From Denmark to Wales, our rapid diagnostic clinics

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Phase 1 of the ICBP

13 jurisdictions in 6 countries

4 cancers

Correct as of September 2016
Phase 1 modules

- Modules 1-3 are now complete (although follow-up studies are still occurring)
- Modules 4-5 are ongoing - up to 10 publications are due within the next 12 months

Correct as of September 2016
Module 1 – survival differences (5 YEAR)

Cancer survival improved overall between 1995-2007 in all jurisdictions

<table>
<thead>
<tr>
<th>Lung cancer</th>
<th>Breast cancer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>Sweden</td>
</tr>
<tr>
<td>Australia</td>
<td>Australia</td>
</tr>
<tr>
<td>Sweden</td>
<td>Canada</td>
</tr>
<tr>
<td>Norway</td>
<td>Norway</td>
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<tr>
<td>Denmark</td>
<td>Denmark</td>
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<tr>
<td>UK*</td>
<td>UK*</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Bowel cancer</th>
<th>Ovarian cancer</th>
</tr>
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<tbody>
<tr>
<td>Australia</td>
<td>Canada</td>
</tr>
<tr>
<td>Canada</td>
<td>Norway</td>
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<td>Sweden</td>
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<td>UK*</td>
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<td>Denmark</td>
<td>Denmark</td>
</tr>
<tr>
<td>UK*</td>
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</tr>
</tbody>
</table>


Correct as of September 2016
From Denmark to Wales, our rapid diagnostic clinics
From Denmark to Wales, our rapid diagnostic clinics

- More than 80-85% starts with GP
- GP is starting point for cancer diagnosis
- Does the healthcare system support the GP
Almost half of cancer patients diagnosed too late
Late detection of condition in 46% of sufferers can greatly reduce chances of survival, warns Cancer Research UK

Patients to be allowed to self-refer for cancer diagnostics without going through GP
12 January 2015 | By Jamie Kaffash

Patients will be able to self-refer themselves for cancer diagnostics without needing to go through GPs as part of NHS England’s new strategy for tackling cancer, which GP leaders said could ‘undermine GPs’ gatekeeper role.

As part of NHS England’s early diagnosis programme announced over the weekend, it will pilot initiatives to offer patients the option to self-refer for diagnostic tests, lower referral thresholds for GPs and introduce multi-disciplinary diagnostic centres where patients can have several tests in the same place on the same day.

It will also set up a taskforce to develop a five-year action plan for cancer services based on the pilots that will include representatives from the RCGP, as well as Macmillan Cancer Support, Public Health England and local councils.
From Denmark to Wales, our rapid diagnostic clinics

- **Learnings**
  - 40% of cancer patients were diagnosed via an accelerated route
  - Integrated between primary and secondary care is a must
  - Stop gatekeeping and trust the GP ‘gut instinct’
  - DO SOMETHING DIFFERENT
From Denmark to Wales, our rapid diagnostic clinics

- Wales Cancer Network
- 2016 - 2017
- Ring-fenced an innovation fund
- Partnership with 2 health boards to match fund and develop rapid diagnostic clinics for patients with serious but non specific symptoms
RDCs at Cwm Taf & Abertawe Bro Morgannwg University Health Boards

• Opened June 2017
• Royal Glamorgan Hospital, CTUHB
• Neath Port Talbot Hospital, ABMUHB
• GP referral only
• Step wise approach to cover all GP clusters within both health boards

• DIAGNOSTIC CENTRES FOR PRIMARY CARE
RDC GP referral criteria

- “Set A” has been requested & documented
- There is no other urgent referral pathway suitable for this clinical scenario
- GP Clinical Suspicion of a serious disease that could be due to cancer / GP “gut feeling”
- ≥18 years of age
- GP is within pilot area
- The patient is well enough to go through the process
- The patient understands the process and is able to attend the RDC, possibly for a whole day at a time at short notice
- Telephone number for the patient
Set A

- FBC, CRP
- U&E, LFT, BONE, TFT
- GLUCOSE, HbA1c
- Ferritin
- Coeliac Screen
- Consider PSA or CA125
- CWM TAF ALSO INCLUDE MYELOMA SCREEN
- Dip urine (and record result in referral text)
- CXR
- Full Physical Examination and record result in referral text
- USE THE RDC Set A Lab Form - ensures all required blood tests are completed (and aids evaluation)
Laboratory Medicine Request Form

