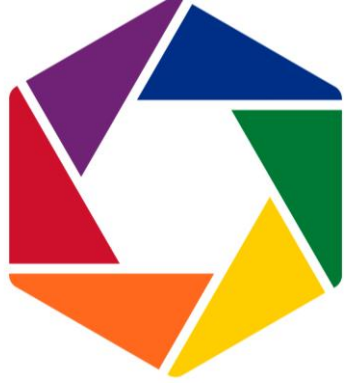




Department  
of Health &  
Social Care

# Whole Genome Sequencing as a Tool for Infection Prevention and Control

Dr Elaine Cloutman-Green



Precision AMR

## Microbiological Screening



## Microbiology Assessment



## Infection Prevention Control Assessment

**Universal screening** on admission:

- Faeces (stool sample)
- Nose and Throat swabs



**Targeted screening** during admission based on symptoms:

- Diarrhoea
- Respiratory symptoms
- Site specific



**Neutropenic screening** during admission, weekly:  
Faecal screening to identify carriage of gentamicin resistant organisms



**Organism identification**  
API or MALDI-ToF



**Antimicrobial resistance identification**

Resistance to Gentamicin + any of

- Ciprofloxacin
  - Ceftazidime
  - Piptazobactam
- or
- resistance to Amikacin/ Carbapenems irrespective of Gentamicin resistance

**Manual review of all positive microbiology results:**

- Healthcare acquired vs community acquired



- **Isolation + appropriate precautions**
- **Further site screening**
- **Cleaning advice**
- **Patient alerting (retained until de-alerting criteria met)**
- **Isolate sent for typing**



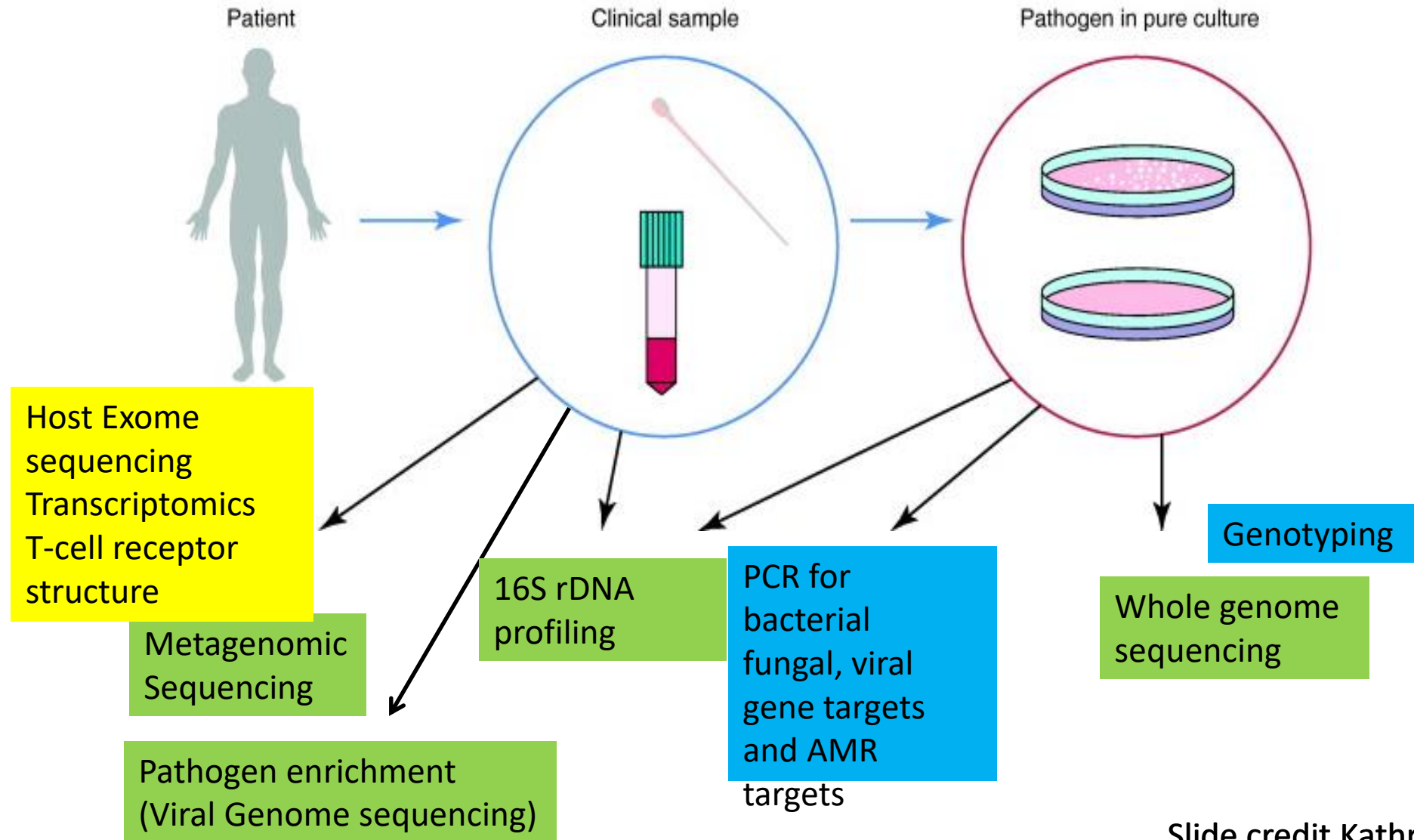
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**Source detection**

