

Stratified Medicine

Cancer Research UK

Together we will beat cancer

Genetic information is one of many information sources that can help clinical decision-making

Information (examples)

- | | | | | | |
|-------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| •Lifestyle | •Imaging | •Pathology | •Pathology | •Lifestyle | •Patient preferences |
| •Family history | •Chemical biomarkers | •Imaging | •Imaging | •Pathology | •Imaging |
| • Genetics | • Genetics | •Chemical biomarkers | •Chemical biomarkers | •Imaging | •Chemical biomarkers |
| | | • Genetics | • Genetics | •Chemical biomarkers | |

Pre-disease

Detectable disease

Diagnosis

Curative treatment

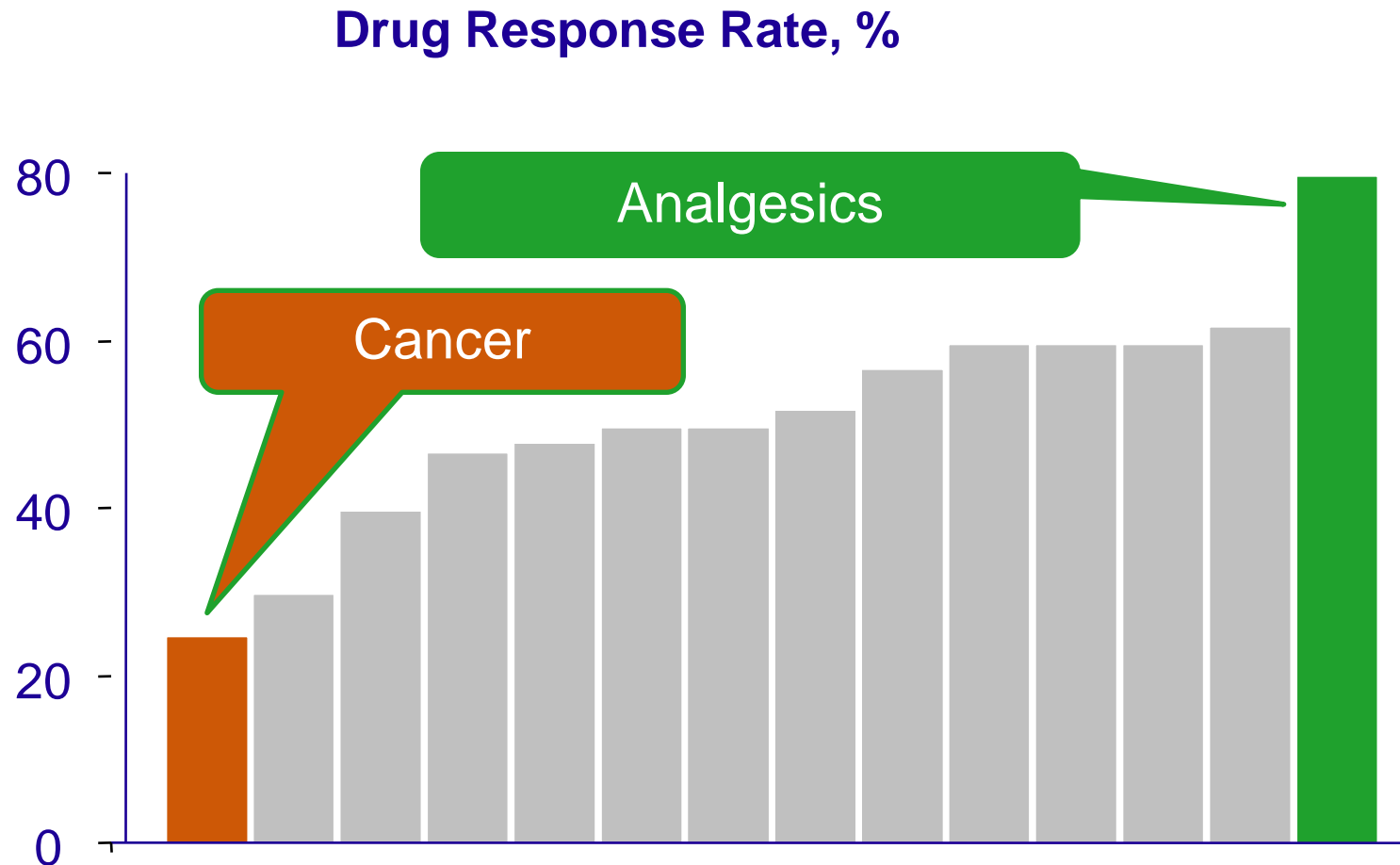
Disease mgmt

Palliative care

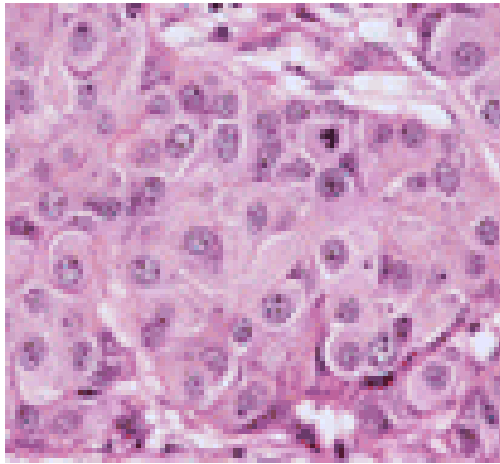
Decisions (examples)

