Improving Patient Outcomes Through Information – Stratified Medicine

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NCIN Conference

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Together we will beat cancer

CANCER RESEARCH UK

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

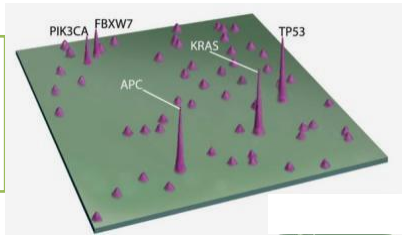
The UK leads the way in cancer intelligence

- Best intelligence in the world
  - E.g. Lung cancer audit
- Biggest cancer data set in world
- Strengths in clinically led data

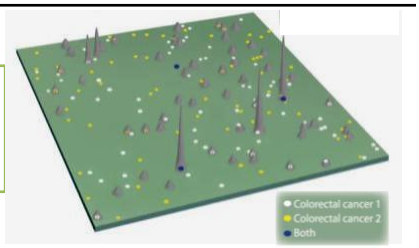
Genetic frequency data indicates that cancer is driven by a few significant genetic changes

Frequency of mutations in colorectal cancers

100+ cancers combined show high frequency mutations



Uncommon mutations are probably incidental

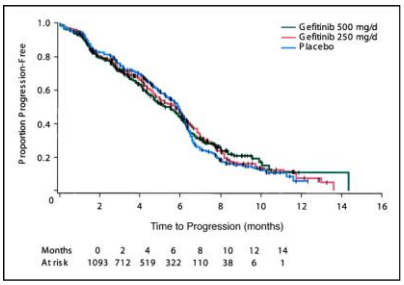


Can understanding major mutations help with prognosis and treatment ?

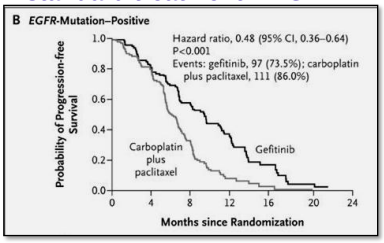
Wood et al, Science Nov 2007

Stratifying a population through genetic analysis allows identification of subgroups which are more or less likely to respond well to particular treatments

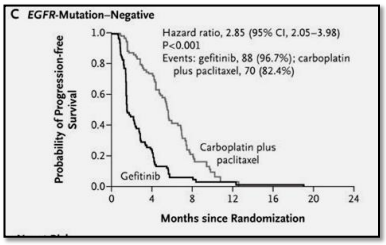
Gefitinib no more effective than placebo overall



Gefitinib more effective than standard treatment if EGFR+

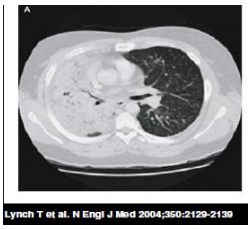


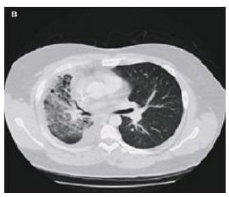
Gefitinib less effective than standard treatment if EGFR-

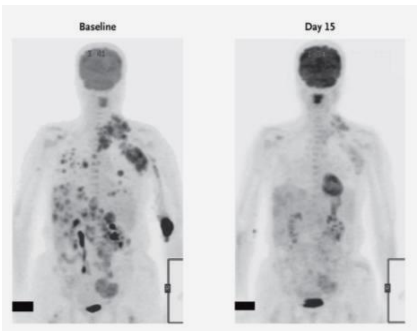


Giaccone, G. et al. J Clin Oncol; 22:777-784 2004
Mok T et al. N Engl J Med 2009;361:947-957

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



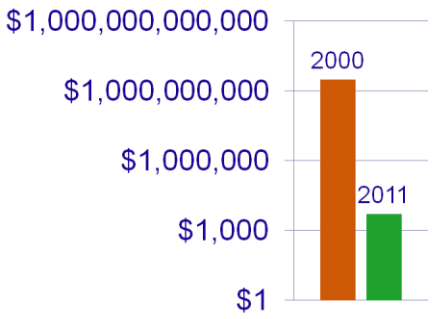




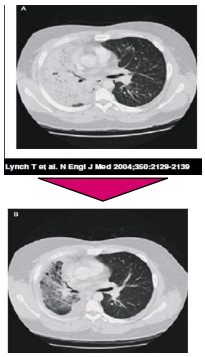
Flaherty KT et al. N Engl J Med 2010;363:809-819.

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



Source: Colins (Nature) 2010, Lynch et al (NEJM) 2004

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

National health service	• Single public funded payer simplifies financial incentives (as opposed to US model) • National organisation facilitates roll-out
Focus on value	• NICE driving stratification to increase cost/quality • QIPP pressure to avoid ineffective treatment
Alignment in oncology	• State, public, private, philanthropic, political and academic groups aligned on the need to drive service improvement in cancer research and services

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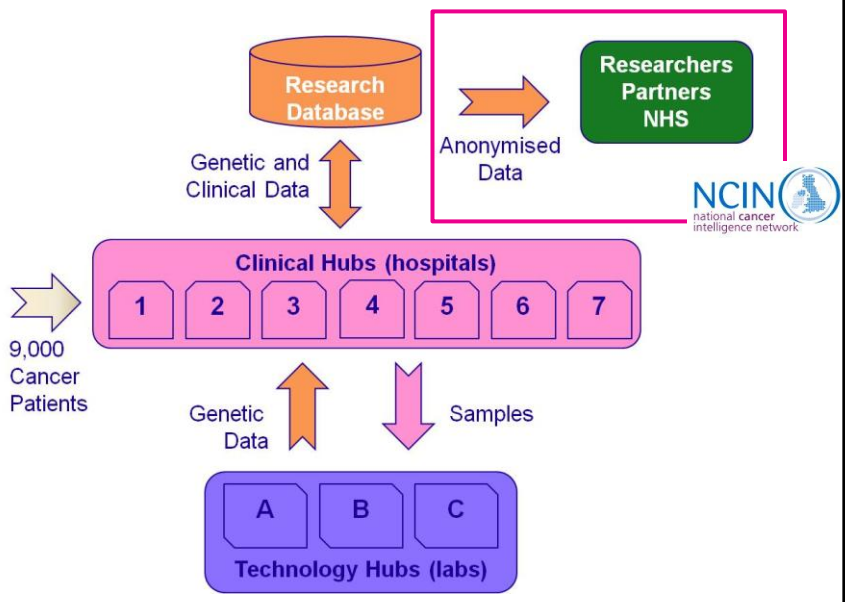
CR-UK is spearheading stratified medicine in the NHS



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

	Existing testing services	Demonstrate new model	Begin roll-out across NHS
Phase		1 (first 2 years)	2
Time	Now	2011-2013	2013 and onwards
Scale	• c.20 labs	• Select 3 labs	• National, cross-disease
Cases	• c. 10,000 cases/year	• Additional 9,000 cases over 2 years	• As many as is cost-effective for treatment
Cancers	• Mainly Lung, Breast and Colorectal	• Lung/Br./CR/Prostate/ Ovarian/Melanoma	• Add less common types
Testing	• Testing is not routine practice or standardised • Range of individual tests on clinical or research demand	• Standardised sequencing for existing and future biomarkers • Hardwire service delivery to research	• As phase 1 • One standard service across the NHS

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

22 June, 2011

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

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