The UK is uniquely positioned among larger countries in the world to undertake high quality epidemiological and health services research related to cancer and to use this information to improve cancer outcomes
The UK leads the way in cancer intelligence

• Best intelligence in the world
  – E.g. Lung cancer audit

• Biggest cancer data set in world

• Strengths in clinically led data

Genetic frequency data indicates that cancer is driven by a few significant genetic changes

**Frequency of mutations in colorectal cancers**

100+ cancers combined show high frequency mutations

Uncommon mutations are probably incidental

Can understanding major mutations help with prognosis and treatment?

Wood et al, Science Nov 2007
Stratifying a population through genetic analysis allows identification of subgroups which are more or less likely to respond well to particular treatments.


Information about tumour type and genetic make up will increasingly influence treatment decisions, resulting in better cancer outcomes.

Scientific and industrial advances mean that genetic data is now affordable and useful

Whole genome sequencing is now affordable in care

Genetic data helps cancer patients

The UK has advantages in rolling out a national programme of genetic stratified medicine in cancer

- Single public funded payer simplifies financial incentives (as opposed to US model)
- National organisation facilitates roll-out

- NICE driving stratification to increase cost/quality
- QIPP pressure to avoid ineffective treatment

- State, public, private, philanthropic, political and academic groups aligned on the need to drive service improvement in cancer research and services
CR-UK is spearheading stratified medicine in the NHS

The programme builds on existing genetic testing to create a scalable standard model, linked to research

<table>
<thead>
<tr>
<th>Phase</th>
<th>1 (first 2 years)</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>Now</td>
<td>2011-2013</td>
</tr>
<tr>
<td>Scale</td>
<td>• c.20 labs</td>
<td>• Select 3 labs</td>
</tr>
<tr>
<td>Cases</td>
<td>• c. 10,000 cases/year</td>
<td>• Additional 9,000 cases over 2 years</td>
</tr>
<tr>
<td>Cancers</td>
<td>• Mainly Lung, Breast and Colorectal</td>
<td>• Lung/Br./CR/Prostate/Ovarian/Melanoma</td>
</tr>
<tr>
<td>Testing</td>
<td>• Testing is not routine practice or standardised</td>
<td>• Standardised sequencing for existing and future biomarkers</td>
</tr>
<tr>
<td></td>
<td>• Range of individual tests on clinical or research demand</td>
<td>• Hardwire service delivery to research</td>
</tr>
</tbody>
</table>
Phase One of the programme will deliver on five core aims that enable stratified medicine delivery and research.

1. **Significant scale across many sites**
   - 9,000 samples collected from 6 hospitals and analysed for c.20 markers in 3 labs with associated data available for research.

2. **Proven service model**
   - Detailed costs, protocols and service models for adoption across the NHS of a genetic testing service, delivered within clinical turnaround times.

3. **Routine consent for research**
   - All patients consented for DNA, diagnostic, treatment and outcome data to be linked and stored in a secure research database

4. **Bioinformatics database**
   - Detailed specifications for an information system that can link and extract anonymised diagnostic, treatment and outcome data

5. **New cancer assays**
   - Development (via the TSB) of a standardised and validated £300 panel of genetic tests for the important clinical and research markers in the major solid tumours

**Future Challenges**

- Scale-up from pilot phase – sites & cancer types
- Additional mutations (and other tests)
- Tumour evolution – repeat testing
- Identification of needed/ missing data
- Stratified prevention/surveillance
Summary

• UK is leading the world in rolling out a stratified medicine programme

• NCIN is uniquely placed to receive, interpret and disseminate this data

Together we will beat cancer