Towards Prevention and Better management of Multimorbidity In Common Allergic Conditions Research Collaborative
Meeting 3

London School of Hygiene & Tropical Medicine

Agenda

1. Welcome and housekeeping (10 mins)

2. Project proposal summary and (10 mins)
   1. We will hear a five minute "elevator pitch" about the project and why it should be funded. This will be followed by a brief presentation of the preliminary results from our initial analysis (work in progress)

3. Breakout rooms for discussion (10 mins)
   1. We will use smaller breakout rooms to discuss these presentations

4. Feedback and Q&A (20-30 mins)
   1. This leaves plenty of time for discussion of the results, the interpretability of the study proposal and any comments or suggestions you have for the group going forward

Welcome and housekeeping

- Email: sign up to https://lists.lshtm.ac.uk/sympa/subscribe/skinepi_ppi

- Website: we have a simple website (work in progress)
  https://a-henderson91.github.io/MICAC/

- Terms of reference

Last time: Revised project aims and summary

Patient and public involvement will be embedded in all work packages.		
CLUSTERS OF MULTIMORBIDITY	**MECHANISMS TOWARDS PREVENTION**	**TOWARDS BETTER CARE**

	Objective 2	Objective 3
Objective 1 To use health record data to understand **patterns** (**identifying** and **mapping clusters**) and **trajectories** (within clusters) of multimorbidity in people with allergic diseases.	To enhance our understanding of the **reasons** (cluster determinants and pathobiological (causal) pathways for multimorbidity in people with allergic diseases, including **wider determinants** of disease such as deprivation and pollution over the life course.	Use mixed methods to investigate the **qualitative** and **quantitative** impact of multimorbidity in common allergic disease.
	Objective 2a Life course epidemiology to explore chains of causality. **Objective 2b** Using Mendelian randomisation to explore causal relationships with factors that may not be easy to capture (e.g. sleep problems).	**3a. Quantify** the burden and cost of multimorbidity in people with allergic disease (cost of treatments, polypharmacy, number of consultations, number of hospital appointments, number/duration of admissions, frailty, and mortality). Determine if a similar burden is seen in trial populations. **3b. Qualitative** – the burden of the lived experience of multimorbidity in allergic disease including assessment of quality of life and stigma.

We are very keen to have your feedback on this document

Is it easy to understand?
Does it convey the aim of the project well?
Are there words or phrases that sound too much like science "jargon"?

Towards Prevention and Better management of Multimorbidity In Common Allergic Conditions Research Collaborative

Lay summary

What is multimorbidity?
Multimorbidity is when people live with two or more conditions. There are many reasons why people develop multiple diseases, it may be due to: genetics; side effects from treatments; or because of other disease symptoms. People with multiple diseases can often receive lower quality care; spend more time accessing healthcare; take more medications, and can feel that taking care of their diseases is a "full time job".

Why does this matter to people with atopic allergic diseases?
In the UK, one in five people have atopic allergic diseases such as asthma and eczema and many live with multiple health conditions. Living with multiple diseases can result in poorer mental and physical health and can make it harder for people to do day-to-day activities such as going to work or school, looking after family members, and seeing friends. In addition, atopic allergic diseases and multimorbidity are expensive, both for the person living with the disease and for the health service.

Why do we need this study?
We need to better understand how and why mental and physical diseases are more likely to occur with common allergic diseases, and hear from people about how it impacts their lives. By knowing this, we can work to prevent multimorbidity, take better care of patients and reduce the impact on patients and the NHS.

Our study
To help us better understand multimorbidity in people with atopic allergic diseases, we will:
- Use health record data to understand patterns of multimorbidity and how these impact people with allergic diseases
- Look at different factors that impact allergic diseases to see why multimorbidity occurs in people with allergic diseases
- Explore how multimorbidity impacts people with common allergic diseases through interviews and questionnaires

Outcomes and expected benefits
At the end of the study, we hope to know more about multimorbidity in people with atopic allergic diseases so we can look for ways to prevent it happening and make people's lives better. Scientists will be able to work on new targeted medications for allergic diseases and healthcare professionals will know which patients need more support controlling their

Project summary

Towards Prevention and Better management of
Multimorbidity In **Common Allergic Conditions** Research Collaborative

Impact:
- Identify **unmet needs**
- Work towards **new interventions**

Novelty:
- No research on **multimorbidity** in common **allergic diseases**
- **Novel clusters:**
  - skin, respiratory, neurological, musculoskeletal, digestive system
  - injury, infectious diseases

