

Addressing health inequalities in infection care access and care quality through data

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Application of AI to optimise the management of infectious diseases
and the use of antimicrobials: CAMO-UK researchers meeting

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Health inequalities within routine AMR and AMU surveillance

Domains of health inequalities with data:

- Ethnic minority communities
 - Multiple deprivation
 - Protected characteristics group defined by the Equality Act 2010
 - People in adult social care
 - Geographic locations
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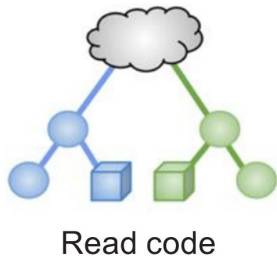
Health inequalities within routine AMR and AMU surveillance

Domains of health inequalities without data:

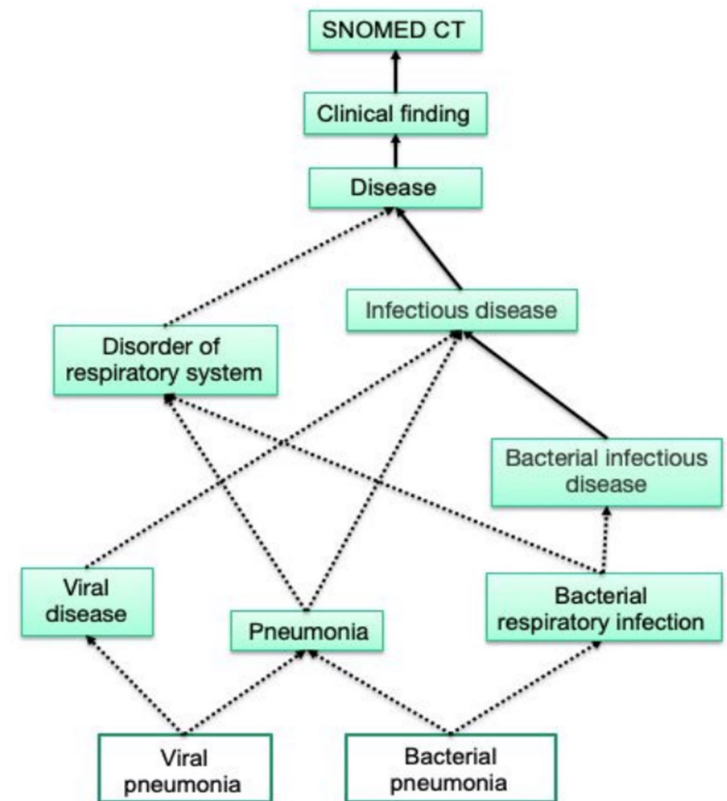
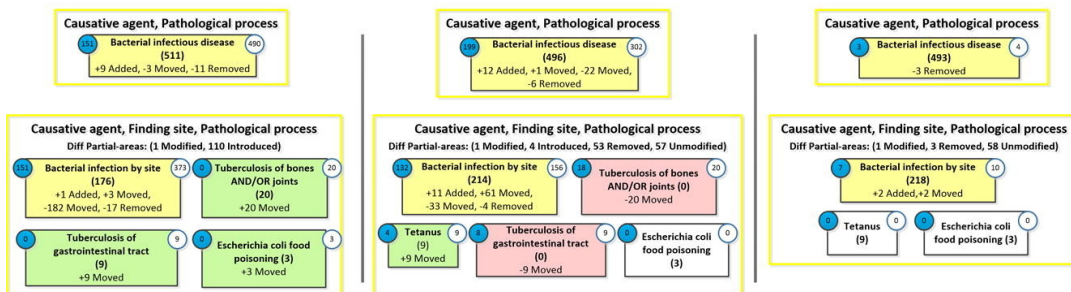
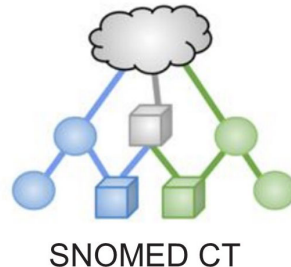
- people with learning disabilities and autistic people
- people with multiple long-term health conditions
- coastal communities with pockets of deprivation hidden amongst relevant affluence
- young carers, looked after children or care leavers
- inclusion health groups (homeless, drug and alcohol dependent, Roma / Gypsy / traveller communities, sex workers, migrants, people in contact with justice systems and victims of modern slavery)

Identify infection cases and patients in the current coding system

Monohierarchy



Polyhierarchy



Identify infection cases and patients in the current coding system

- NHS Data and Connectivity Collaboration Regional Linked Health Data for Research Programme
- OpenSAFELY clustered condition groups relevant to COVID-19

Who is involved?



