

CANCER EARLIER DIAGNOSIS – POSSIBILITIES AND CONSEQUENCES

FOUNDATION FOR SCIENCE
AND TECHNOLOGY DEBATE –
11 JULY 2017

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CANCER RESEARCH UK

KEY POINTS: CANCER EARLIER DIAGNOSIS

The imperative

The possibilities

Consequences for patients and individuals

Implications for the health system

THE IMPORTANCE OF EARLY DIAGNOSIS

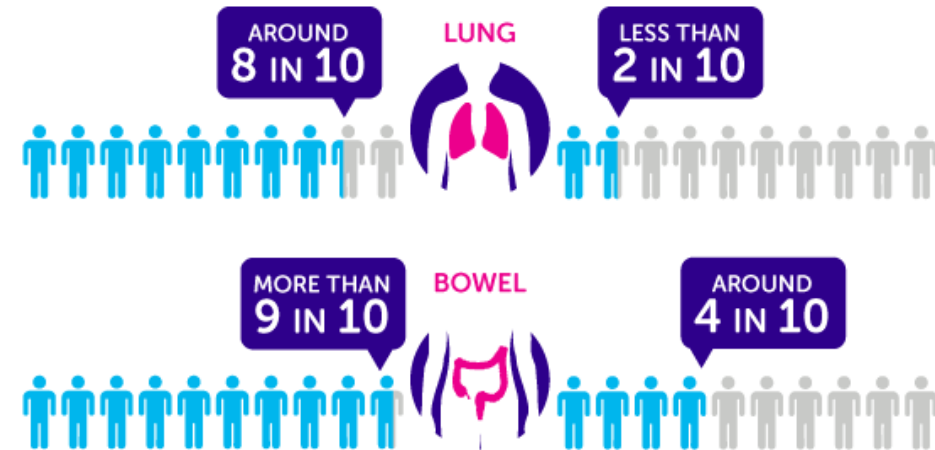
LATE DIAGNOSIS = POORER OUTCOME

SURVIVAL BY STAGE AT DIAGNOSIS

 = PEOPLE SURVIVING THEIR CANCER FOR ONE YEAR OR MORE
2014