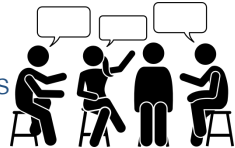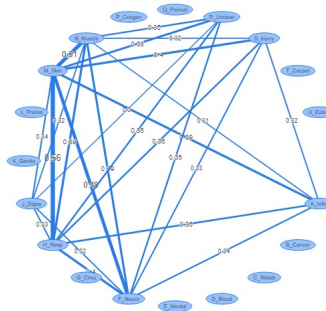**Data sources**

Electronic health records
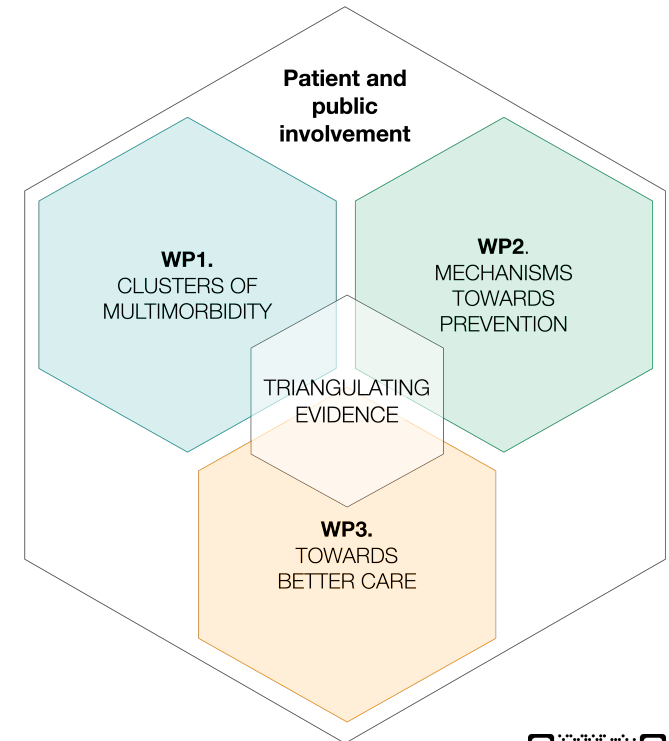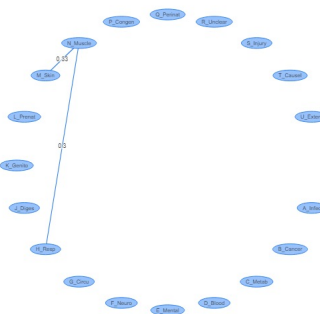
Cohorts

Genetic data

Focus groups

Trials

Atopic eczema
Undirected network, men age 50

Controls
Undirected network, men age 50

Patient and public involvement

WP1.
CLUSTERS OF MULTIMORBIDITY

WP2.
MECHANISMS TOWARDS PREVENTION

TRIANGULATING EVIDENCE

WP3.
TOWARDS BETTER CARE

bit.ly/3vp03Zi

Preliminary results

Preliminary results

We have approximately 2 million sets of records like this:

Record of asthma in 1990

Born 1985

1995
Record of fracture

S

1999
Record of glandular fever

A

Preliminary results

We have approximately 2 million sets of records like this:

Born 1985 — 1995 Record of fracture — 1999 Record of glandular fever — Record of asthma in 1990

S   A

Born 1992 — 2005 Record of recurrent dislocations of shoulder — 1999 Record of ingrowing nail — No asthma

N   A

Preliminary results

Using a statistical model we look at millions of people and ask:

If you have a record like this….

…what is the probability you have a record like this?

Born 1985

1995 Record of fracture

1999 Record of glandular fever

Record of asthma in 1990

S

A

Born 1992

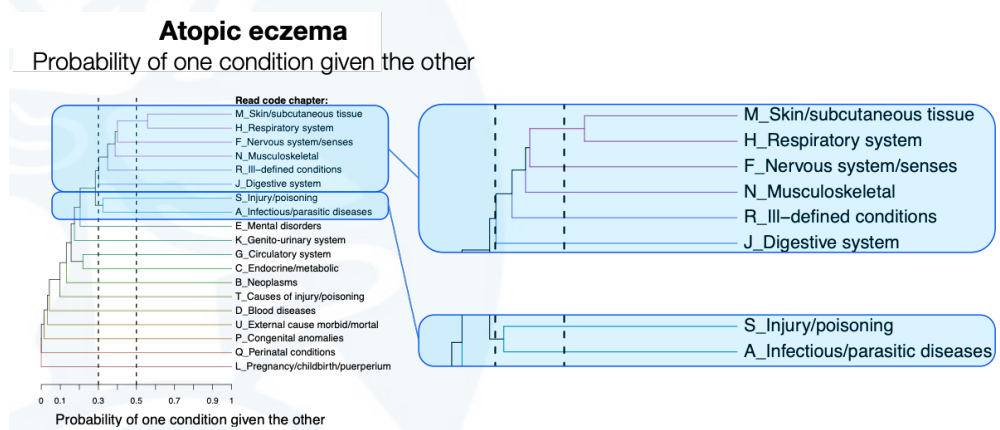2005 Record of recurrent dislocations of shoulder

