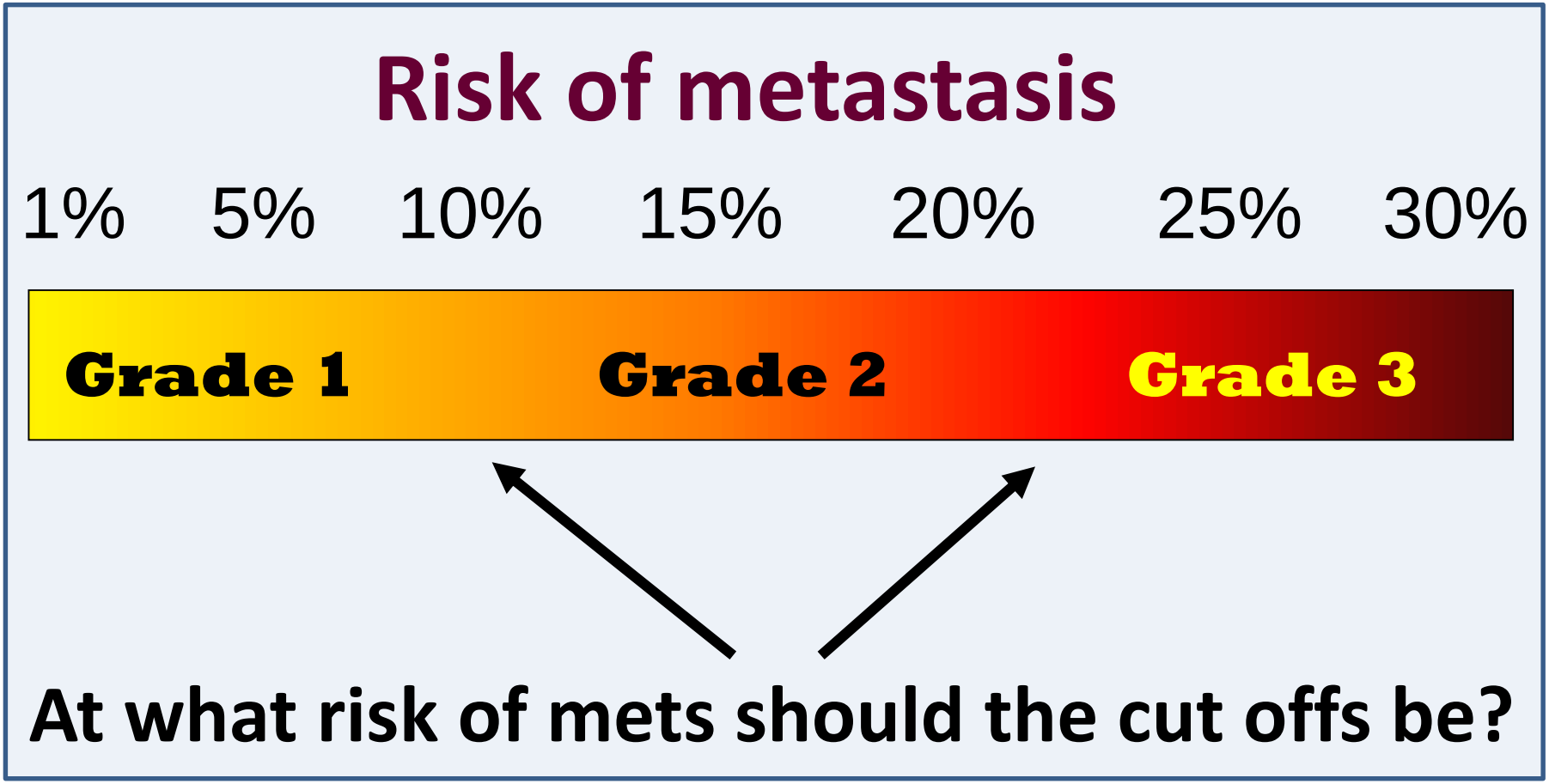
Endometrial cancer grading

- A **clinical** continuum with arbitrary cut-offs

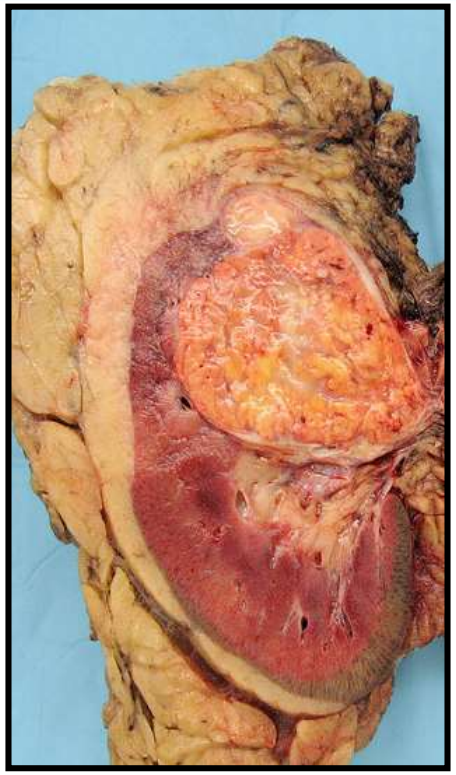


Endometrial cancer grading

- A **clinical** continuum with arbitrary cut-offs



RCC staging



pT1
(up to 70mm)

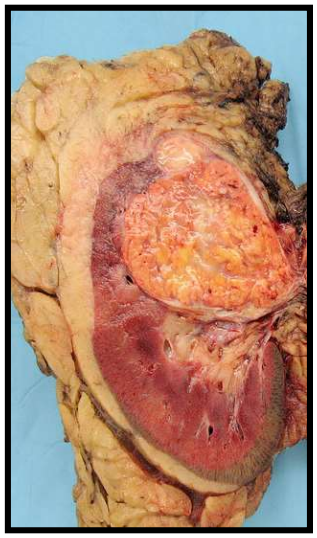
pT2
(>70mm)