DIAGNOSED EARLIER
AT STAGE I

DIAGNOSED LATER
AT STAGE IV

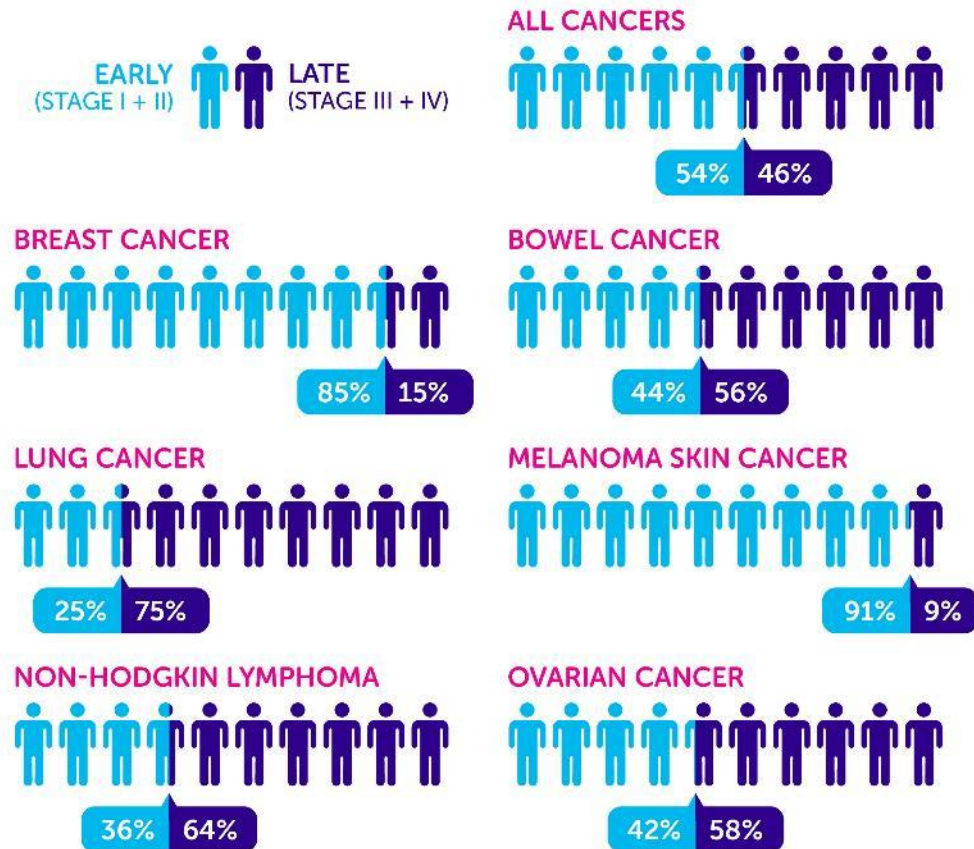


Data for people diagnosed in England in 2014
Source: ONS/PHE, Cancer survival by stage at diagnosis for England (experimental statistics)

THE IMPORTANCE OF EARLY DIAGNOSIS

EARLY AND LATE CANCER DIAGNOSIS

STAGE OF CANCER WHEN DIAGNOSED, ENGLAND 2014



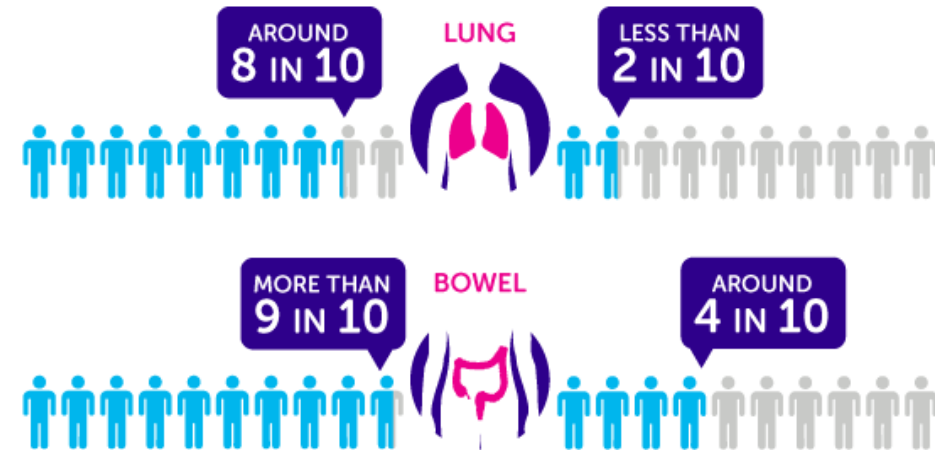
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Source: National Cancer Intelligence Network. Stage Breakdown by CCG 2014. London: NCIN; 2016.

