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End-to-End Biometrics

Cluster Analysis on RWD to Find Patterns of Multimorbidity: A Conceptual Framework

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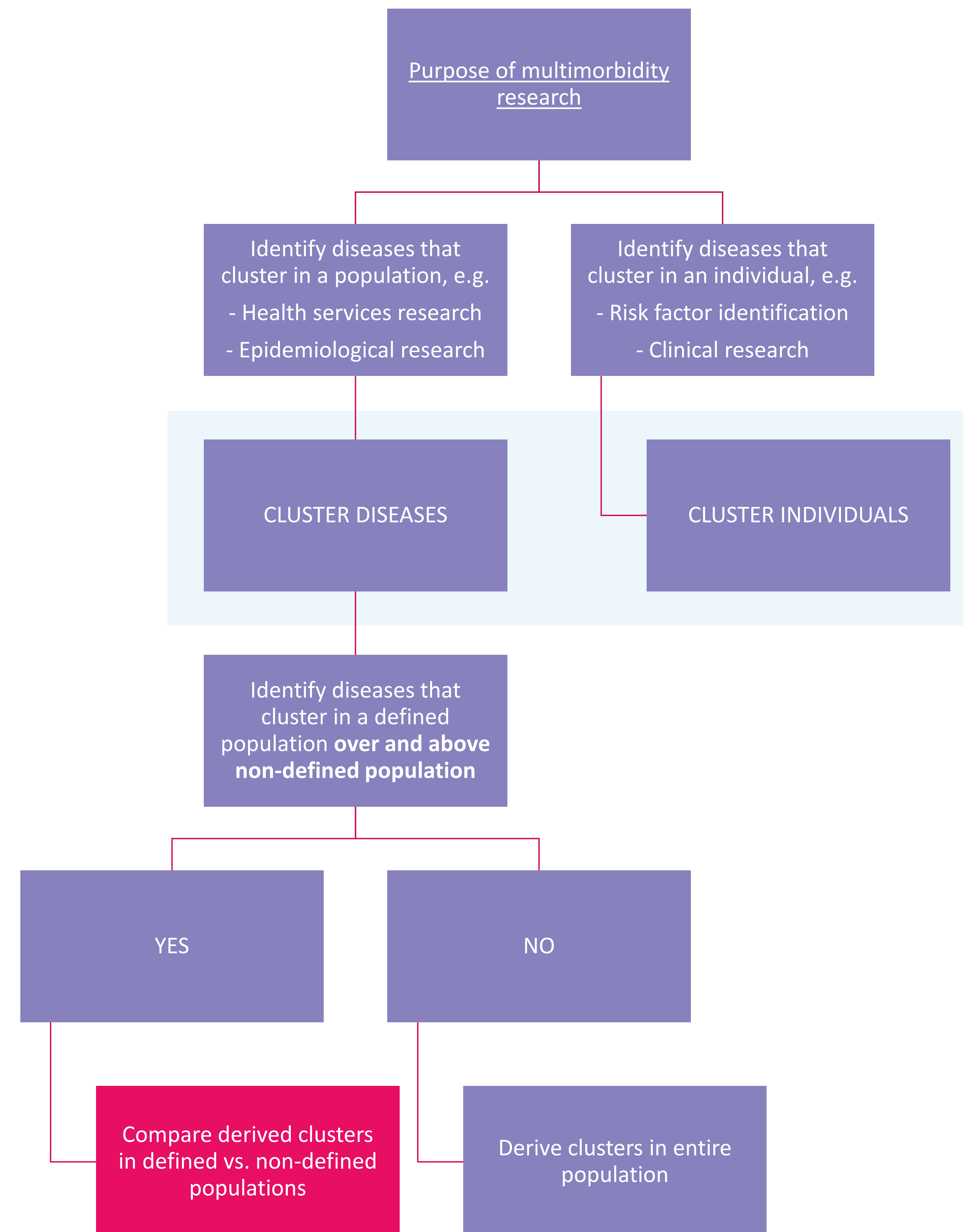[2] London School of Hygiene & Tropical Medicine, London, UK
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Introduction

- Eczema and asthma are two of the commonest chronic conditions in high-income countries
- Multimorbidity with other allergic conditions is well known, but we don't know about non-allergic conditions
- A variety of methods are in use to identify clusters of multimorbidity, with differing interpretations

Methods

- **Data source:** Electronic Health Records from the UK: CPRD GOLD
- **Populations:** People with and without eczema/asthma
- **Morbidities:** Read chapter recordings (n=19 possible)
- **Objective:** to identify and compare clusters of multimorbidity in people with eczema or asthma and people without
- **Problem:** How to derive clusters. Group individuals or morbidities together?

