Polyp Cancers
In the Scottish Screening Programme

Prof. Bob Steele
Professor of Surgery, University of Dundee Medical School
Findings at Screening Colonoscopy (Prevalence)

- Carcinoma: 10%
- Adenoma: 40%
- No Neoplasia: 50%
The Adenoma-Carcinoma Sequence
Stage Distribution of Symptomatic Colorectal Cancer (NHS Tayside only)

- A: 8%
- B: 33%
- C: 34%
- D: 25%
Stage Distribution of Screen - Detected Cancers (1st round)

- True A: 31%
- A: 49%
- Polyp Cancers: 18%
- B: 20%
- C: 7%
- D: 21%
Polyp Cancers

Invasive cancer in:

- Polypectomy
- EMRs or ESDs
- Transanal excision of rectal tumours
Issues in polyp cancers

• Diagnosis may be difficult (risk of overdiagnosis)

• Diagnosis and treatment may be at same procedure

• If so node status (Dukes’ stage) not known

• Need predictors of nodal/systemic disease
We want to know…

- Is it really invasive cancer?

- What is the risk of residual mural disease?

- What is the risk of lymph node disease?
Diagnosis

- Often a difficult problem.....
- How reproducible is this diagnosis?
- Needs consensus
Kikuchi levels

Applicable to sessile adenomas only

sm1  sm2  sm3
Depth of invasion.....

• Kikuchi system
  – Refined
    • sm1a – invading front < ¼ of width of lesion
    • sm1b – invading front ¼ - ½ width of lesion
    • sm1c – invading front > ½ width of lesion
  – Not currently recommended
Kikuchi Levels and LN involvement

T1 sm1a
Invasive depth <1/3 through submucosa, usually <0.3mm.
Invades <1/3 of width of adenoma

2%

T1 sm1b
Invasive depth <1/3 through submucosa, usually <0.3mm.
Invades >1/3 & <2/3 of width of adenoma

8%

T1 sm1c
Invasive depth <1/3 through submucosa, usually <0.3mm.
Invades >2/3 of width of adenoma

23%

T1 sm2
Invasive depth >1/3 and <2/3 of submucosa

Kikuchi et al *Dis Colon Rectum* 1995; 38: 1286

T1 sm3
Invasive depth >2/3 of submucosa but not into M. propria
But what do we do if there is no muscle in the specimen?
Haggitt RC et al. Gastroenterology 1985;89:328-36

Level 0: non-invasive carcinoma *in situ*

Level 1: invasion of the submucosa but limited to the head of the polyp

Level 2: invasion extending into the neck of the polyp

Level 3: invasion into any part of the stalk

Level 4: invasion beyond the stalk but above the muscularis propria
Pedunculated

Sessile

Ueno et al Gastroenterology 2004; 127: 385
Lymph Node Metastasis and Dimensions of Invasive Tumour

Width of submucosal invasion
- <4mm: 2.5%
- >4mm: 18.2%

Depth of submucosal invasion
- <2mm: 3.9%
- >2mm: 17.1%

Ueno et al *Gastroenterology* 2004; 127: 385
Problems

- Assessment of depth of invasion difficult and impossible without muscle
- Lack of reproducibility
Diagnostic accuracy in early cancers
## APPENDIX D  PROFORMA FOR LOCAL EXCISION SPECIMENS

<table>
<thead>
<tr>
<th>Surname:</th>
<th>Date of birth:</th>
</tr>
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<tbody>
<tr>
<td>Forenames:</td>
<td>Date of birth:</td>
</tr>
<tr>
<td>Hospital:</td>
<td>Hospital no:</td>
</tr>
<tr>
<td>Hospital no:</td>
<td>NHS no:</td>
</tr>
<tr>
<td>Date of receipt:</td>
<td>Date of reporting:</td>
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<tr>
<td>Date of reporting:</td>
<td>Report no:</td>
</tr>
<tr>
<td>Pathologist:</td>
<td>Surgeon:</td>
</tr>
<tr>
<td>Surgeon:</td>
<td>Sex:</td>
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</table>

### Specimen type

- Polypectomy / Endoscopic mucosal resection / Transanal endoscopic microsurgical (TEM) excision / Other

### Comments:

<table>
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<tr>
<th>Comments:</th>
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</table>

### Gross description

#### Site of tumour

<table>
<thead>
<tr>
<th>Site of tumour</th>
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#### Maximum tumour diameter (if known)

<table>
<thead>
<tr>
<th>Maximum tumour diameter (if known): mm</th>
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</table>