Rapid Diagnosis Centre (RDC) Pathway
GP Panel A Investigations

Date:

Sex: M / F

Address:

Consultant/GP:

Location:

Date of collection:

Time of collection:

Copy to:

Clinical Details – Please provide:

Samples: Please Tick Tests Required

<table>
<thead>
<tr>
<th>Specimen</th>
<th>Tests Required</th>
<th>Tick if Required</th>
<th>Request Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 x clotted sample (5 ml gold top tube)</td>
<td>Laboratory Profile (Renal profile, LFT, Bone profile, CRe, Thyroid Function Tests, Fertility, Anti-T1(6))</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CA-195</td>
<td></td>
<td></td>
<td>CA195</td>
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<tr>
<td>PSA</td>
<td></td>
<td></td>
<td>PSA</td>
</tr>
<tr>
<td>1 X Fluoride Oxalate-sample (5 ml grey top tube)</td>
<td>Glucose</td>
<td>Please indicate if fasting</td>
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</tr>
<tr>
<td>HbA1c</td>
<td></td>
<td></td>
<td>HBA1C</td>
</tr>
<tr>
<td>1 X EDTA sample (5 ml purple top tube)</td>
<td>Full Blood Count</td>
<td></td>
<td>FBC</td>
</tr>
</tbody>
</table>

Version 2 - 07-02-17
RDC is not suitable for:

- Patients already on a designated USC pathway
- Patients who are suitable for a current USC pathway
- Patients <18 years of age
- Seen in RDC within last 3 months with no new symptoms
- Patients too unwell to attend/requiring acute admission
- Patients unable to attend for the whole session
- A non cancer diagnosis is the most likely diagnosis
Referral Process: majority are seen within 5 days of GP referral

1. Received Electronically
2. Referral vetted
3. Bloods/CXR checked
4. Patient Booked
RDC Process

- All cases discussed by 1\textsuperscript{st} MDT - physician, radiologist, CNS
- Patients allocated Radiology 1\textsuperscript{st} (usually CT TAP) or Physician 1\textsuperscript{st}
- Patients then “swap” over
- All results discussed at 2\textsuperscript{nd} MDT (live reporting of scans) - physician, radiologist, CNS
- All patients seen, results and management plan given
Outcomes

- **A - Diagnosis made:**
  Patient referred by RDC to a site specific USC pathway.
  Patient referred by RDC to a non cancer OPD

- **B - Patient requiring further investigation:**
  Set B bloods, endoscopy, further imaging, tissue biopsy
  (pathway agreed with medics)

- **C - Patient returned to GP for further management**

  In all cases this will be accompanied by a letter to referring GP detailing full results and MDT opinion/advice sent electronically within 24 hours.
CLINIC UPDATE – to 31st December 2018

- 243 clinics, 930 patients seen
- 509 female, 421 male
- Age range: 24 – 95 years
- Average age: 68.9 years
- 862 CT TAP
Referral symptoms

% of all patients referred displaying this symptom

Vague symptoms

Number of patients referred

WGT – Weight loss
ABDO – Abdominal pain
PAIN – Generalised pain
FAT – Fatigue
ANAE – Anaemia
LAB – Unexplained laboratory findings
NAU – Nausea
APP – Appetite loss
SOB – Shortness of breath
Comparison of all presenting symptoms

Cancer Diagnosis Patients

No Diagnosis Patients
Cancer diagnoses

Between June 2017 and 31\textsuperscript{st} December 2018 86 patients were diagnosed with a cancer:

17 x Lung  
7 x Colorectal  
10 x Renal  
3 x Gastric  
9 x Lymphoma  
12 x MUO  
8 x Pancreatic  
5 x Prostate

2 x Melanoma  
3 x Oesophageal  
3 x Breast  
1 x Liver  

2 x Leukaemia  
2 x TCC  
1 x Cervical  
1 x Myeloma

Number of patients monitored: 37  
Conversion rate: 11.3%

Recently (Q3), we have seen a slight increase in the number of early stage at presentation compared with previous quarters.
Non cancer diagnoses

- PE/VTE
- Gallstones
- Heart Failure
- Giant cell arthritis
- Gastritis
- Polymyalgia Rheumatic
- Stomach Ulcer
- AVM
- Hyperthyroidism
- IDA
- Mesenteric ischaemia
- Haemachromatosis
- Diverticular disease
- Depression
- Osteoporosis
- Frailty
- And many others…….