EARLIER DIAGNOSIS HAS THE POTENTIAL TO REDUCE TREATMENT COSTS

The average cost of Stage 1 lung cancer is estimated at **£7,952**

The average cost of Stage 1 colon cancer is estimated at **£3,373**

The average cost of Stage 1 rectal cancer is estimated at **£4,449**

The average cost of Stage 4 lung cancer is estimated at **£13,078**

The average cost of Stage 4 colon cancer is estimated at **£12,519**

The average cost of Stage 4 rectal cancer is estimated at **£11,815**

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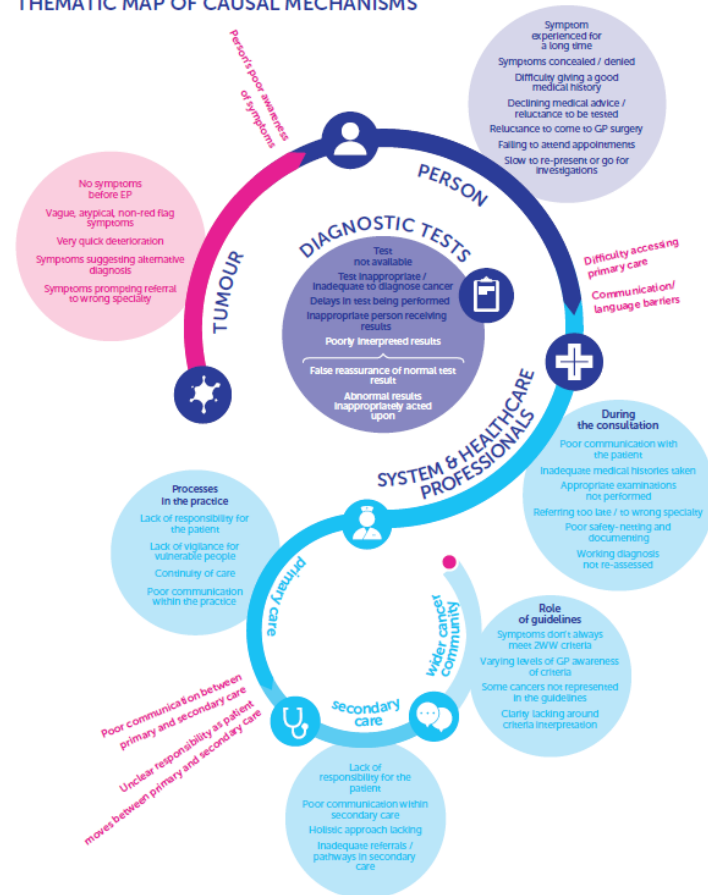
Implications for the health system

THE POSSIBILITIES FOR EARLIER DIAGNOSIS

- Screening uptake
- Investment in additional capacity
- System efficiency and effectiveness
- Pathway redesign
- Active surveillance – groups at high risk
- New technologies

WHY AREN'T PEOPLE BEING DIAGNOSED EARLY?

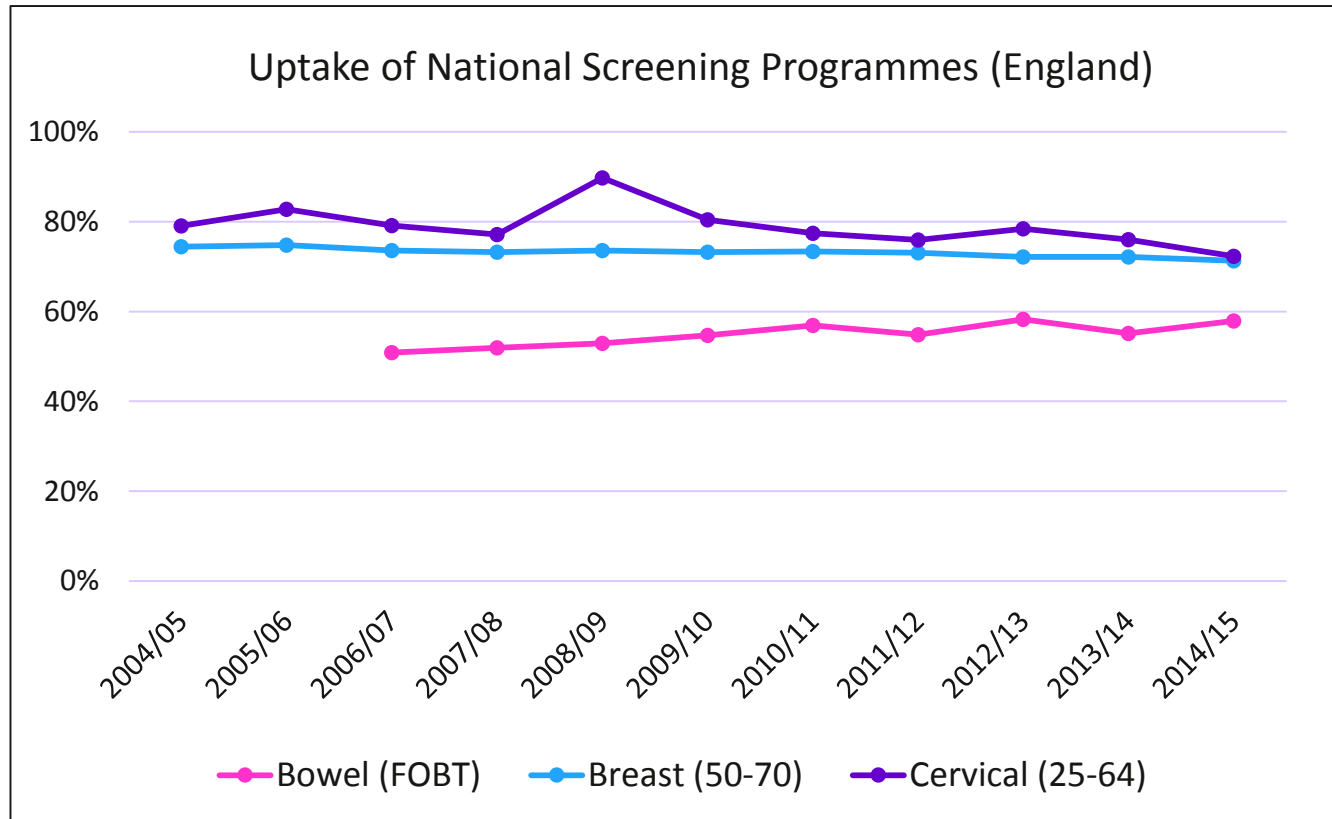
DIAGNOSIS OF CANCER THROUGH AN EMERGENCY PRESENTATION* THEMATIC MAP OF CAUSAL MECHANISMS