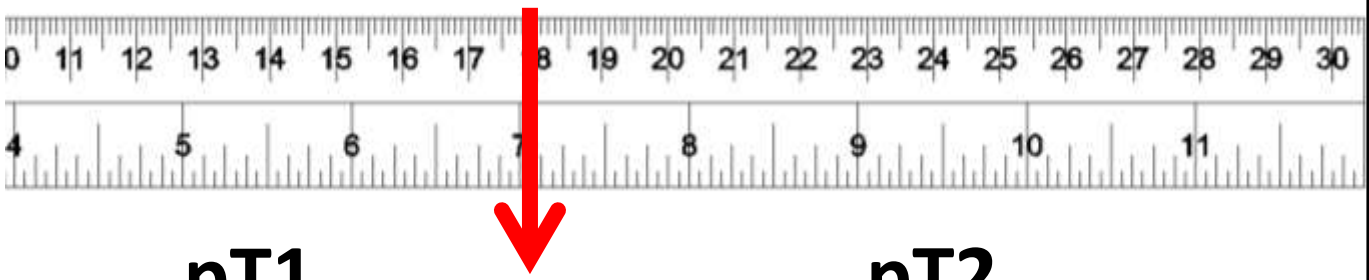
Staging/Grading
A clinical continuum

- A 71mm (pT2) RCC not more aggressive than 69mm (pT1) tumour

Staging/Grading
A clinical continuum

- A 71mm (pT2) RCC not more aggressive than 69mm (pT1) tumour
- A bad “low-grade” not biologically different from a good “high-grade” tumour





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pT2
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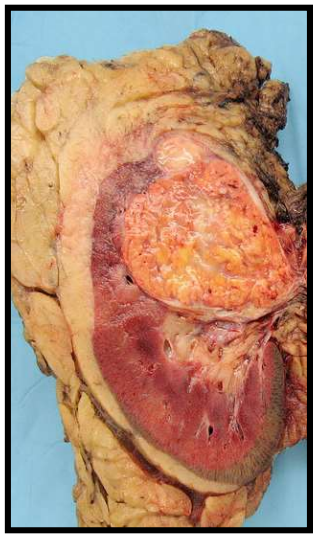
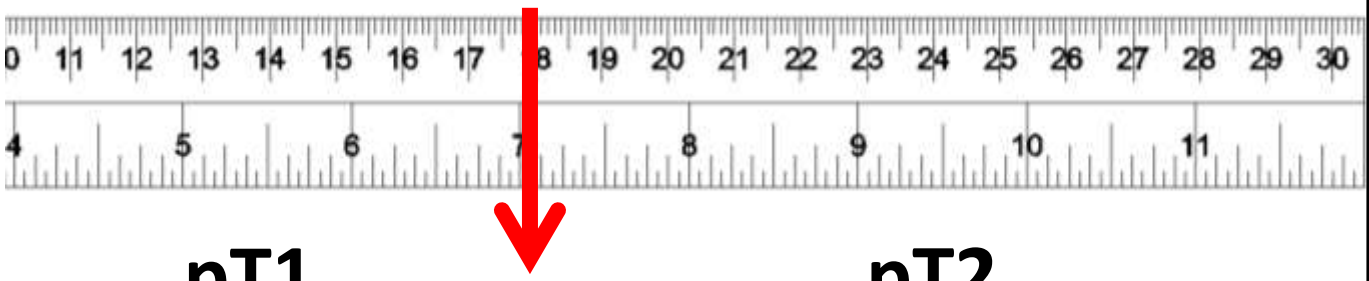
- **We report dimension in mm not just stage**
  - pT2 may be 71mm or 151mm





pT1
(up to 70mm)

pT2
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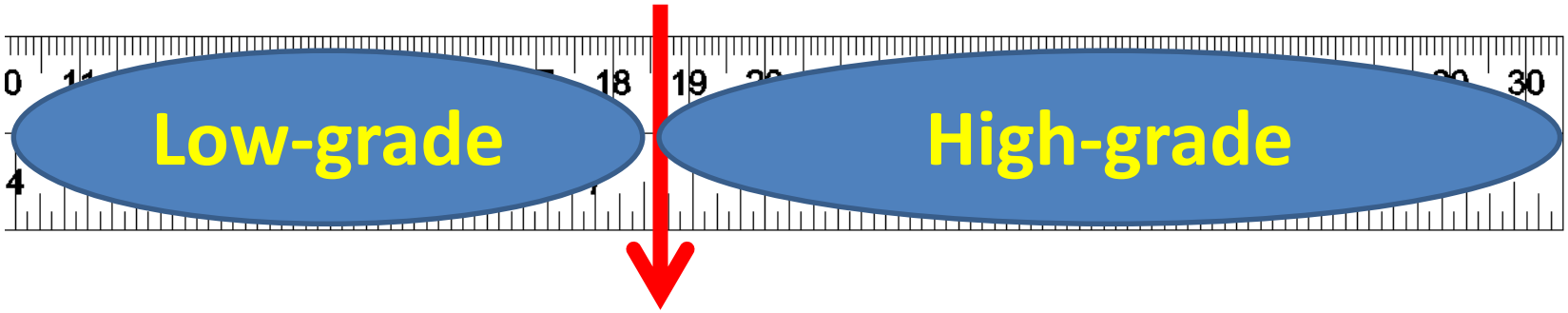
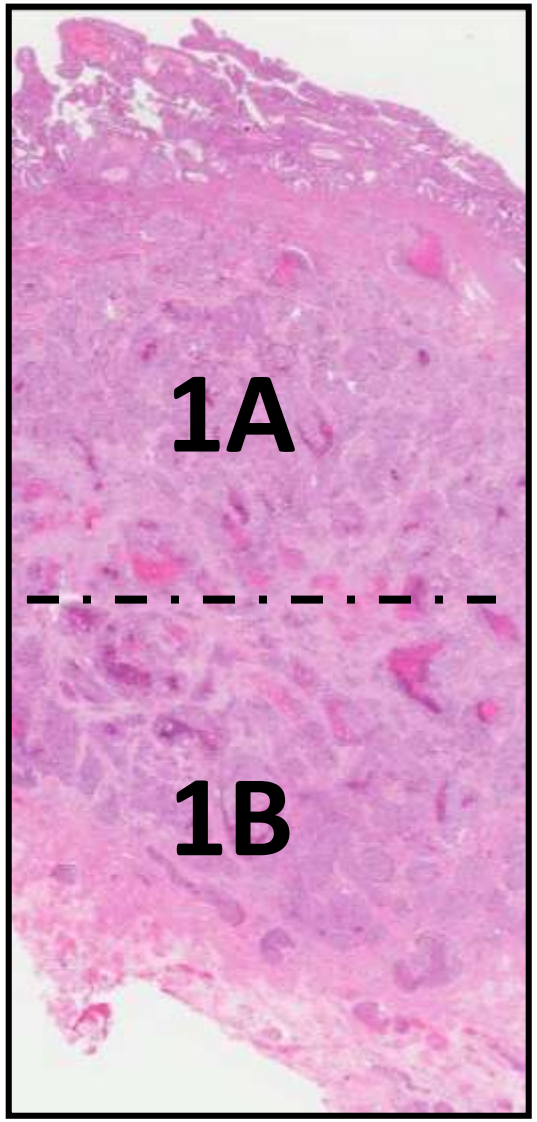
- We report dimension in mm not just stage
  - pT2 may be 71mm or 151mm
- **But grade reported as discrete variable**