Highest number of onward referrals: Respiratory

- Lung Cancer
- Lung Nodules
- Bronchiectasis
- Emphysema
- Pneumonia
- Tuberculosis
- Sarcoidosis
- Exacerbation of respiratory disease
- Inflammatory changes
- Unexplained lung abnormalities on scan
RDC@NPTH clinic outcomes – based on onward management of all patients seen

Clinic Outcomes based on onward patient management
Feedback:

Patients:
- ‘I walked in feeling very low, 3 hours later I had an answer and my wellbeing was lifted by the visit. No waiting, a complete feeling of being a valued patient, thank you.’
- ‘Everyone was very kind and helpful and I felt cared for – as a person, not just a number.’
- ‘I had a positive result, so the system did meet my expectations. Less time to worry

GPs:
- ‘I am very impressed that such a service is available to GP's in the local area. The patient was seen promptly and had the necessary investigations.’
Economic Evaluation of the ABMUHB Pilot Rapid Diagnosis Centre
The aim of the economic evaluation

• To estimate the **costs and consequences** of the **Rapid Diagnosis Centre** in improving outcomes compared to usual care for people with vague/non-specific symptoms that could be due to cancer (but do not fit USC referral pathway)
Methods - Overview

- **Population**: Patients aged 18 years and over with vague and/or non-specific symptoms which may be due to cancer

- **Intervention group**: Patients referred to, and seen at, Rapid Diagnosis Centre

- **Comparator group**: Patients referred to USC pathway by GP but then downgraded due to lack of red flags

- **Outcomes**: Patient waiting times, time to diagnosis, implementation cost of the RDC, total cost from referral to diagnosis, cost-effectiveness
Methods - Overview

- Build a discrete event simulation model to estimate the costs, waiting times and impact on patient quality of life of the RDC in the diagnosis of patients with non-specific symptom suspicious of cancer between referral and diagnosis.

- Identify a suitable and relevant comparator together with the RDC team.

- Undertake a patient flow analysis to estimate the impact of changes to the service on patient waiting time during their RDC appointment.
Methods – Input parameters

Routine data from all RDC NPT patients up to May 2018 (n = 189):
  • RDC attendance, tests, outcome, further investigations, follow up
  • Cost of running RDC on a monthly basis

Comparator data (n = 85):
  • Healthcare resource use and costs of all investigations between referral and diagnosis (hospital data hand-searched)

Patient quality of life (from published literature)
The results – Time at RDC

- Patients just over 3 hours at RDC clinic (if they have a suspicion of cancer diagnosis)
- Just under 2 ¾ hours if they either have a different diagnosis, the doctors need to investigate further or if they are discharged to the GP.
- Queuing times are between 0.28 minutes 37 minutes (95% CI: 15.20 to 15.53) depending on number of patients seen per clinic.
- Patients diagnosed with cancer wait on average 15.29 minutes (95% CI: 14.50 to 16.08) for the CNS appointment post cancer diagnosis.
## The results - Time to diagnosis

<table>
<thead>
<tr>
<th></th>
<th>Time to diagnosis (SD)</th>
<th>Derived from:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean time to RDC diagnosis (days)</td>
<td>5.90 (3.44)</td>
<td>RDC routine data (up to May 2018)</td>
</tr>
<tr>
<td>Mean time to diagnosis RDC + further investigations (days)</td>
<td>40.76* (27.96)</td>
<td>RDC routine data (up to May 2018)</td>
</tr>
<tr>
<td>Mean time to diagnosis comparator arm (days)</td>
<td>84.22 (65.27)</td>
<td>NPT hospital records</td>
</tr>
</tbody>
</table>

*If 4 outliers are removed, this decreases to 33.85 days.