THERE ARE MANY REASONS INCLUDING:

- PATIENT FACTORS
- SYSTEM AND HEALTHCARE PROFESSIONAL FACTORS
- ISSUES WITH DIAGNOSTIC TESTS

UPTAKE OF BOWEL CANCER SCREENING IS POOR

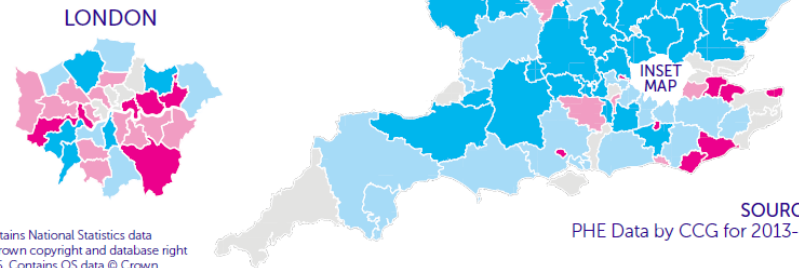
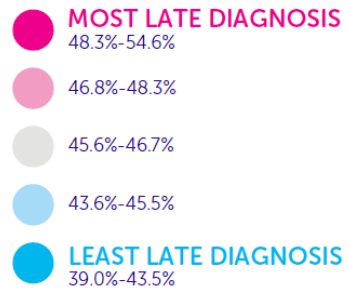


- Bowel screening (gFOBT) is about 10 years old now, but uptake remains lower than other national screening programmes
- Bowel cancer mortality is 25% lower in those who've taken part in bowel screening (gFOBT)
- There are significant inequalities in uptake related to:
 - Deprivation
 - Sex (lower in men)
 - Age

