Identification and early detection of cancer patients in primary care

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Cancer diagnosis today
Reasons for increased cancer survival

• Screening for several cancers
• Better methods in cancer diagnostics
• Better, more efficient cancer treatments
## Cancer incidence

<table>
<thead>
<tr>
<th></th>
<th>Cases of cancer</th>
<th>Deaths in cancer</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Globally</strong>*</td>
<td>&gt;18 million</td>
<td>9.5 million</td>
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<tr>
<td><strong>Europe</strong>*</td>
<td>&gt;3.45 million</td>
<td>1.75 million</td>
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<tr>
<td><strong>Sweden</strong>**</td>
<td>65 000</td>
<td>&gt;23 000</td>
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</tbody>
</table>

* = WHO, Globocan 2018, estimated cancer incidence, mortality and prevalence  
** = Socialstyrelsen, Cancer incidence and causes of death 2016
Many patients die in common cancers due to late diagnosis.

Figure 1. Relative survival colon cancer after elective surgery 2010-2016
The Swedish Colorectal Cancer Register
Diagnosing cancer

> 70% of cancer patients consult primary care before cancer diagnosis
Diagnosing cancer
GPs’ challenge nr 1
Patients with suspected cancer
Number of patients with cancer...
Diagnosing cancer
GPs’ challenge nr 2

Cancer symptoms can present in any form from any part of the body
Diagnosing cancer
GPs’ challenge nr 3

Alarm symptoms signal increased risk of cancer - but in most cases are not cancer

Non-specific/general symptoms can also be signs of cancer - but are common in many other benign diseases
Identification and early detection of cancer patients in primary care

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The overall aims of the thesis

• Explore how general practitioners could identify common cancers in patients in primary care

• At an early stage

• Design a risk assessment tool
Methods

• Case-control

• Patients diagnosed 2011 in region Västra Götaland with prostate, breast, colorectal, lung, gynaecological and skin cancer including malignant melanoma

• Consulted a GP in the year before the date of cancer diagnosis

• 4562 cancer patients and 17,979 matched controls without cancer

• Diagnostic codes were collected from regional healthcare databases and Swedish cancer register

• Statistical analyses
<table>
<thead>
<tr>
<th>Study/Paper</th>
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<th>II</th>
<th>III</th>
<th>IV</th>
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<tbody>
<tr>
<td><strong>Design</strong></td>
<td>Case-control</td>
<td>Case-control</td>
<td>Case-control</td>
<td>Case-control</td>
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<tr>
<td><strong>Setting</strong></td>
<td>Primary healthcare units in RVG</td>
<td>Primary healthcare units in RVG</td>
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</tr>
<tr>
<td><strong>Study participants</strong></td>
<td>4562 patients, 17,979 controls</td>
<td>2570 patients, 9424 controls</td>
<td>542 patients, 2139 controls</td>
<td>373 patients, 1472 controls</td>
</tr>
<tr>
<td><strong>Data collection method</strong></td>
<td>SCR, regional healthcare database</td>
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<td>SCR, EIA, regional healthcare database</td>
</tr>
<tr>
<td><strong>Primary outcome measures</strong></td>
<td>Consultation frequency, symptom density by cancer type</td>
<td>Consultation profiles and clinical features in patients with four or more GP consultations</td>
<td>PPV for clinical features, risk assessment tool non-metastatic colorectal cancer</td>
<td>OR for clinical features of non-metastatic lung cancer and clinical features in GPs’ referral letters for chest X-ray</td>
</tr>
</tbody>
</table>

EIA= Enterprise information archive for radiology  
RVG= Region Västra Götaland  
SCR=Swedish Cancer Register
Aim
Identify early diagnostic profiles, such as diagnostic codes and consultation patterns of patients with the most common cancers.
Results

Figure 3. Consultation frequency: weekly consultation frequency of cancer patients (red continuous line) compared to controls (black interrupted line) one year prior to cancer diagnosis.

Results

Figure 3. Consultation frequency: weekly consultation frequency of cancer patients (red continuous line) compared to controls (black interrupted line) one year prior to cancer diagnosis.