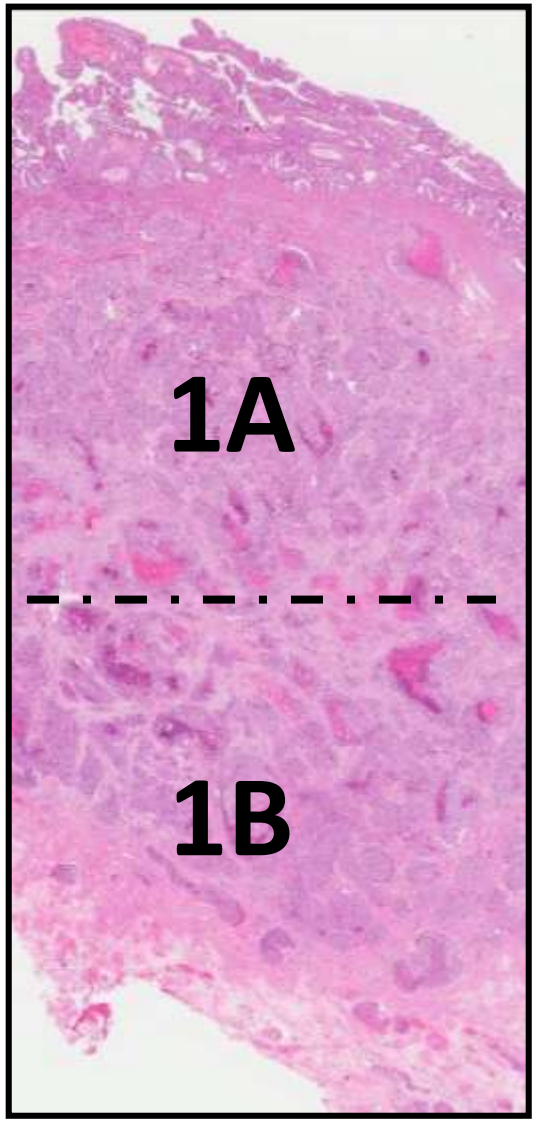


Staging endometrial cancer



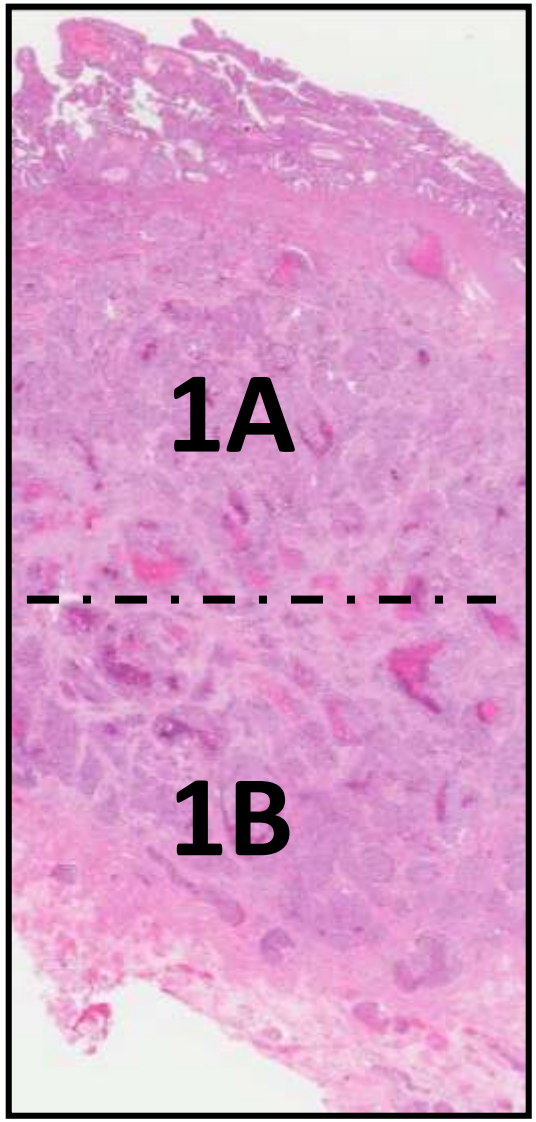
- **Clinically relevant**
  - Brachytherapy
- **50% cut-off**