- environmental screening + environment evaluation
  - ward level patient screening + contact review
    - antimicrobial stewardship review

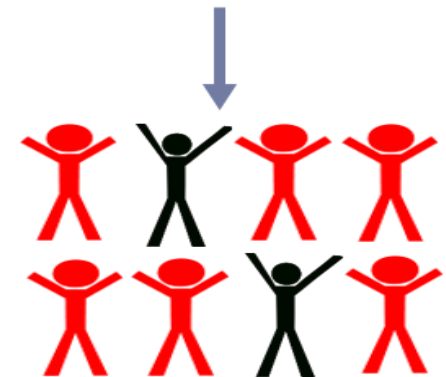
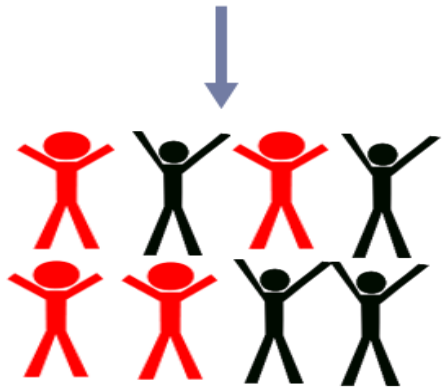
# Molecular Microbiology



# Why Is Typing Crucial Clinically?



What Information Can Typing Provide?



- Did the organism come from:
  - Prior colonisation?
  - New infection?
  - Spread from another patient or somewhere else?

Interventions

- Antibiotic policy
- Care bundle adherence
- Hand hygiene
- Probiotics/Prebiotics
- Selective digestive decontamination

- Isolation adherence
- Cleaning
- Hand hygiene
- Environmental screening
- Patient screening