- | | | | | | |
|-----------------------------|------------------------|-------------------------------------|--------------------|--------------------|------------------|
| •Lifestyle advice | •Further investigation | •Diagnose | •Adjust treatments | •Monitoring | •Palliative care |
| •Screening | •Diagnose | •Chose treatments | •Change treatments | •Adjust treatments | •Place of death |
| •Preventative interventions | •Reassure | (e.g. surgery, radiotherapy, drugs) | | •Lifestyle advice | |
| | | •Inform patient | | | |

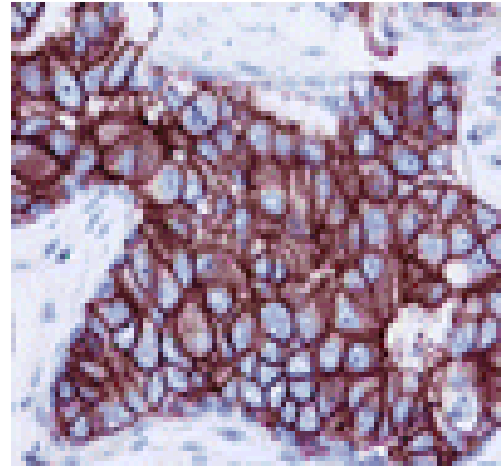
For example, genetic information could be a way increase prescription effectiveness in cancer



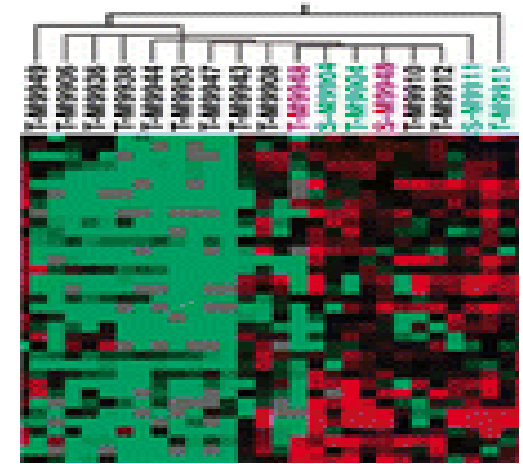
Scientific and industrial advances mean that genetic data can be used for cancer clinical decisions