Staging endometrial cancer



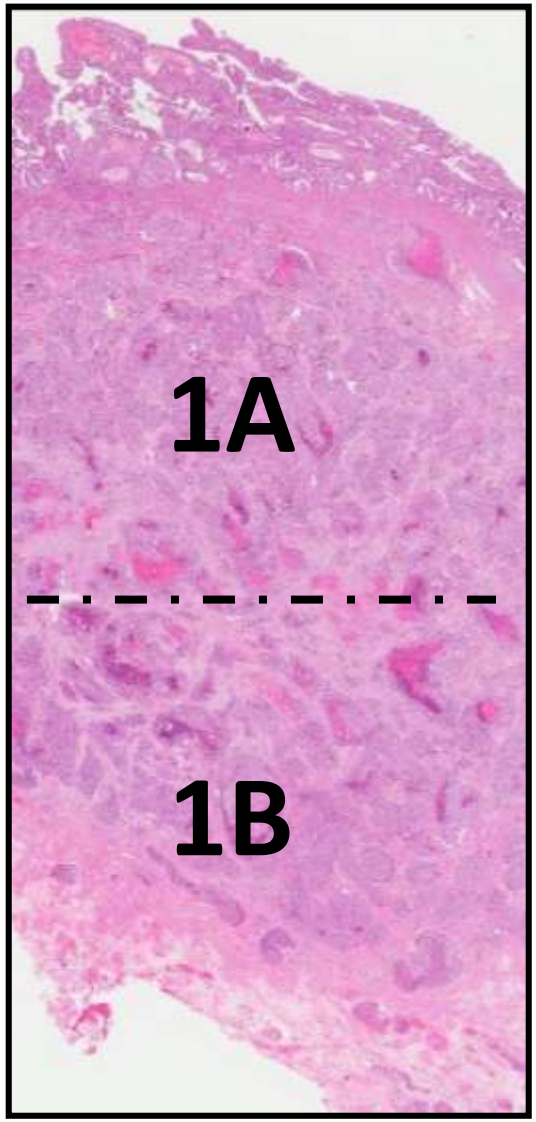
- **50% cut-off is arbitrary**
- **45% not different from 55%**
  - Tumours cannot see imaginary lines!

Staging endometrial cancer



- **1B may be 51% or 99%**
  - Surveillance may be OK for 51% but not for 99%

Staging endometrial cancer



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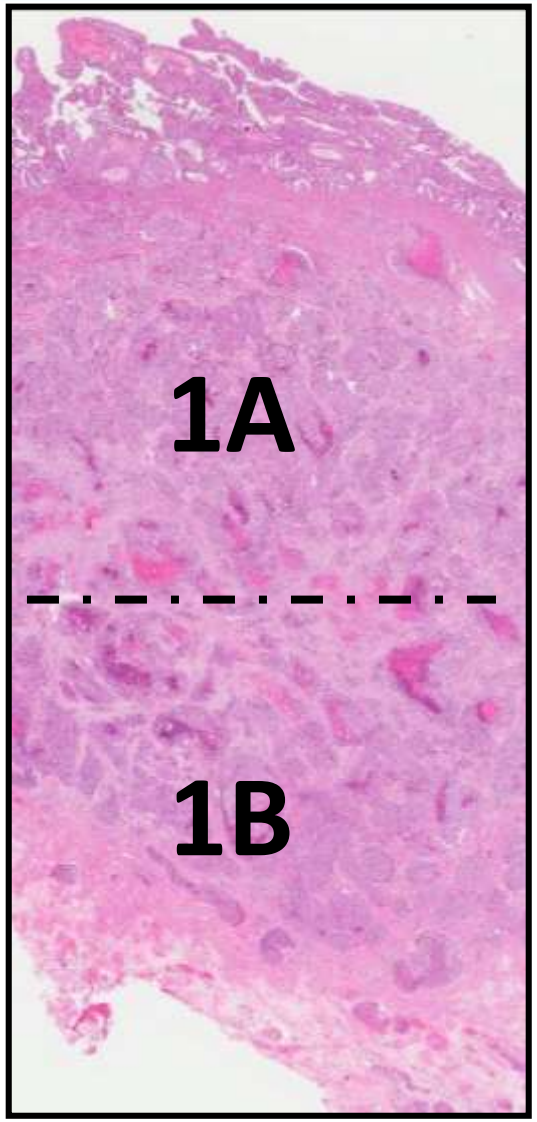


- 1B may be 51% or 99%
  - Surveillance may be OK for 51% but not for 99%
- Path report will not provide info to oncologist/patient
- **Comment on borderline cases**
  - 1A: approaching 50%
  - 1B: just over 50%

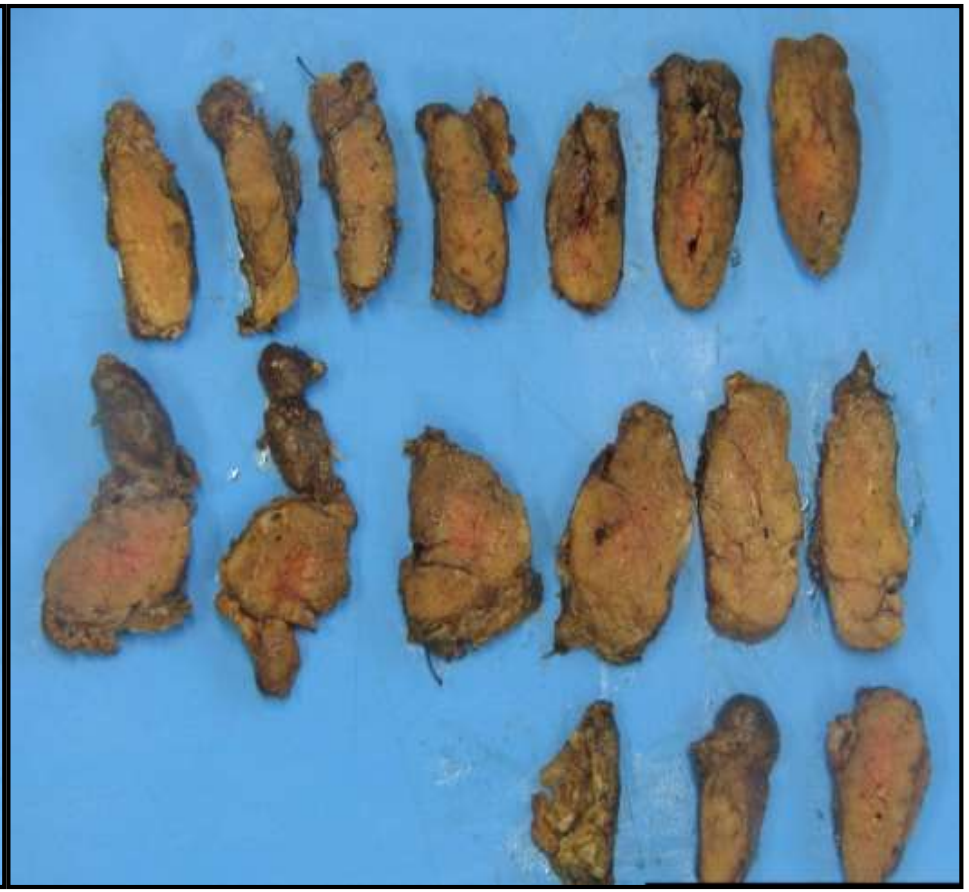
Pseudo-precision

- Ambiguous definitions

“x blocks per cm max diameter”