**Right intervention = right use of resources**

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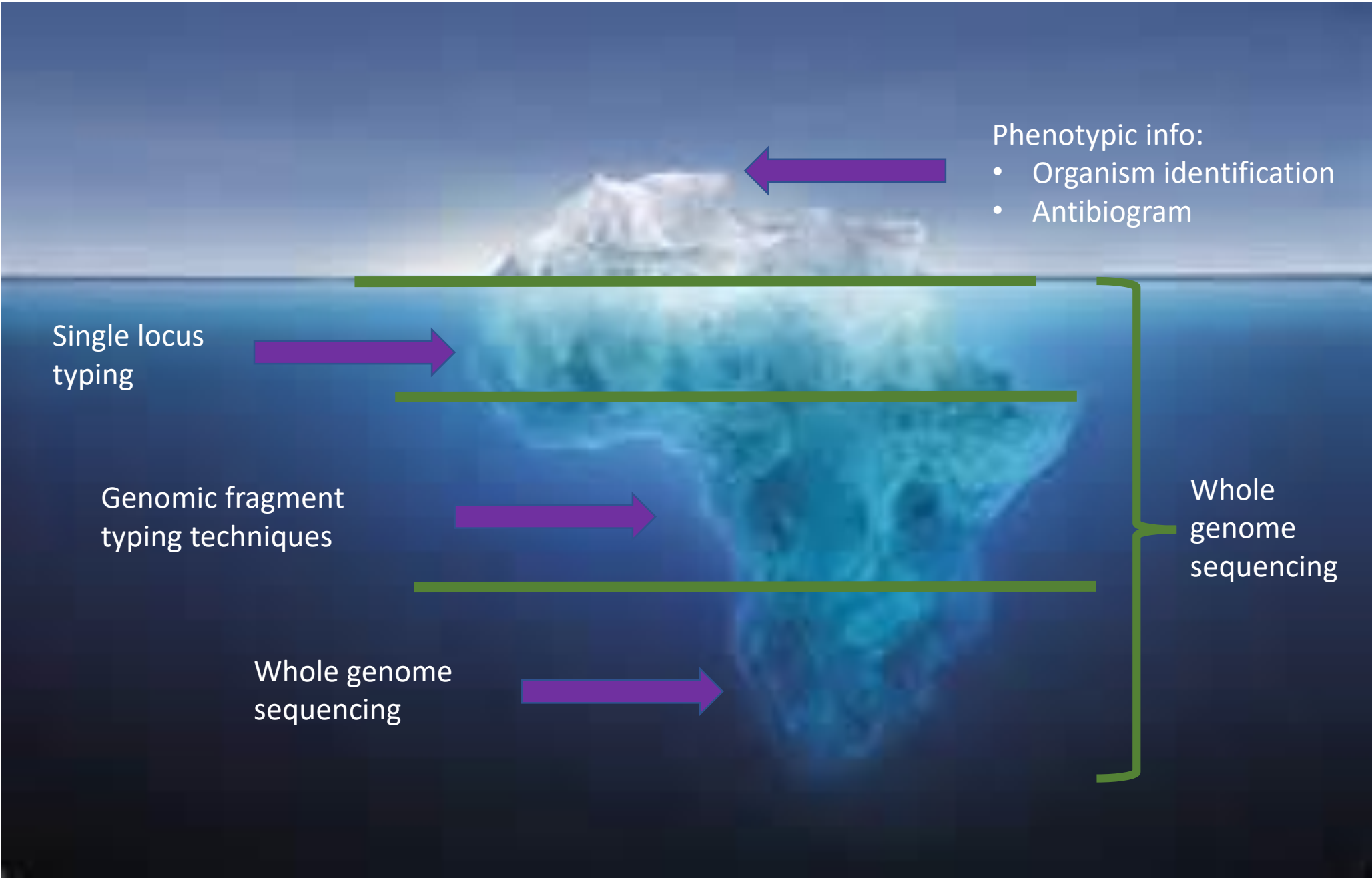