SD=standard deviation
The results - Implementation cost

- Including total staff costs per half-day clinic, CT scan, any additional tests (including blood, urine and faecal tests, echocardiograms, electrocardiograms and MRIs)

<table>
<thead>
<tr>
<th>Number of patients per clinic</th>
<th>RDC cost per patient</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 patient</td>
<td>£2,758.05</td>
</tr>
<tr>
<td>2 patients</td>
<td>£1,438.13</td>
</tr>
<tr>
<td>3 patients</td>
<td>£998.16</td>
</tr>
<tr>
<td>4 patients</td>
<td>£778.17</td>
</tr>
<tr>
<td>5 patients</td>
<td>£646.18</td>
</tr>
</tbody>
</table>
# Healthcare cost between referral and diagnosis

<table>
<thead>
<tr>
<th>Outcome category</th>
<th>Mean cost per RDC patient (SD) n=189</th>
<th>Cost per comparator patient (SD) n=85</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>4 patients per clinic</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cancer diagnosis</td>
<td>£778.17 (£2,106.96)</td>
<td>£2,396.99 (687.69)</td>
<td>-£1,618.82</td>
</tr>
<tr>
<td>Other diagnosis</td>
<td>£778.17</td>
<td>£871.43 (687.69)</td>
<td>-£93.26</td>
</tr>
<tr>
<td>No serious pathology found</td>
<td>£778.17</td>
<td>£515.01 (£138.94)</td>
<td>£263.16</td>
</tr>
<tr>
<td>Further investigations</td>
<td>£1,168.27 (£214.27)</td>
<td>£953.07 (£381.42)</td>
<td>£215.20</td>
</tr>
<tr>
<td><strong>5 patients per clinic</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cancer diagnosis</td>
<td>£646.18 (£2,106.96)</td>
<td>£2,396.99 (687.69)</td>
<td>-£1,750.81</td>
</tr>
<tr>
<td>Other diagnosis</td>
<td>£646.18</td>
<td>£871.43 (687.69)</td>
<td>-£225.25</td>
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<tr>
<td>No serious pathology found</td>
<td>£646.18</td>
<td>£515.01 (£138.94)</td>
<td>£131.17</td>
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<tr>
<td>Further investigations</td>
<td>£1,036.28 (£214.27)</td>
<td>£953.07 (£381.42)</td>
<td>£83.20</td>
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</table>
Cost-effectiveness – Cost-utility analysis

RDC is less costly and more effective compared to usual care (referral to USC pathway followed by downgrade)

<table>
<thead>
<tr>
<th></th>
<th>No RDC</th>
<th>RDC</th>
<th>Difference (95% Confidence interval)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 patients per clinic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td>£943,693</td>
<td>£917,826</td>
<td>-£25,868</td>
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<tr>
<td>QALY</td>
<td>1,415.81</td>
<td>1,425.01</td>
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<tr>
<td>ICER (Cost per QALY)</td>
<td>-£2,812</td>
<td>(dominates)</td>
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<tr>
<td>5 patients per clinic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td>£943,693</td>
<td>£785,836</td>
<td>-£157,858</td>
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<tr>
<td>QALY</td>
<td>1,415.81</td>
<td>1,425.01</td>
<td>9.1987</td>
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<tr>
<td>ICER (Cost per QALY)</td>
<td>-£17,161</td>
<td>(dominates)</td>
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Based on a simulated model cohort of 1,000 patients
If the RDC was run at full capacity (5 patients per clinic) for one year, it would be **£84,482 less expensive** compared to USC downgrade.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Cost with RDC</th>
<th>Cost without RDC (usual care)</th>
<th>Budget impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current provision (mean 4 patients per clinic)</td>
<td>£367,442.81</td>
<td>£382,231.22</td>
<td>-£14,788.41</td>
</tr>
<tr>
<td>Full capacity (5 patients per clinic)</td>
<td>£393,307.52</td>
<td>£477,789.03</td>
<td>-£84,481.51</td>
</tr>
</tbody>
</table>
Summary

• The RDC addresses an unmet need and provides excellent value for money.

• Cost-effectiveness depends on patient numbers per clinic, but **RDC is less costly and more effective than usual care when run at (or near) full capacity.**

• The **RDC reduces mean time until diagnosis** from 84 days for comparator patients to 6 days for patients diagnosed during RDC and 41 days for patients requiring further investigations after their RDC appointment.
Our learning points

• Development of a **minimum dataset**, or indeed a registry, to aid any future evaluations of the clinical and cost-effectiveness of the RDC.

• **Harmonisation of key data items** of RDC models across Wales and the UK to enable comparisons.

• Further investigation and consensus on what constitutes a **suitable comparator** for local context and national comparisons.

• Using this model as a template for future developments (e.g. to capture longer-term horizons) that enable **further investigation as data matures**.
Thank you very much. Do you have any questions?