Dataloch



PIONEER Health Data Research Hub



University of Sheffield



Lancashire Teaching Hospitals NHS Trust



Barts Health NHS Trust



CIPHA



BHF Data Science Centre



University of Bristol



University Hospital Southampton NHS Trust



Imperial College Healthcare NHS Trust

Predict of risks of infection acquisition and treatment failure

- For patients with multiple long-term health conditions and polypharmacy
 - Machine-learning based algorithms
 - Allow embedding in the current NHS routine data landscape

 - Acute-care based: risk of HCAI acquisition

 - Community-based: risk of UTI treatment failure
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Predict of risks of infection acquisition and treatment failure

- Community-based: risk of UTI treatment failure
- Retrospective case identification using clinical observations, prescribing, and microbiology data
- Differentiate urine-related and non-urine-related bacteraemia based on pathogen (Gram-negatives) and past urine culture
- Consider drug-drug interaction

Challenges

- Device-associated infections
- Increased prescribing threshold during COVID-19
- Co-morbidities: particularly patients who were immunocompromised (consider clinical phenotypes and history procedure and prescribing records)
- Example: HIV ~510 codes

Human immunodeficiency virus (HIV) codes	103406000	Human immunodeficiency virus Centers for Disease Control and Prevention category A1 (finding)
Human immunodeficiency virus (HIV) codes	103408004	Human immunodeficiency virus Centers for Disease Control and Prevention category A3 (acquired immunode
Human immunodeficiency virus (HIV) codes	103409007	Human immunodeficiency virus Centers for Disease Control and Prevention category B1 (finding)
Human immunodeficiency virus (HIV) codes	103410002	Human immunodeficiency virus Centers for Disease Control and Prevention category B2 (finding)
Human immunodeficiency virus (HIV) codes	103415007	Human immunodeficiency virus World Health Organization class I (finding)
Human immunodeficiency virus (HIV) codes	103416008	Human immunodeficiency virus World Health Organization class II (finding)
Human immunodeficiency virus (HIV) codes	103417004	Human immunodeficiency virus World Health Organization class III (finding)
Human immunodeficiency virus (HIV) codes	111880001	Acute human immunodeficiency virus infection (disorder)
Human immunodeficiency virus (HIV) codes	1142046003	Pityriasis rubra pilaris due to human immunodeficiency virus infection (disorder)
Human immunodeficiency virus (HIV) codes	1142049005	Disease caused by parasite due to human immunodeficiency virus infection (disorder)
Human immunodeficiency virus (HIV) codes	1153348007	Primary effusion lymphoma due to human immune deficiency virus infection (disorder)
Human immunodeficiency virus (HIV) codes	143224002	HIV positive (finding)
Human immunodeficiency virus (HIV) codes	165816005	Human immunodeficiency virus positive (finding)
Human immunodeficiency virus (HIV) codes	186708007	Human immunodeficiency virus infection with secondary clinical infectious disease (disorder)
Human immunodeficiency virus (HIV) codes	186709004	Human immunodeficiency virus with secondary cancers (disorder)
Human immunodeficiency virus (HIV) codes	186710009	[X]Hiv disease resulting in haematological and immunological abnormalities, not elsewhere classified (disorde
Human immunodeficiency virus (HIV) codes	186714000	Human immunodeficiency virus with other clinical findings (disorder)
Human immunodeficiency virus (HIV) codes	186716003	Human immunodef virus resulting in other disease (disorder)
Human immunodeficiency virus (HIV) codes	186717007	Human immunodeficiency virus disease resulting in mycobacterial infection (disorder)
Human immunodeficiency virus (HIV) codes	186718002	Human immunodeficiency virus disease resulting in cytomegaloviral disease (disorder)
Human immunodeficiency virus (HIV) codes	186719005	Human immunodeficiency virus disease resulting in candidiasis (disorder)
Human immunodeficiency virus (HIV) codes	186725009	Human immunodeficiency virus disease resulting in multiple malignant neoplasms (disorder)
Human immunodeficiency virus (HIV) codes	186726005	Human immunodeficiency virus disease resulting in lymphoid interstitial pneumonitis (disorder)
Human immunodeficiency virus (HIV) codes	187438009	[X]Human immunodeficiency virus disease (disorder)