## Interventions

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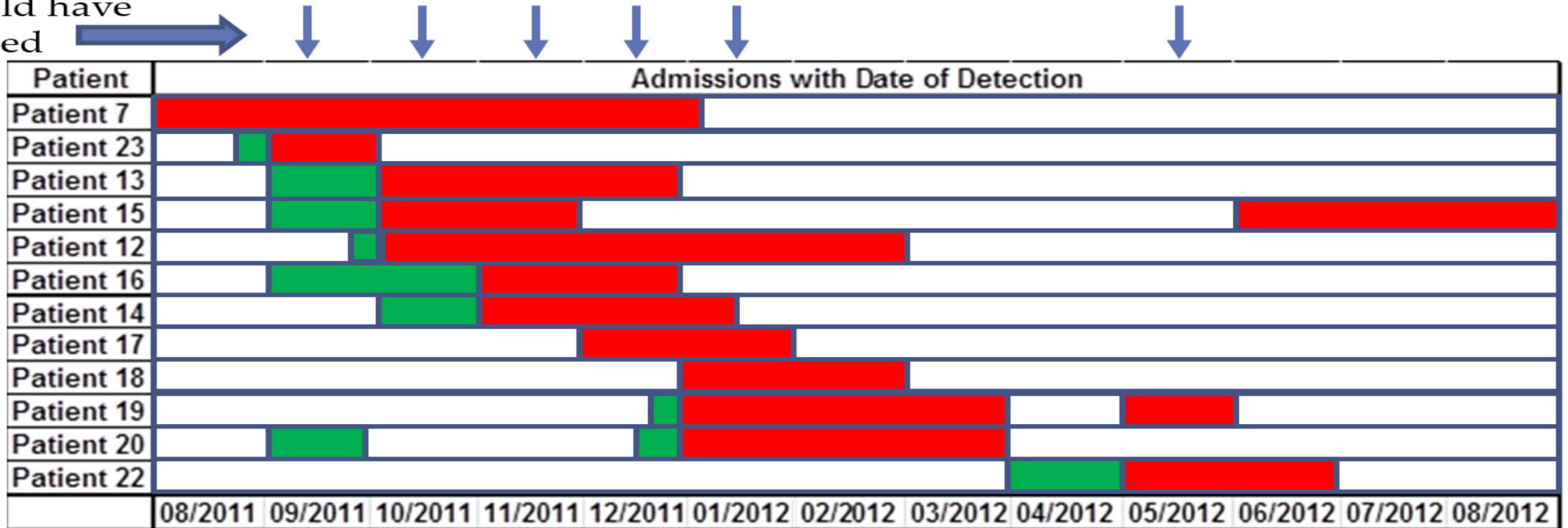
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**Right intervention = right use of resources**



# What Difference Could Improved Typing Make?

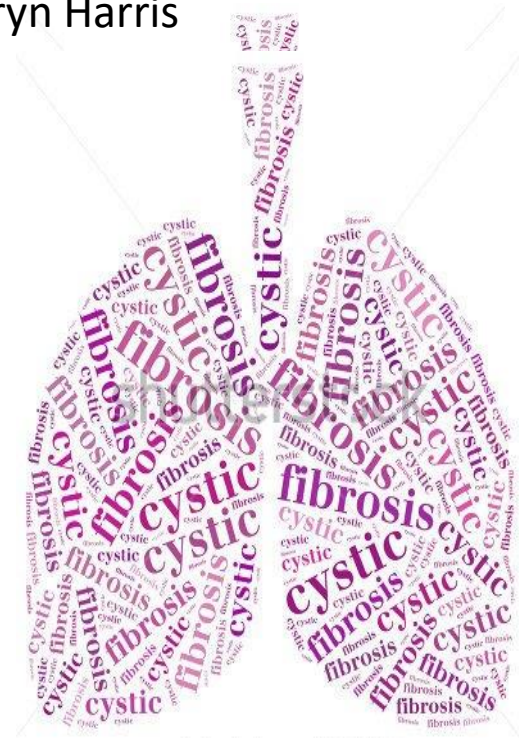
Points where improved typing would have helped



*Klebsiella pneumoniae* outbreak timeline by month. Green = un-colonised period of admission, Red = colonised period of admission. (manuscript in preparation)