Purpose of multimorbidity research

Identify diseases that cluster in a population, e.g.
- Health services research
- Epidemiological research

Identify diseases that cluster in an individual, e.g.
- Risk factor identification
- Clinical research

CLUSTER DISEASES

CLUSTER INDIVIDUALS

Identify diseases that cluster in a defined population **over and above non-defined population**

YES

NO

Compare derived clusters in defined vs. non-defined populations

Derive clusters in entire population

Clustering Method

- Derive **Jaccard index**, by age and sex, using logistic regression on each pairwise morbidity combination (n=171)
- Derive clusters using **hierarchical analysis** on Jaccard Indices
- Compare clusters with **>30% probability of co-occurrence**

Results

Eczema/asthma populations had larger multimorbidity clusters than non-eczema/asthma populations

Men aged 50

With eczema | Without eczema | With asthma | Without asthma
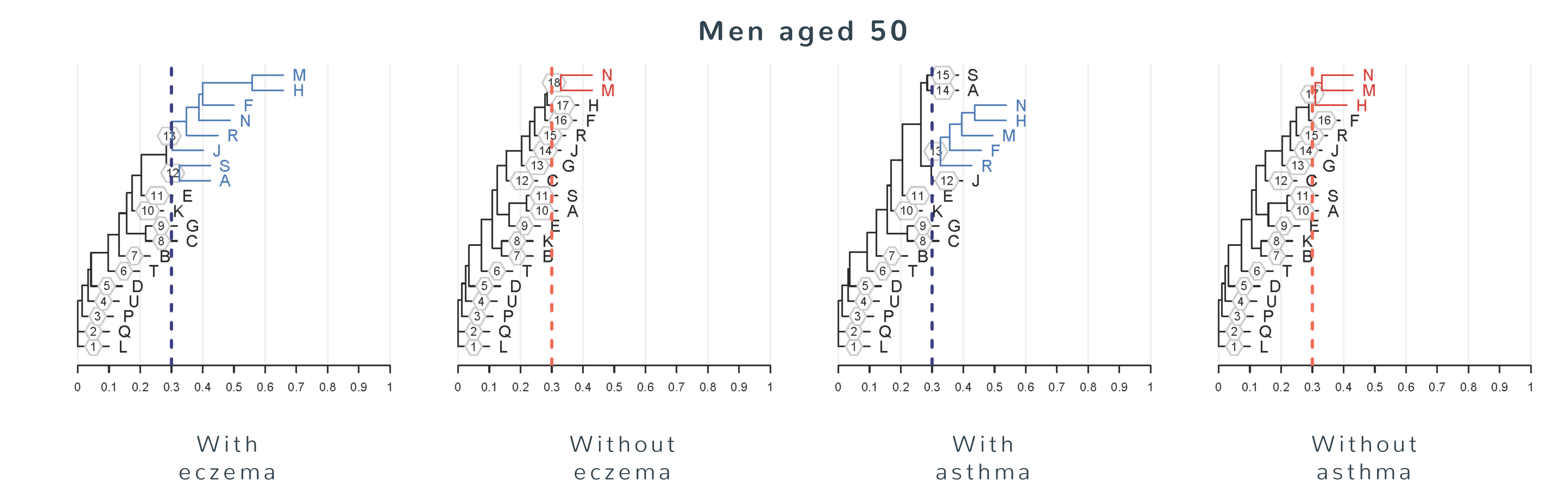
Dendrograms showing Read code chapters that cluster together with greater than 30% probability (blue/red).

A: Infectious/parasitic diseases, B: Neoplasms, C: Endocrine/metabolic, D: Blood diseases, E: Mental disorders, F: Nervous system/senses, G: Circulatory system, H: Respiratory system, J: Digestive system, K: Genito-urinary system, L: Pregnancy/childbirth, M: Skin/subcutaneous, N: Musculoskeletal, P: Congenital anomalies, Q: Perinatal conditions, R: Ill-defined conditions, S: Injury/poisoning, T: Causes of injury/poisoning, U: External causes.

- Cluster size also depended on sex (women > men) and age (older > younger)
- Injuries, Digestive disorders and mental disorders more likely in eczema/asthma populations than non-eczema/asthma

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