Results

• Consultation frequency in cancer patients started to increase 50-100 days before cancer diagnosis.
• Breast and gynaecological cancer 50 days
• Colorectal and lung cancer 100 days

• The highest OR for the diagnostic codes
  - Lump in breast
  - Neoplasm of uncertain behaviour
  - Abnormal serum enzyme levels
Study/Paper II

Aim
Identify the consultation profiles including potential missed diagnostic opportunities and clinical features of cancer patients who frequently consult GPs.
Results

• 56% of cancer patients consulted a GP ≥ 4 times in the year before the date of cancer diagnosis

• The majority of the clinical features (symptoms or diseases) associated with cancer were registered at the 4\textsuperscript{th} or later consultation and were alarm symptoms for cancer

• 1/6 of all clinical features associated with cancer were presented at the 1\textsuperscript{st} or 2\textsuperscript{nd} consultation

• These features originated from specific parts of the body and had benign characteristics
Study/Paper III

Aim
Identify clinical features of non-metastatic colorectal cancer and to design a risk assessment tool for it.
Results

Five symptoms and signs were independently associated with non-metastatic colorectal cancer

• Bleeding: rectal bleeding, melaena and GI bleeding
• Anaemia
• Change in bowel habit: diarrhoea, constipation, and change in bowel habit
• Abdominal pain
• Weight loss
Risk assessment tool
non-metastatic colorectal cancer

PPV
- Insufficient data
- 0-1%
- > 1%
- > 2.5%
- > 5%
- > 10%

Single symptom:
- 1.1 (0.9-1.5)
- 3.9 (2.3-8.3)
- 1 (0.3-3)
- 0.9 (0.7-1.1)
- 1.4 (1.1-1.8)

Change in bowel habit:
- 1 (0.6-1.6)
- 13.7 (2.1-54.4)
- 1.5 (0.6-2.6)
- 2.9 (1-8.4)

Bleeding:
- 5 (1.5-15.3)
- 12.2 (1.8-51.2)
- 2.9 (1.2-6.9)

Weight loss:
- 2.9 (0.3-22.2)
- 5.6 (0.7-33)

Abdominal pain:
- 1 (0.7-1.5)
- 4.2 (1.6-10.3)

Anaemia:
- 1.6 (1.1-2.4)
Study/Paper IV

Aim

• Identify clinical features of non-metastatic lung cancer

• Compare the clinical features in GPs’ referral letters for chest X-ray with clinical features expressed as diagnostic codes in the regional healthcare database.
Results

1. The highest OR for non-metastatic lung cancer

<table>
<thead>
<tr>
<th>ICD-10 code and diagnosis</th>
<th>Prevalence %</th>
<th>OR (95% CI)</th>
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<th>Prevalence %</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D51 Vitamin B12 deficiency anaemia</td>
<td>3.8</td>
<td>6.7 (1.6 to 27.9)</td>
<td>L20 Atopic dermatitis</td>
<td>1.2</td>
<td>12.0 (1.2 to 115.4)</td>
</tr>
<tr>
<td>R060 Dyspnoea</td>
<td>8.4</td>
<td>5.0 (2.0 to 12.7)</td>
<td>R042 Haemoptysis</td>
<td>2.1</td>
<td>9.6 (1.9 to 49.7)</td>
</tr>
<tr>
<td>J42 Unspecified chronic bronchitis</td>
<td>3.8</td>
<td>5.0 (1.3 to 18.6)</td>
<td>I26 Pulmonary embolism</td>
<td>1.7</td>
<td>8.0 (1.5 to 43.7)</td>
</tr>
</tbody>
</table>

2. Clinical features in referral letters for chest X-ray were almost three times more frequent compared to the corresponding features in the regional healthcare database.
Conclusion of the thesis

• Increased consultation frequency in primary care - a risk marker for cancer.

• A considerable proportion of patients with frequent consultations presented already at the two first consultations features associated with cancer. These clinical features that were focal and had benign characteristics might have been missed diagnostic opportunities.

• Colorectal bleeding combined with diarrhoea, constipation, a change in bowel habit or abdominal pain are the most powerful predictors for non-metastatic colorectal cancer. A risk assessment tool for non-metastatic colorectal cancer was possible to design.

• Not enough evidence to suggest that patients with non-metastatic lung cancer can be identified by their features presented in primary care.
Primary care