REGIONAL VARIATION IN STAGE AT DIAGNOSIS

UNADJUSTED

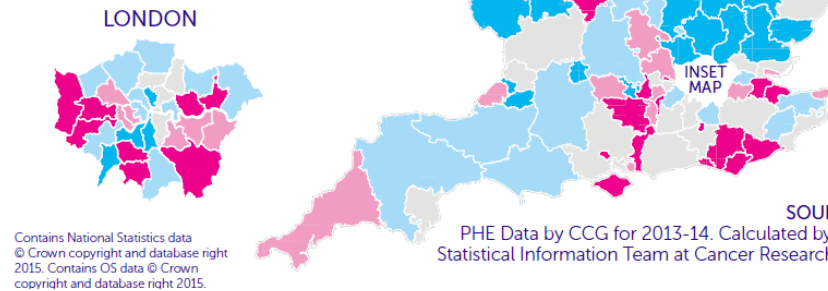
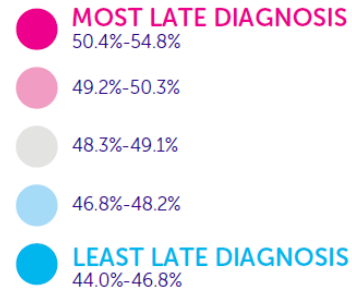
Percentage of cancers diagnosed at a late stage (Stage 3 and 4) where stage at diagnosis is known:



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ADJUSTED FOR CANCER TYPE

Percentage of cancers diagnosed at a late stage (Stage 3 and 4) where stage at diagnosis is known, weighted according to cancer type incidence:



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ADDITIONAL DRIVERS OF VARIATION