Total thyroidectomy for Graves

“2 blocks from each lobe”

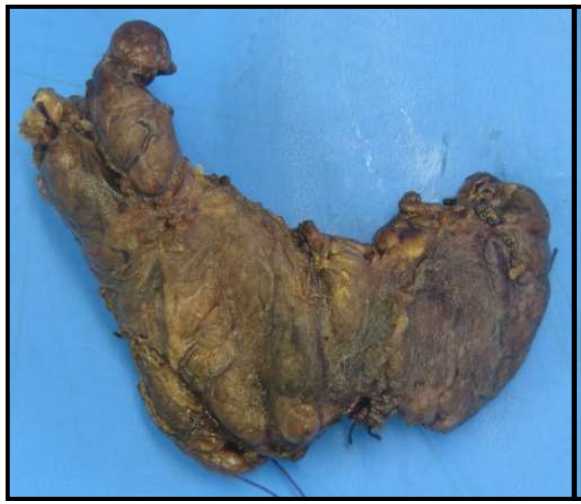


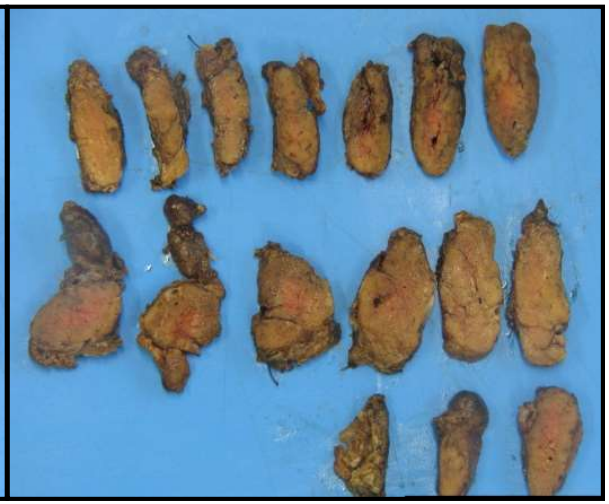
“2 blocks from each lobe”

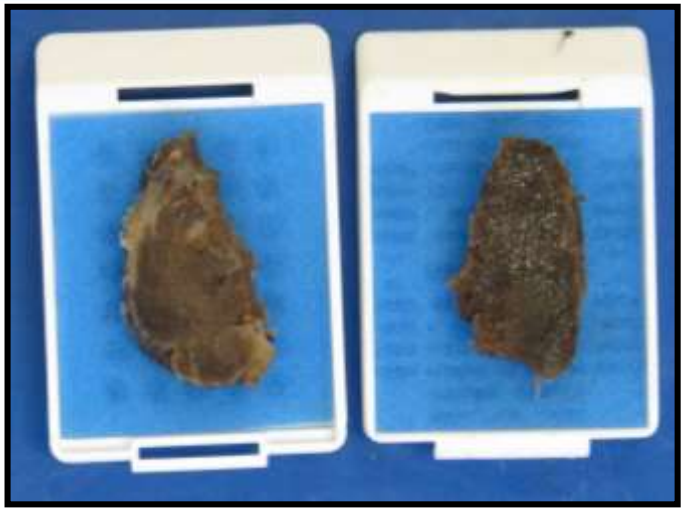
What is a block?

“2 blocks from each lobe”

What is a block?