<table>
<thead>
<tr>
<th>Maximum tumour diameter (if known): mm</th>
</tr>
</thead>
</table>
Histology

Tumour type
Adenocarcinoma        Yes ☐        No ☐
If No, Other

Differentiation
Well/moderate        ☐        Poor ☐

Local invasion
Confined to submucosa (pT1)  ☐
Into muscularis propria (pT2)  ☐
Beyond muscularis propria (pT3)  ☐

For pT1 tumours:
Maximum thickness of invasive tumour from muscularis mucosae ..........mm
Haggitt level (polypoid tumours) 1 / 2 / 3 / 4
Kikuchi level (for sessile/flat tumours) sm1 / sm2 / sm3

Lymphatic or vascular invasion:
None    ☐
Possible ☐
Definite ☐

Background adenoma:    Yes ☐        No ☐

Margins
Not involved            ☐
Involved by adenoma only ☐
Deep margin Involved by carcinoma ☐
Peripheral margin Involved by carcinoma ☐

Histological measurement from carcinoma to nearest deep excision margin.........................mm

Pathological staging
Complete resection at carcinoma at all margins
Yes (R0) ☐       No (R1 or R2) ☐

pT stage     ........

Signature: ........................................ Date ....../...../.........         SNOMED codes   T........ / M......
When to operate?

- Invasive cancer within 1 mm of resection margin
- Polyp > 2 cm
- Lymphovascular Invasion
- Poor differentiation
An evidence-based treatment algorithm for colorectal polyp cancers: results from the Scottish Screen-detected Polyp Cancer Study (SSPoCS)

CH Richards, NT Venth, D Mansouri, M Wilson, G Ramsay, CD Mackay, CN Parnaby, D Smith, J On, D Speake, G McFarlane, YN Neo, E Aitken, C Forrest, K Knight, A McKay, H Nair, C Mulholland, JH Robertson, FA Carey, RJC Steele, on behalf of The Scottish Surgical Research Group
Richards et al 2017

No. POLYP CANCERS

Pilot Starts

Roll-out Starts
Richards et al. 2017

**Screen-detected cancers**
- **N = 3202**
  - **Non-polyp cancers**
    - **2717/3202 (85%)**
  - **Polyp cancers**
    - **485/3202 (15%)**

**Outcomes**
- **Residual tumour in specimen**
  - **41/186 (22%)**
- **Segmental resection**
  - **186/485 (38%)**
  - **No residual tumour in specimen**
    - **145/186 (78%)**

**Outcomes**
- **Alive**
  - 38/41 (92.7%)
- **Cancer death**
  - 1/41 (2.4%)
- **Non-cancer death**
  - 2/41 (4.9%)
- **Local recurrence**
  - 3/41 (7.3%)
- **Systemic recurrence**
  - 4/41 (9.8%)

**Outcomes**
- **Alive**
  - 135/145 (93.1%)
- **Cancer death**
  - 4/145 (2.8%)
- **Non-cancer death**
  - 6/145 (4.1%)
- **Local recurrence**
  - 1/145 (0.7%)
- **Systemic recurrence**
  - 8/145 (5.6%)