GENDER

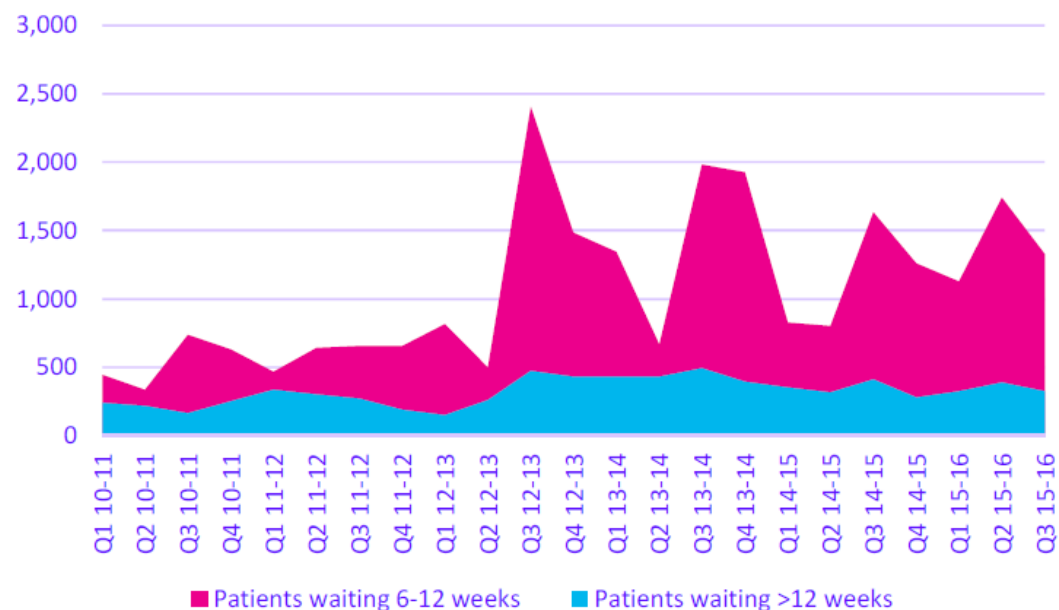
AGE

SOCIOECONOMIC FACTORS

ETHNICITY

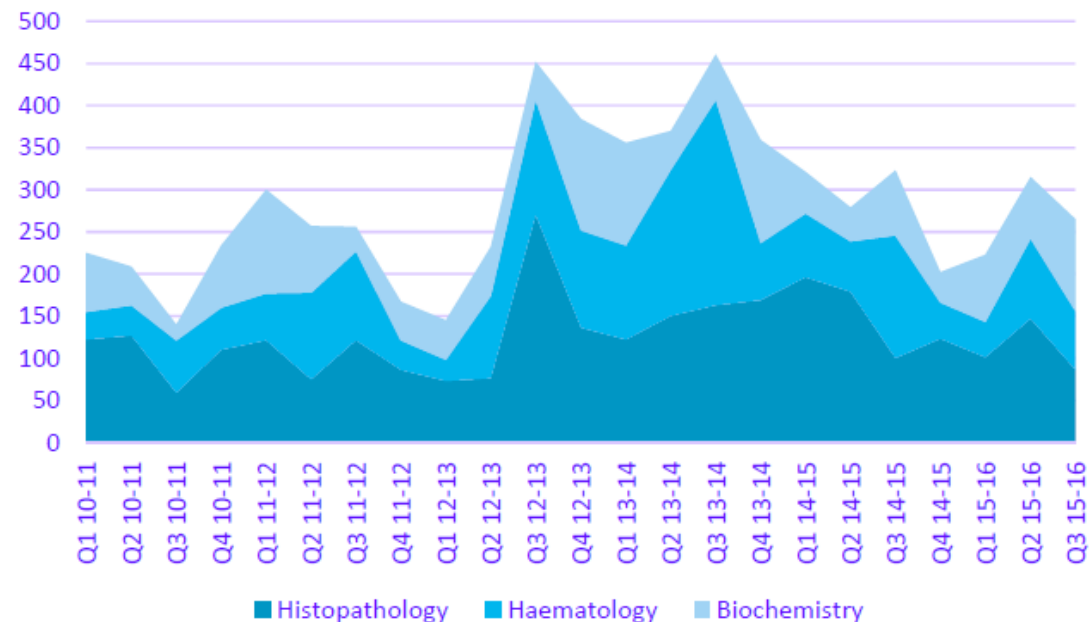
WAITING TIMES FOR PATHOLOGY SERVICES ARE INCREASING

PATIENTS WAITING MORE THAN SIX WEEKS FOR PATHOLOGY DIAGNOSTICS AT QUARTER END



Source: NHS England Quarterly Diagnostic Waiting Times Statistics

PATIENTS WAITING >12 WEEKS FOR PATHOLOGY DIAGNOSTICS AT QUARTER END



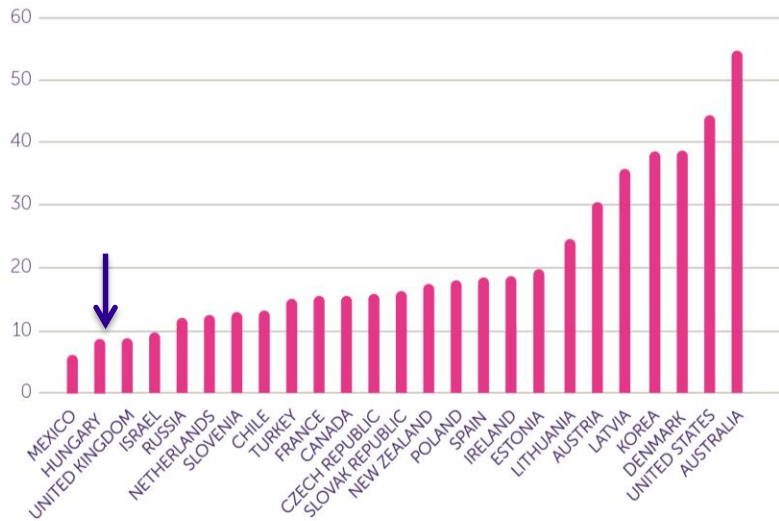
Source: NHS England Quarterly Diagnostic Waiting Times Statistics