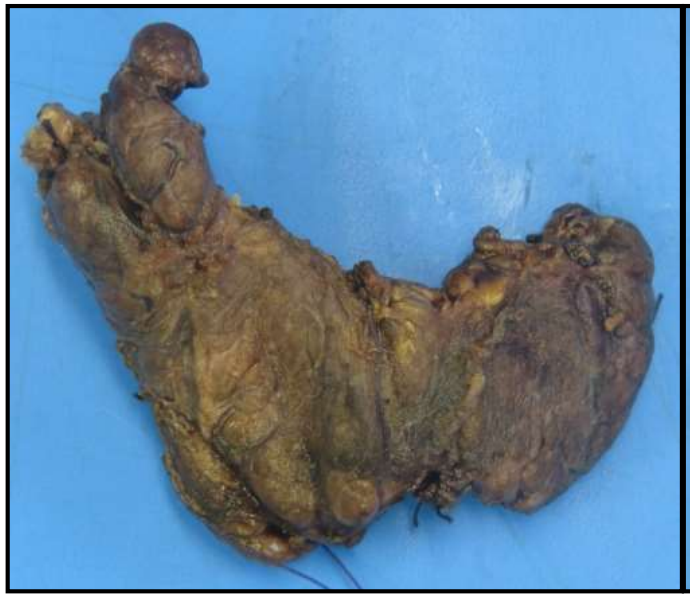


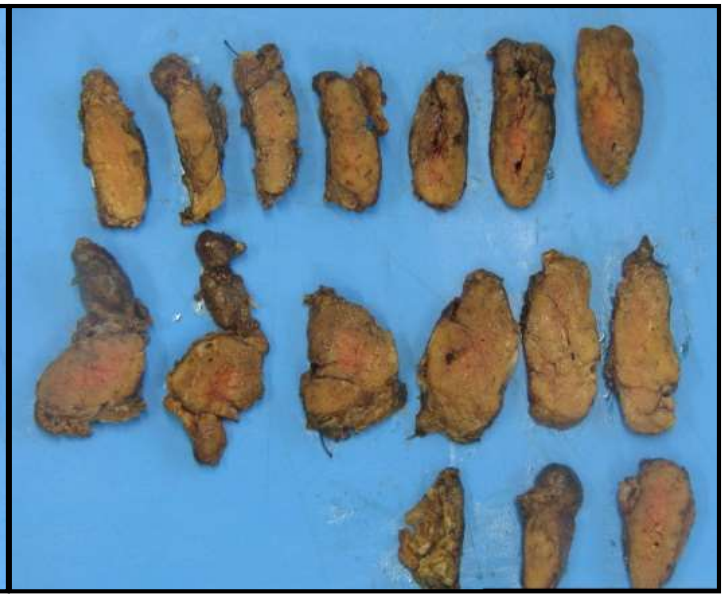


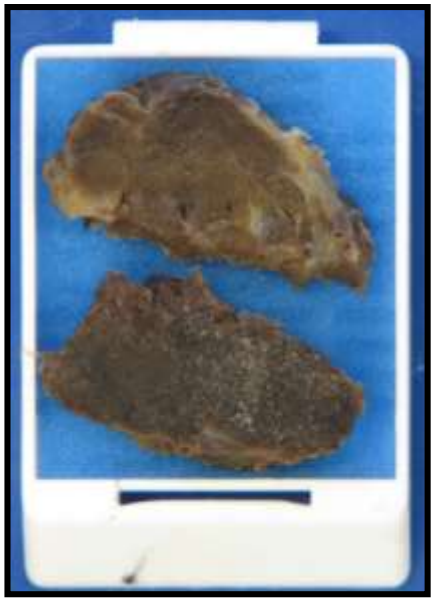
Two blocks

“2 blocks from each lobe”

What is a block?







Is this one block or two?

“x blocks per cm max diameter”

- Re-define as “x cm^2 tissue per cm max diameter?

“x blocks per cm max diameter”

- Re-define as “x cm^2 tissue per cm max diameter?
- **Number of blocks too simplistic?**
  - Each block samples only tiny part of tumour

Specimen “all embedded”

- One 5 micron section examined from each 3-4mm piece of tissue
- Only 0.15% examined under microscope (5/3500)

“x blocks per cm max diameter”

- Re-define as “x cm^2 tissue per cm max diameter?
- **Number of blocks too simplistic?**
  - Sampling macroscopically different areas more important than number of blocks
  - Need fewer blocks for grossly homogeneous tumours?

“x blocks per cm max diameter”

- Re-define as “x cm^2 tissue per cm max diameter?
- Number of blocks too simplistic?
- **Are such requirements pertinent for cystic lesions**
  - Size of cystic lesion depends on amount of fluid

Clinical management

vs.

Pathology reporting

Clinical management

- **Based on clinical scenario and perceived cost-effectiveness**
  - **eg. bone scans for prostate cancer patients**
    - Only for patients with intermediate/high risk of mets: eg. Gleason 7 or PSA >20
      - Rare Gleason 6, low PSA patients have mets
      - Not cost-effective to do bone scan

Pathology reporting

- Proforma based: one size fits all

Pathology reporting

- **Proforma based: one size fits all**
  - Search for and report perineural invasion in patients with metastatic prostate cancer!!

We need to change!!

A new approach to pathology?

A new approach to pathology?

A little less about the

SPECIMEN

A new approach to pathology?

A little less about the

SPECIMEN

A lot more about the

PATIENT

Drivers for change

- **Ever increasing workload**
  - Molecular testing for Lynch syndrome
  - PDL-1 testing
  - ……

Drivers for change

- Ever increasing workload
- **Ever lengthening cancer datasets**

Drivers for change

- Ever increasing workload
- Ever lengthening cancer datasets
- **Increasing other commitments**
  - Management, EQA, Appraisal, revalidation

  .....

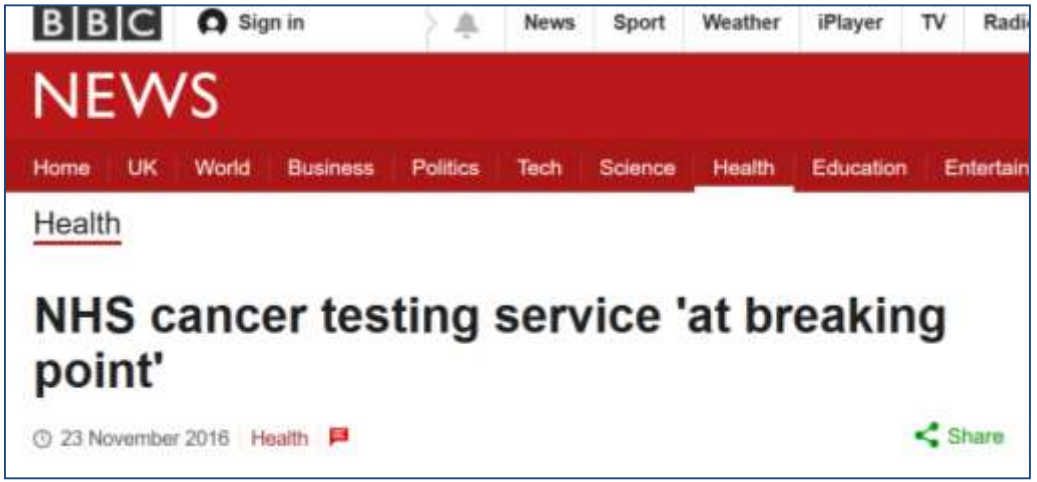
Drivers for change

- Ever increasing workload
- Ever lengthening cancer datasets
- Increasing other commitments
- **No increase in resources**
  - Manpower, finance ….

TESTING TIMES TO COME?
AN EVALUATION OF PATHOLOGY CAPACITY ACROSS THE UK

NOVEMBER 2016

CANCER RESEARCH UK



TESTING TIMES TO COME?
AN EVALUATION OF PATHOLOGY CAPACITY ACROSS THE UK

NOVEMBER 2016

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Pathology labs 'face cash and recruitment crisis'

BRITISH MEDICAL JOURNAL VOLUME 282 4 APRIL 1981

Freedom, fallibility, and the energy of motor vehicles
T J R Francis, MB

Black spots for road accidents
G M Hunter, MRCGP

Staffing crisis in pathology
J L Emery, FRCPATH, and M S Variend, MRCPATH; R P Lindley, BM

Medical education, manpower, and unemployment
H M Buckland, MB

Selling oneself short
R N Hedley, MRCGP

Risks of current practice

- **Waste of resources**
  - Time and money
- **Information overload**
  - Significant findings missed by clinicians

3. Sections of breast show two foci of a grade 1 invasive mammary carcinoma that I would consider to be of tubular/cribriform type. The first focus, seen macroscopically, measures 11.6 mm across. This is associated with intermediate grade ductal carcinoma in situ of cribriform pattern that lies within the invasive tumour. The tumour extends to 0.1 mm from the deep margin and 5.7 mm from the anterior margin. The other margins are further away. A second focus lies in the lateral part of the specimen. This measures 1.7 mm across is 15 mm away from the main tumour. It is 1.7 mm from the deep margin and 2.7 mm from the lateral margin. In addition, in the medial part of the specimen there is a separate focus of intermediate grade ductal carcinoma in situ of solid pattern that measures 1.3 mm across. This lies >5 mm from the deep and anterior margins, which are the nearest. No lymphovascular invasion is seen.