# Whole Genome Sequencing of Mycobacterium abscessus isolated in CF patients

Slide credit Kathryn Harris



1 in 2,500 babies born with CF in UK

Most common life-shortening genetic disease in caucasians

Infection and inflammation



Lung damage



Lung transplantation



Mycobacterium abscessus

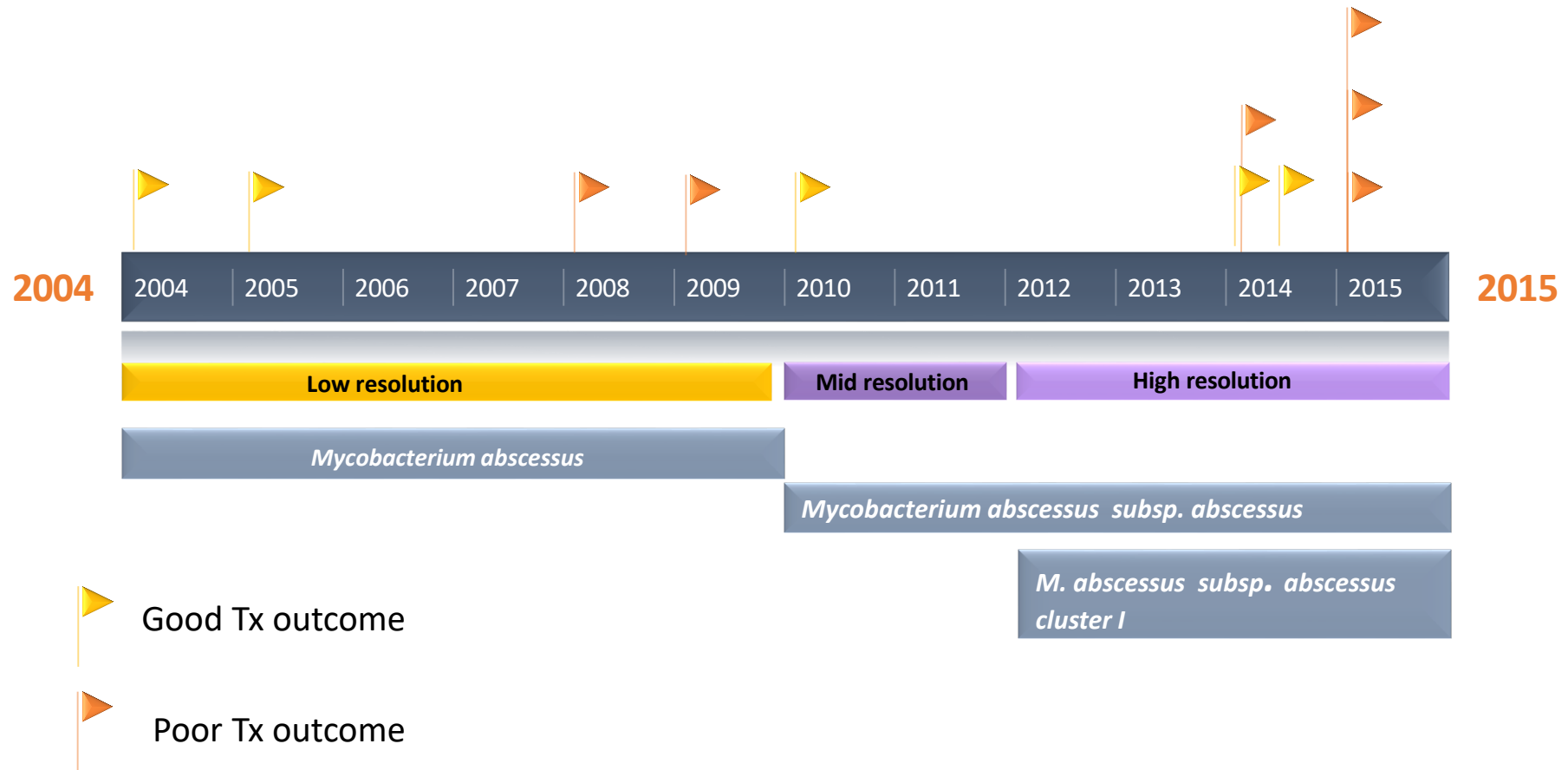
10% CF patients