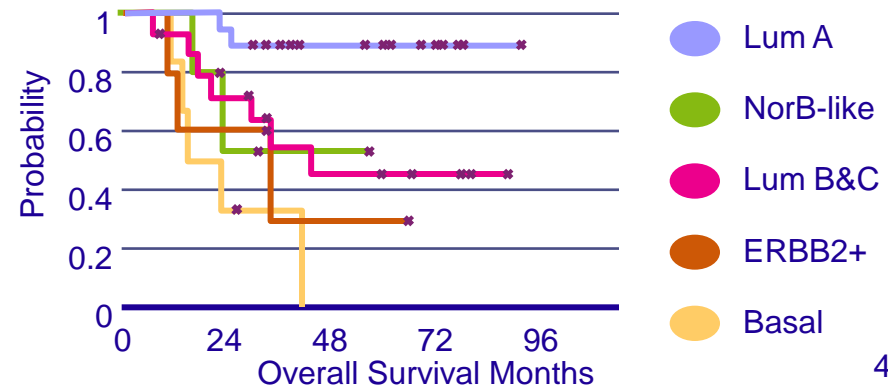
**Morphological
Diagnosis**



**Immunohistochemical
assessment**



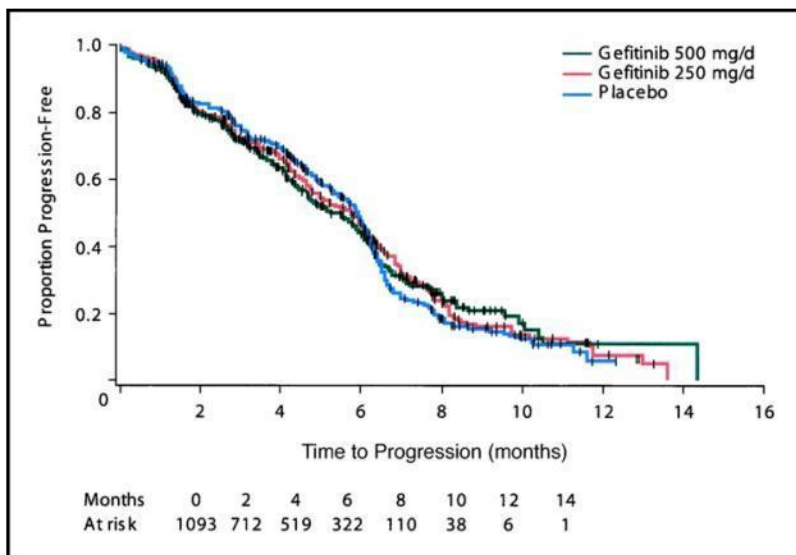
**DNA microarray
analysis**



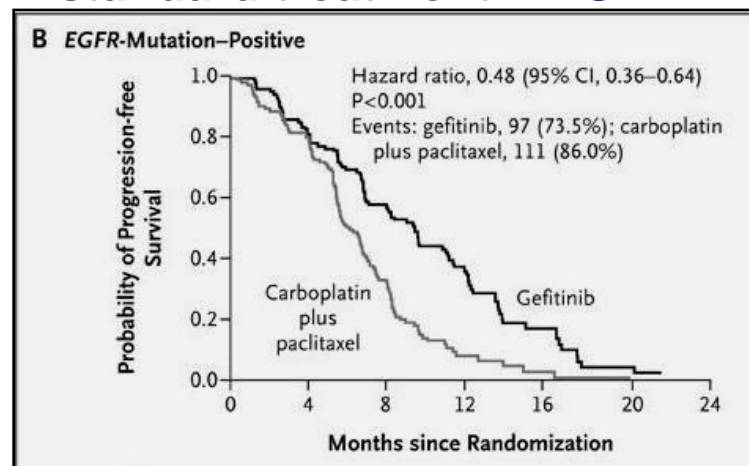
Source: Baselga and Norton, 2002

Genetic analysis can show when drugs are likely to be effective or safe

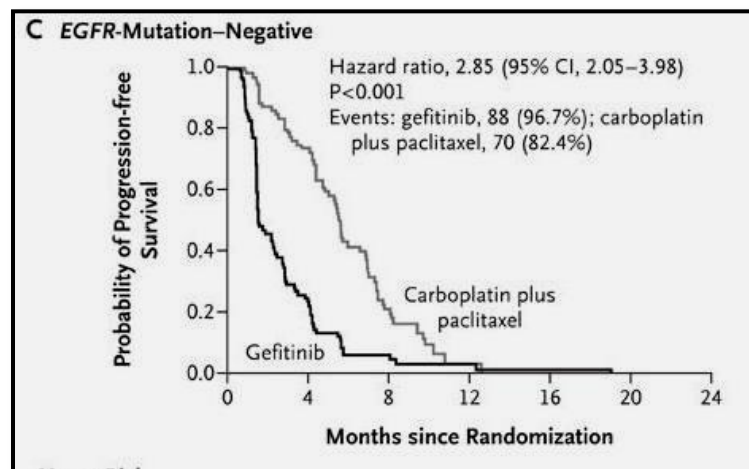
Gefitinib no more effective than placebo overall



Gefitinib more effective than standard treatment if EGFR+