1999 Record of ingrowing nail

No asthma

N

A

Preliminary results

Atopic eczema
Probability of one condition given the other

Read code chapter:
M_Skin/subcutaneous tissue
H_Respiratory system
F_Nervous system/senses
N_Musculoskeletal
R_Ill–defined conditions
J_Digestive system
S_Injury/poisoning
A_Infectious/parasitic diseases
E_Mental disorders
K_Genito-urinary system
G_Circulatory system
C_Endocrine/metabolic
B_Neoplasms
T_Causes of injury/poisoning
D_Blood diseases
U_External cause morbid/mortal
P_Congenital anomalies
Q_Perinatal conditions
L_Pregnancy/childbirth/puerperium

0   0.1   0.3   0.5   0.7   0.9   1
Probability of one condition given the other

M_Skin/subcutaneous tissue
H_Respiratory system
F_Nervous system/senses
N_Musculoskeletal
R_Ill–defined conditions
J_Digestive system

S_Injury/poisoning
A_Infectious/parasitic diseases

We put these probabilities together and see which chapters cluster together

Read code chapters (**men**):
- One big cluster with unexpected chapters included
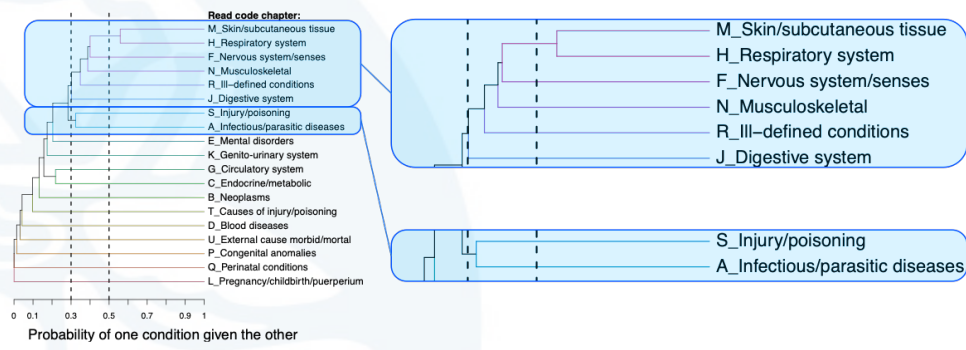
- One smaller cluster

We found very similar clusters for asthma

We found a similar but larger cluster in **women** which also included
- K (Genito-urinary)
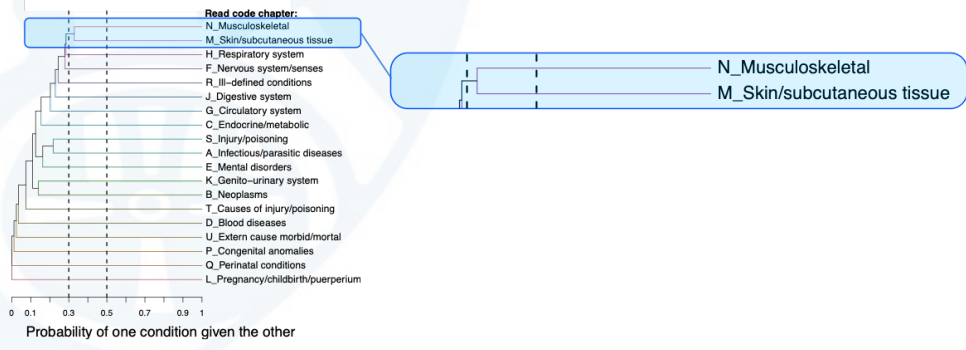
Preliminary results

Atopic eczema
Probability of one condition given the other

Matched controls
Probability of one condition given the other

We also found fewer and smaller clusters in those people that do not have an allergic condition (asthma or eczema)

Conclusion

We have found a new cluster of neurological and musculoskeletal disease in people with eczema and asthma which was not observed in controls. Our work highlights that allergic disease is not an isolated entity and documents

Breakout rooms

1. What was your impression of the 5-minute project proposal? How could it be improved?

2. Do you have any feedback on the preliminary results? Are the clusters as you would expect? Is the probability higher than you would expect?

Breakout rooms: feedback

Next steps

Write up results (available online shortly)	May 2021
Funding interview	Early May 2021
Funding decision	June 2021
Project begins	August 2021