WE KNOW WE HAVE LESS IMAGING EQUIPMENT AND FEWER TRAINED STAFF IN THE UK

COMPUTED TOMOGRAPHY (CT) SCANNERS

Per 1 000 000 inhabitants, 2013

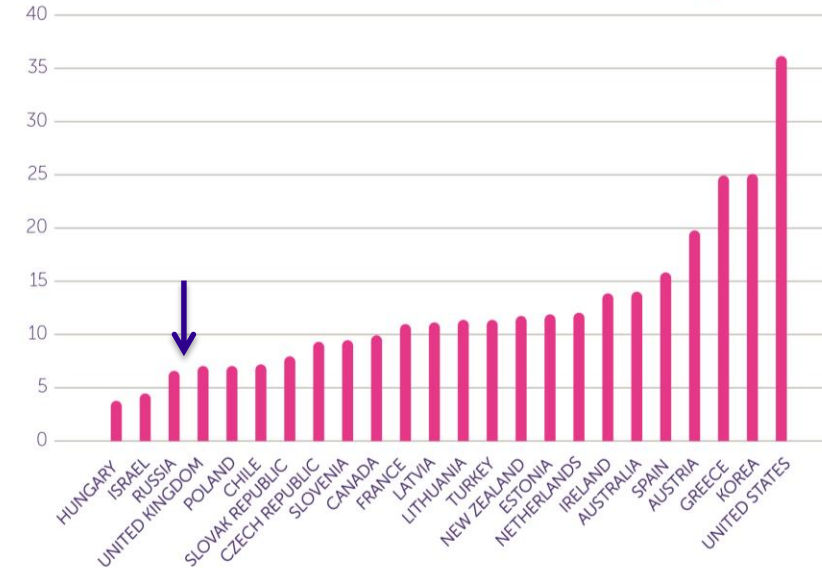
● TOTAL



MAGNETIC RESONANCE IMAGING (MRI)

Per 1 000 000 inhabitants, 2013

● TOTAL



Fewer trained radiologists

Per 1 000 000 inhabitants, 2013



A FASTER DIAGNOSIS STANDARD HAS BEEN SET



 **TARGET
4 WEEKS MAX**

Any patient referred for testing is definitively diagnosed/ cancer is excluded **AND** the result communicated to the patient, **within four weeks.**