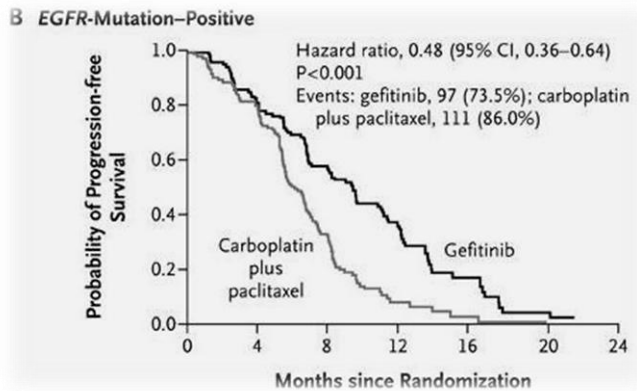
Gefitinib less effective than standard treatment if EGFR-



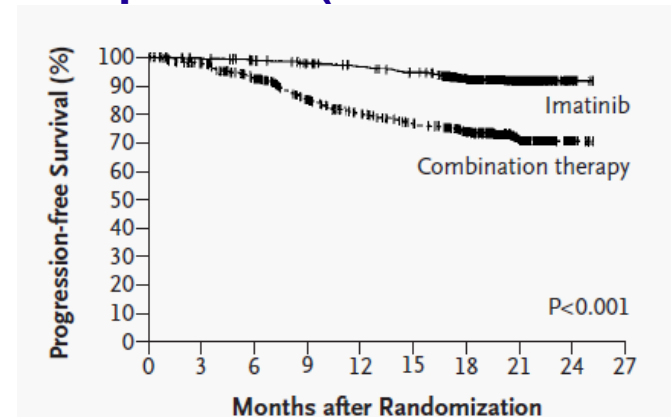
Source: Giaccone, G. et al. J Clin Oncol; 22:777-784 2004, Mok T et al. N Engl J Med 2009;361:947-957

Better patient outcomes are seen in a number of cancer drugs targeted at genetic markers

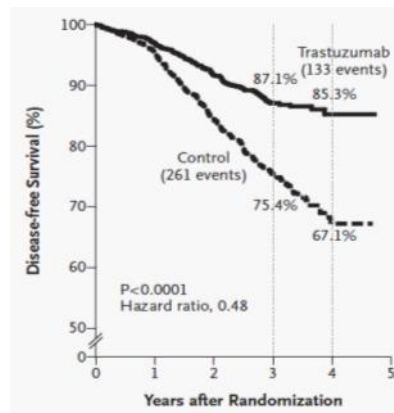
Gefitinib more effective for 20% lung patients who are EGFR+