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- **Waste of resources**
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- **Stressed pathologist**
- **Risk of errors**
  - Missing significant data due to excess redundant info

Human constraints

- Time
- Concentration span

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  - Significant findings missed by clinicians
- **Stressed pathologist**
- **Risk of errors**
  - Missing significant data due to excess redundant info
  - Transcription error missed in unduly long report

Information overload?

Typo missed

B. (Left lobe). Six cores and tissue fragments are seen of which three are infiltrated by invasive prostate adenocarcinoma of Gleason sum 3 + 4 = 7. The vast majority is pattern 3 with a small amount of pattern 4. The dimension of the tumour and the volume of the tumour (given as a %) in each core is as follows: 8mm (47%), 8mm (67%), 3mm (19%). Focal perineural invasion is seen but no evidence of extraprostatic extension or lymphovascular invasion is present. The greatest percentage of cancer in any core is 67%. The greatest focus of cancer in any cores measures 8mm. The total percentage of cancer in the entire tissue of the left lobe is 24%. Associated high grade cribriform PIN is noted.

CONCLUSION:

A. PROSTATE, RIGHT LOBE - FOCUS SUSPICIOUS OF HIGH GRADE PIN.
- NO EVIDENCE OF MALIGNANCY

B. PROSTATE, LEFT LOBE - ADENOCARCINOMA, GLEASON 3 + 3.
- 3/6 CORES INVOLVED.
- GREATEST PERCENTAGE OF CANCER 67%.
- GREATEST FOCUS OF CANCER 8MM.

Pathologists' psyche

- Obsessive Compulsive Disorder

Pathologists' psyche

- **Obsessive Compulsive Disorder**
  - **"Complete comprehensive pathology report"**

Pathologists' psyche

- **Obsessive Compulsive Disorder**
  - **"Complete comprehensive pathology report"**
    - Clinicians would not do complete neurological examination of every patient
      - Would identify clinically significant disease
      - Not cost-effective: would increase consultation time and waiting lists

Data collection

“Belt and braces” approach

Pathology data collection
"Belt and braces" approach

- Record everything that ***could*** be useful
- More is better
- Fear of missing data

Pathologists' psyche

- **Obsessive Compulsive Disorder**
  - **"Complete comprehensive pathology report"**
    - Significant delays in reporting
    - Patient anxiety and potential harm

Clinical vs histology data

- **Clinical**
  - Single window of opportunity
  - Unrecorded data (clinical examination or investigation) cannot be retrieved
- **Histological**
  - Slides stored “indefinitely”
  - Data can be retrieved if necessary

Data collection
Focussed approach

- Collect less data
- Collect this better

Advantages of change

Pathologists

- **More interesting and satisfying**
  - We are doctors not box-ticking civil servants
- **More efficient**
  - Less work
  - Less stress
  - Fewer errors

Other advantages of change

- **Lab**
  - Fewer blocks to process, slides to cut and file
  - Improved TAT

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  - Shorter reports – less risk of missing significant info
  - Better understanding of surgical pathology

Other advantages of change

- **Lab**
  - Fewer blocks to process, slides to cut and file
  - Improved TAT
- **Clinicians**
  - Shorter reports – less risk of missing significant info
  - Better understanding of surgical pathology
- **Patients**
  - Improved TAT
  - Less stress waiting for “all-clear”

Benign vs. Cancer reports

- **Cancer**
  - Urgent
  - Treatment implications
  - Cancer targets
- **Benign**
  - Non-urgent
  - Ends up in “backlogs”

Benign vs. Cancer reports
Implications of delays

- **Cancer**
  - Many cancers indolent
  - A weeks delay unlikely to change outcome

Benign vs. Cancer reports
Implications of delays

- **Cancer**
  - Many cancers indolent
  - A weeks delay unlikely to change outcome
- **Benign**
  - An extra week of unnecessary distress?

Social Science & Medicine

Volume 71, Issue 2, July 2010, Pages 421-428

Waiting is the hardest part: Anticipating medical test results affects processing and recall of important information

David B. Portnoy [1] ✉

How do we change?

- **Consider patient management**
  - All differentials are not equally important
  - All dataset items not equally important

How do we change?

- **More focussed approach**
  - Focus on clinically important data items
  - **While still meeting RCPath requirements**

How do we change?

- **More focussed approach**
  - Focus on clinically important data items
  - **While still meeting RCPath requirements**
    - RCPath requirements need to change?

Categorising pathology data

RCPath
Data categorisation

- **Core**
  - "Required for cancer staging, optimal patient management and prognosis"
  - "Supported by robust published evidence"
- **Non-core**

RCPath

Data categorisation: core/non-core

- A data item is either core or non-core in all specimens and in any clinical scenario

RCPath

Data categorisation: core/non-core

- A data item is either core or non-core in all specimens and in any clinical scenario
- However a core data item may be critical, important or unimportant depending on clinical scenario

Pathology data

All data are equal but some data are sometimes **less** equal

1mm Gleason 3 + 3 prostate cancer in a needle bx

- **Man with raised PSA**
  - Critical

1mm Gleason 3 + 3 prostate cancer in a needle bx

- **Man with raised PSA**
  - Critical
- **Man on active surveillance**
  - Irrelevant

1mm Gleason 3 + 3 prostate cancer in a needle bx

- **Man with raised PSA**
  - Critical
- **Man on active surveillance**
  - Irrelevant
    - Benign, suspicious and low volume 3+3 cancer managed in identical manner
      - Continue active surveillance

Clinically orientated data categorisation

- **Critical**
  - Presence of cancer
  - Prognostic/predictive factors affecting treatment
- **Important**
  - Prognostic factors affecting follow-up
- **Less important**
  - Prognostic factors that do not affect management
- **Unimportant**
  - Length of ureters...