Increased rate of lung function decline

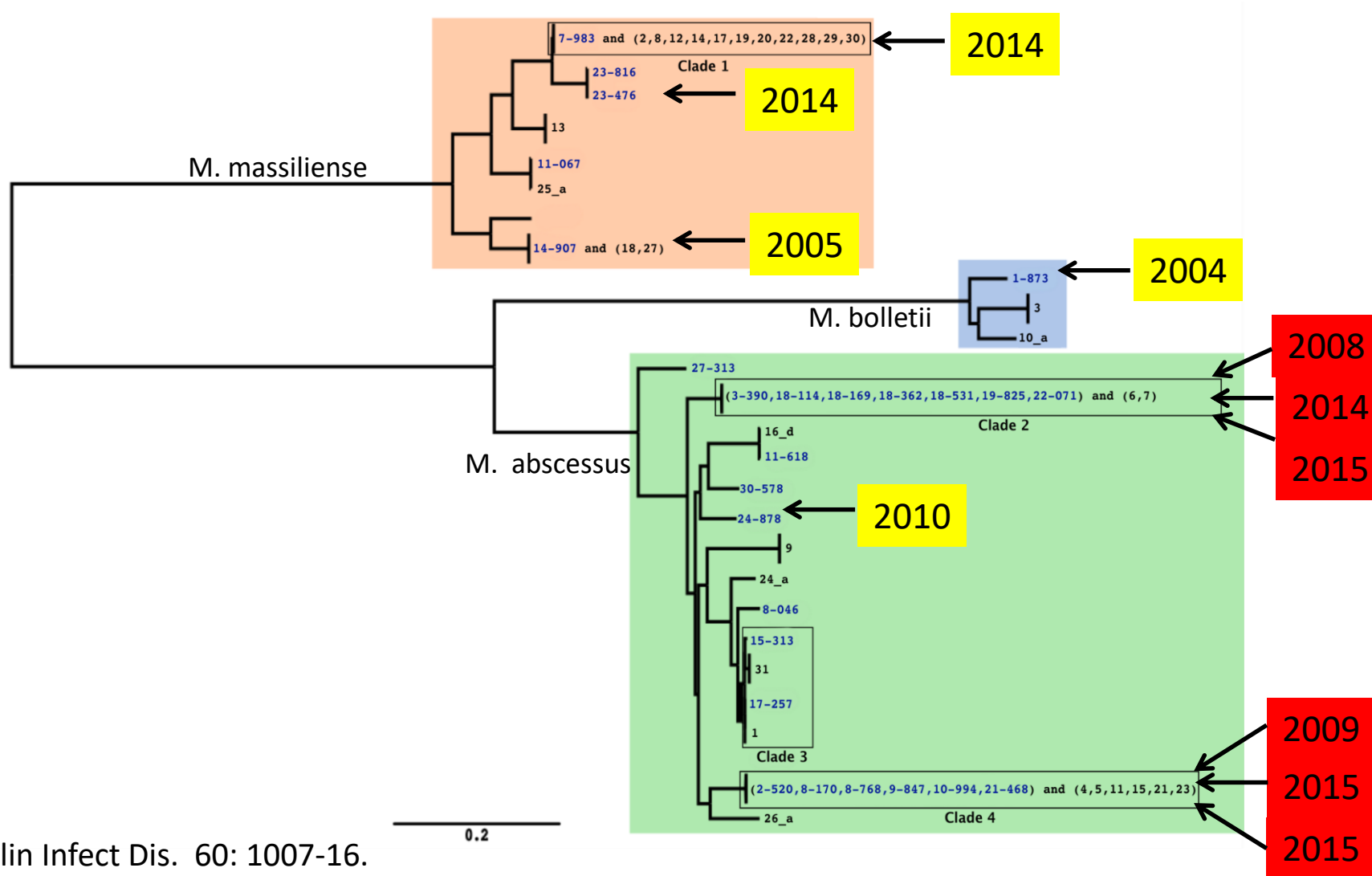
Lung Tx contraindicated at some centres for CF patients with MA



# Eleven CF patients with Mycobacterium abscess infection have undergone lung transplantation at GOSH



# Pathogen Whole Genome Sequencing



Harris KA et al (2015). Clin Infect Dis. 60: 1007-16.

Slide credit Kathryn Harris