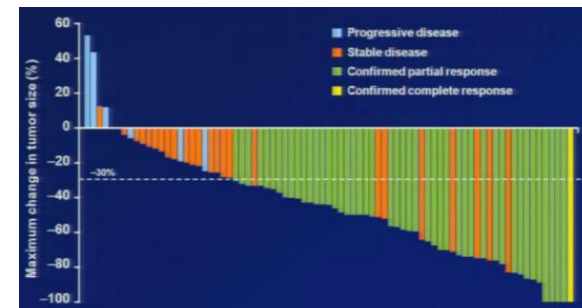
Imatinib more effective for c.85% CML patients (BRC-ABL defect)



Trastuzumab more effective for 20-30% breast patients who are HER-2 positive



Crizotinib highly promising for 3-5% lung patients who are ALK positive



The UK has comparative advantage in rolling out a national programme of stratified medicine

National health service

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

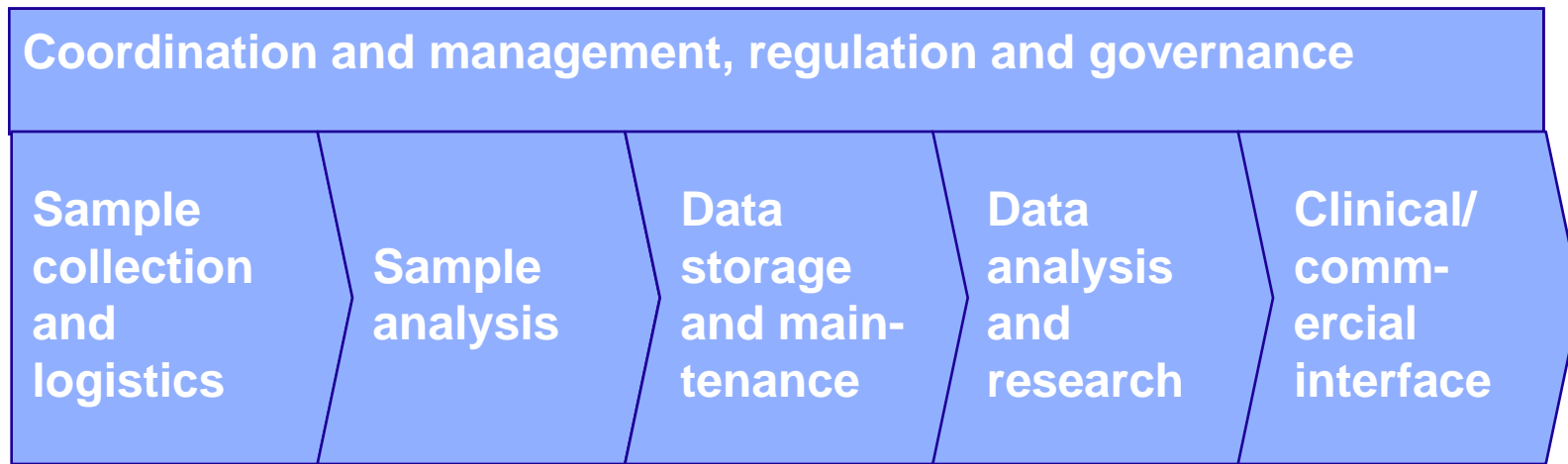
Focus on value

- NICE driving stratification to increase value
- Pressure to increase prescribing effectiveness

Alignment in oncology

- State, public, private, philanthropic, political and academic groups aligned on the need to drive service improvement in cancer research and services

Plans for the “stratified medicine” programme will cover a range of activities



- | | | | | | |
|-----------------|---|---|---|--|---|
| Service details | <ul style="list-style-type: none">• Obtain consent• Take sample and data• Sample logistics• Sample storage | <ul style="list-style-type: none">• DNA extraction• DNA microarray or sequencing• Other tests e.g. CTCs | <ul style="list-style-type: none">• Database development• Database maintenance<ul style="list-style-type: none">– Data cleansing | <ul style="list-style-type: none">• Data analysis• Report production• Research | <ul style="list-style-type: none">• Information access to clinicians, researchers, industry |
|-----------------|---|---|---|--|---|

The programme combines service delivery and research