**Outcomes**
- **Alive**
  - 266/299 (89%)
- **Cancer death**
  - 4/299 (1.3%)
- **Non-cancer death**
  - 29/299 (9.7%)
- **Local recurrence**
  - 4/299 (1.3%)
- **Systemic recurrence**
  - 8/299 (2.7%)
<table>
<thead>
<tr>
<th>Variable</th>
<th>Residual disease in bowel wall</th>
<th>Residual disease in lymph nodes</th>
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<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>OR</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤70</td>
<td>31 (24)</td>
<td>0.76</td>
</tr>
<tr>
<td>&gt;70</td>
<td>7 (17)</td>
<td>0.76</td>
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<tr>
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<td></td>
<td></td>
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<tr>
<td>Female</td>
<td>11 (18)</td>
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<tr>
<td>Male</td>
<td>27 (21)</td>
<td>1.22</td>
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<tr>
<td>BMI (kg/m²)</td>
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<td>&lt;25</td>
<td>4 (14)</td>
<td>1.52</td>
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<tr>
<td>&gt;25</td>
<td>16 (19)</td>
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<td>Charlson Comorbidity Index</td>
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<td></td>
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<tr>
<td>0–2 (fit)</td>
<td>21 (20)</td>
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<tr>
<td>≥3 (unfit)</td>
<td>17 (24)</td>
<td>1.28</td>
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<tr>
<td>Polyp location</td>
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<td></td>
</tr>
<tr>
<td>Colon</td>
<td>31 (20)</td>
<td></td>
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<tr>
<td>Rectum</td>
<td>7 (21)</td>
<td>1.01</td>
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<td>Polyp size (mm)</td>
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<tr>
<td>&lt;10</td>
<td>8 (25)</td>
<td>0.79</td>
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<tr>
<td>≥10</td>
<td>27 (21)</td>
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<td>Polyp morphology</td>
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<td></td>
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<tr>
<td>Pedunculated</td>
<td>17 (18)</td>
<td></td>
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<tr>
<td>Sessile</td>
<td>16 (24)</td>
<td>1.47</td>
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<tr>
<td>Polyp differentiation</td>
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<td></td>
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<tr>
<td>Well/moderate</td>
<td>24 (19)</td>
<td></td>
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<tr>
<td>Poor</td>
<td>2 (9)</td>
<td>0.41</td>
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<tr>
<td>Lymphovascular invasion</td>
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<td></td>
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<tr>
<td>Absent/not recorded</td>
<td>31 (23)</td>
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<tr>
<td>Present</td>
<td>7 (13)</td>
<td>0.50</td>
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<tr>
<td>Completeness of excision</td>
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<tr>
<td>Complete†</td>
<td>5 (7)</td>
<td>5.61</td>
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<tr>
<td>Incomplete</td>
<td>33 (29)</td>
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<tr>
<td>Margin clearance</td>
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<td>&gt;1 mm</td>
<td>2 (7)</td>
<td>3.84</td>
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<tr>
<td>≤1 mm/not assessable</td>
<td>36 (23)</td>
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Table 4  Multivariate analysis of risk factors associated with adverse events in all patients with screen-detected polyp cancers (binary logistic regression analysis)

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Adverse events</th>
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<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>OR</td>
<td>95% CI</td>
<td>p Value*</td>
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<tr>
<td>Age</td>
<td>&gt;70 years</td>
<td>15 (11)</td>
<td>0.98</td>
<td>0.93 to 1.05</td>
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<tr>
<td>Sex</td>
<td>Male</td>
<td>43 (13)</td>
<td>1.06</td>
<td>0.45 to 2.47</td>
<td>0.90</td>
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<tr>
<td>Charlson Comorbidity Index</td>
<td>≥3 (unfit)</td>
<td>26 (14)</td>
<td>1.61</td>
<td>0.72 to 3.62</td>
<td>0.25</td>
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<tr>
<td>Polyp location</td>
<td>Rectum</td>
<td>12 (14)</td>
<td>0.60</td>
<td>0.22 to 1.65</td>
<td>0.32</td>
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<tr>
<td>Polyp size</td>
<td>≥10 mm</td>
<td>44 (14)</td>
<td>1.72</td>
<td>0.62 to 4.71</td>
<td>0.30</td>
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<tr>
<td>Polyp morphology</td>
<td>Sessile</td>
<td>24 (16)</td>
<td>1.19</td>
<td>0.53 to 2.67</td>
<td>0.67</td>
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<tr>
<td>Polyp differentiation</td>
<td>Poor</td>
<td>6 (13)</td>
<td>1.78</td>
<td>0.49 to 6.43</td>
<td>0.38</td>
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<tr>
<td>Lymphovascular invasion</td>
<td>Present</td>
<td>16 (19)</td>
<td>2.65</td>
<td>1.14 to 6.15</td>
<td>0.023</td>
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<tr>
<td>Completeness of excision</td>
<td>Incomplete†</td>
<td>46 (24)</td>
<td>10.23</td>
<td>4.24 to 24.64</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

An adverse event is defined as (1) evidence of tumour in the resected specimen of patients undergoing segmental resection, (2) cancer-related death in any patient, (3) local or systemic disease recurrence in any patient.

*Multivariate binary logistic regression analysis.
†Defined as pathological evidence of tumour extending to the diathermy edge or a margin that is not assessable.
Screen-detected polyp cancer → Colorectal MDT → Completely excised
Margin assessable and >0.1mm clearance → Lymphovascular invasion absent → Follow-up according to local protocol ¹
→ Lymphovascular invasion present → Consider segmental resection ²
→ Incompletely excised
Margin not assessable or Tumour to diathermy margin
→ Consider re-excision → Consider segmental resection ³
When to operate?

- Invasive cancer at resection margin (<0.1mm)
- Lymphovascular Invasion
Resection after polypectomy

- Difficulty of finding polypectomy site
- Reassuring for endoscopist/surgeon!
Implications for polypectomy

• Tattoo suspicious polyps

• Ensure complete en-bloc excision whenever possible