

# Healthy Aging Pharmacogenomics and Polypharmacy (HAPPY): Implementing PGx in primary care



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## Background

- Polypharmacy is associated with increased adverse drug reactions (ADR; PMID: 24073682). In the UK 2million 65+yrs are on at least 7 medications a week.
- Adverse drug reactions have been shown to account for up to 16.5% hospital admissions (e.g. PMID: 357888071)
- Pharmacogenetic (PGx) testing is an effective strategy for optimising medication and potentially has considerable utility in the ageing population on polypharmacy. PGx-informed medication management in the over 65's has been shown to reduce medical changes(PMID: 35330421)
- Most prescribing takes place in primary care and ~20% new prescriptions for 56 drugs in primary care have an actionable drug-gene interaction (PMID:33464647)
- Several barriers have been identified preventing widespread adoption of PGx, including lack of evidence in using PGx results, uncertainty in interpretation of results, lack of integration with electronic medical records and decision support tools (PMID:27143951).

The Healthy Aging Pharmacogenomics and Polypharmacy project has two key aims:

- to develop an implementation plan for PGx in polypharmacy patients via a clinical study providing PGx reports to general practitioners
- to develop an innovative, scalable, integrated clinical decision support platform to support the implementation of PGx into primary care.

Here we describe the HAPPY clinical study

## Methods



500 participants  
 ≥50yrs  
 ≥3 medications  
 (≥1PGx)



Saliva sample  
 Patient registry:  
 • Medications  
 • Healthcare interactions E.g. A&A admission  
 • PFFS questionnaire  
 • ADR questionnaire (PMID:33094229 amendment)



Genotyping & report  
 • Illumina GDA + Enhanced PGx  
 • Agena  
 Veridose Core, CYP2D6 CNV & custom panels  
 • Abomics



GP & pharmacist review  
 • MDT



Medication changes  
 • documented  
 • actioned



Questionnaire  
 • PFFS  
 • ADR  
 • 3, 6, 12 months after PGx review



Healthcare interactions  
 • 12mth

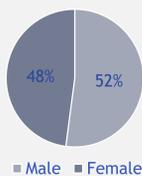


## Results

Demographics of first 96 participants

### Age & Gender

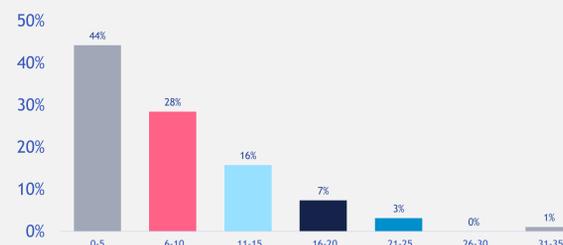
Age Group	Number of Patients
50-60	22
61-70	41
71-80	25
81-90	7
n/a	1



### Ethnicity

Ethnicity	Number of Patients
White	86
Asian/Asian British	4
Other ethnic group	2
Mixed/multiple ethnic groups	1
Black/African/Caribbean/Black British	1
n/a	2

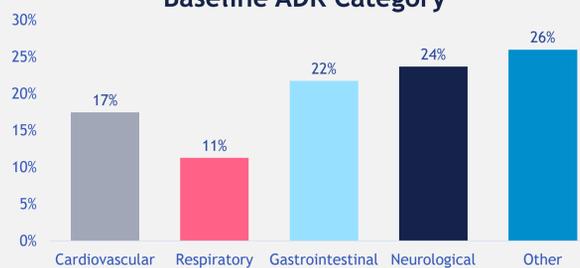
### #GP appointments in prior year



### Reasons for participating

- To help the NHS, research, or other patients
- Interested in genetics and research
- Would like to reduce side effects or if they can reduce/stop medication

### Baseline ADR Category



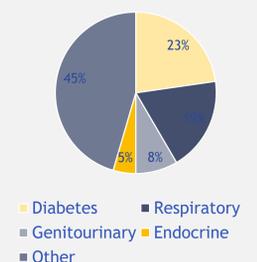
### Most common ADR per category

Category	Most common ADR
Cardiovascular	Shortness of breath
Respiratory	Breathing difficulties
Gastrointestinal	Constipation
Neurological	Memory problems

### Baseline BNF Indication

BNF indication	Number of occurrences
Cardiovascular	258
Gastrointestinal	64
Mental health	37
Pain management	36
Other	160

### 'Other' Baseline BNF Indication



### Baseline # ADRs per patient



## Limitations

- Participants are majority white therefore not representative of the population
- ADRs are as reported by participant rather than healthcare professional therefore may be an adverse event rather than ADR
- ≥3 medications selected as definition of polypharmacy rather than more common ≥5

## Summary

- The HAPPY study will generate evidence to inform the implementation and utility of PGx testing in primary care and develop the analytical solutions to support large scale implementation.
- Polypharmacy is also prevalent in other disciplines, e.g. oncology (PMID:33799547) and intellectual disability (PMID:35975635) therefore solutions which can be translated to other clinical settings would be beneficial.

## Acknowledgements:

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