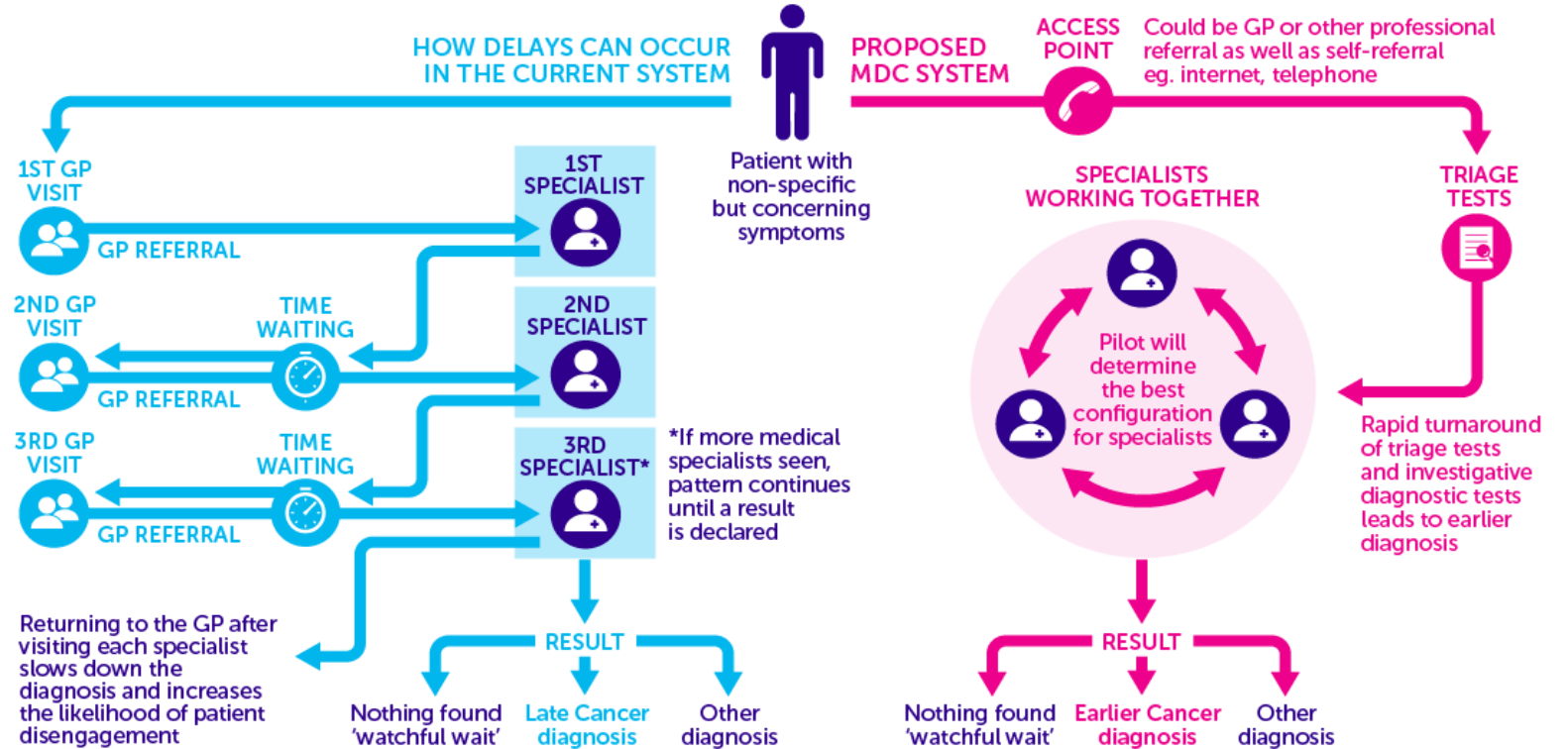
AMBITION

- **95%** of patients have this by 2020
- **50%** definitively diagnosed within 2 weeks

THE ACE PROGRAMME

- A programme to **accelerate, coordinate and evaluate (ACE)** innovation and streamline diagnostic pathways to achieve earlier diagnosis of cancer.
- **ACE 2** is piloting **six projects** trialling a new diagnostic pathway for patients with vague symptoms – an approach incorporating a **Multidisciplinary Diagnostic Centre** as in Denmark.

HOW MDC'S COULD IMPROVE EARLY CANCER DIAGNOSIS



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- **New technologies:**
 - Circulating biomarkers – CTCs, ctDNA, autoantibodies
 - Volatile compounds
 - Imaging, e.g. low-dose CT, ultrasound
 - Cell capture – nasal, oesophageal brushings etc
 - AI/machine learning – combining medical and non-medical data sets

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CONSEQUENCES FOR PATIENTS AND INDIVIDUALS

- False positives (e.g. LDCT 96%)
- False negatives
- Over-diagnosis (e.g. breast screening)
- Identifying tissue of origin

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IMPLICATIONS FOR HEALTH SYSTEM

- Greater investment upstream – new technologies, diagnostic capacity
- Shift in resource requirements downstream – surgery vs treating metastatic disease
- Role of primary care:
 - Smaller? (Patients with known symptoms – straight to test?)
 - Larger? (Community based testing?)

IMPLICATIONS FOR HEALTH SYSTEM

- Greater investment upstream – new technologies, capacity
- Shift in resource requirements – surgery
- Role of ...

Better outcomes
Better resource utilisation

... known symptoms – straight to

(Community based testing?)

LOOKING TO THE FUTURE – CRUK RESEARCH

- Understanding of early disease biology
- Biomarkers of disease:
 - Pre-cursors
 - Early cancers
- New imaging modalities
- Distinguishing lethal cancers that need treating from non-lethal ones which don't
- Use of AI/machine learning:
 - Radiology and pathology – capacity (and accuracy?)
 - Investigation or presentation patterns

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