Why clinically categorise data?

- Identify where to focus time, money, energy

Why clinically categorise data?

- Identify where to focus time, money, energy
- **Recognise clinical implications of diagnosis**
  - **Urine: U4 vs. U5**
  - **Thyroid FNA: Thy4 vs. Thy5**

Why clinically categorise data?

- Identify where to focus time, money, energy
- **Recognise clinical implications of diagnosis**
  - **Urine: U4 vs. U5**
    - Limited clinical significance
      - Both lead to further investigations
  - **Thyroid FNA: Thy4 vs. Thy5**
    - May be critical
      - Thy4 : lobectomy
      - Thy5: total thyroidectomy following by lifelong thyroxine replacement.

Critical caveats

- Subjectivity in categorisation
- May change with time
- May change with local practice
- Principles may differ between cancers
- **All RCPath core data items MUST be collected**
  - But pathologists should focus time and energy on the most clinically relevant data

Critical caveats

- Subjectivity in categorisation
- May change with time
- May change with local practice
- Principles may differ between cancers
- All RCPath core data items MUST be collected
- **If in doubt: err on side of critical/important**

Pathology practice

- **Non-specialist reporting**
- **Extensive double-checking of non-specialist reports**
  - Routine MDT slide review
- **Is this cost-effective?**

How to effect change?

- **More discussion with clinicians**
  - What do they use?
  - What is redundant?
- **More scrutiny of non-core data items**
  - Specimen measurements
  - 3 dimensions of tumour
- **Dataset modification?**
  - Add clinical significance section in each dataset?

Educate clinicians?

Radiology vs Pathology

Radiology vs Pathology

- **Radiology**
  - Radiology is anatomy
  - Surgeons view and interpret Xrays/CT/MRI…

Radiology vs Pathology

- **Radiology**
  - Radiology is anatomy
  - Surgeons view and interpret Xrays/CT/MRI…
- **Pathology**
  - Pathology is histology

Surgeons and Pathology

- Surgeons do not view histology material
- **Don't** need to be able to interpret histology

Surgeons and Pathology

- Surgeons do not view histology material
- **Don't** need to be able to interpret histology
  - **No need to demonstrate histology at MDT meetings**

Surgeons and Pathology

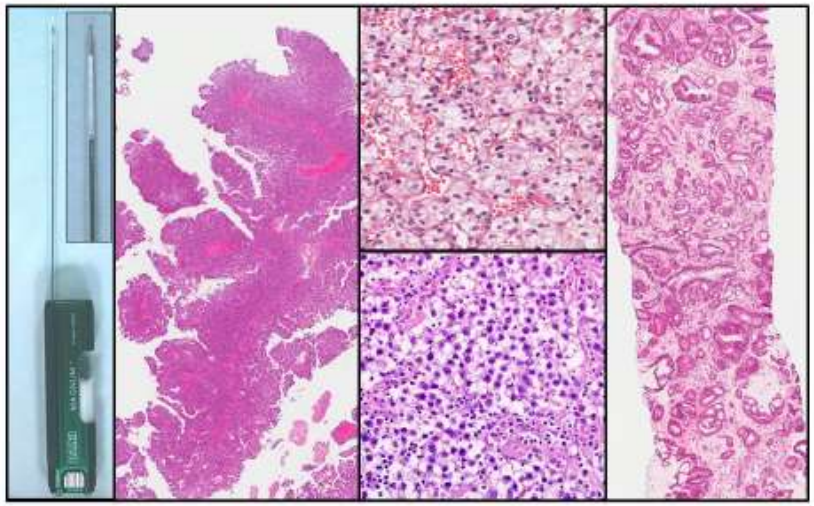
- Surgeons do not view histology material
- Do **not** need to be able to interpret histology
- **Do need to be able to interpret path reports**

3. Sections of breast show two foci of a grade 1 invasive mammary carcinoma that I would consider to be of tubular/cribriform type. The first focus, seen macroscopically, measures 11.6 mm across. This is associated with intermediate grade ductal carcinoma in situ of cribriform pattern that lies within the invasive tumour. The tumour extends to 0.1 mm from the deep margin and 5.7 mm from the anterior margin. The other margins are further away. A second focus lies in the lateral part of the specimen. This measures 1.7 mm across is 15 mm away from the main tumour. It is 1.7 mm from the deep margin and 2.7 mm from the lateral margin. In addition, in the medial part of the specimen there is a separate focus of intermediate grade ductal carcinoma in situ of solid pattern that measures 1.3 mm across. This lies >5 mm from the deep and anterior margins, which are the nearest. No lymphovascular invasion is seen.

But do surgeons understand pathology reports?

- Correct interpretation of reports requires awareness of limitations of histopathology
- Many surgeons have limited awareness of pitfalls and limitations of pathology

Pathology for Urologists Study Day



University Hospital of Wales
Cardiff
13th October 2017

Pathology for Urologists Study Day

13th October 2017

Pathology department, University Hospital of Wales (UHW), Cardiff

PROGRAMME

09.15 – 09.50: Coffee and biscuits

09.50 – 10.00: Welcome
Mr Krishna Narahari, Consultant Urologist, UHW

10.00 – 10.30: General overview/principles (MV)

10.30 – 11.00: Bladder (IE)

11.00 – 11.30: Prostate (MV)

11.30 – 12.00: BREAK

12.00 – 12.30: Kidney (HT)

12.30 – 13.00: Testis (DG)

13.00 -14.00: LUNCH

14.00 – 14.45: Specimen cut-up and lab tour (IE/HT)

15.00 – 15.45: Multiheader microscopy (DG/MV)

15.45: END

Follow-up

- Please complete evaluation forms
- Comments/suggestions appreciated
- More such symposia?
  - GI, skin .....


Thank You