

Pharmacoepidemiology and Healthcare Research Group

Aim and mission

Our aim is to optimise effective and safe use of medicines by maximising the use of health informatics and electronic health records, supporting stratified/personalised medicine and the design/development, implementation and evaluation of healthcare interventions, including digital health technologies.

Our mission is to enhance our international profile to become a recognised Centre of Excellence in medicines informatics that informs a more “stratified” approach to both the choice of medicine and the care delivery package. This involves personalising the technology (medicine)- through the analysis and interpretation of real-world data, and the accompanying care package (intervention) – through utilising our digital health and care expertise.

Research Themes & Current Projects

Pharmacy research within the Pharmacoepidemiology and Healthcare Research group spans three main themes and involve engagement and collaboration with key stakeholders. These stakeholders include clinicians and policy makers within the health and social care community and academia at both a national and international level.

The key research themes are:

- **Pharmacoepidemiology** - this involves analysis of real-world clinical practice data to provide real-world evidence on the effectiveness and safety of medicines that supports stratified, personalised or precision medicine approaches to patient care. Examples of research areas and topics include the Cancer Medicine Outcome Programme (CMOP), antimicrobial resistance and cardiovascular medicines, such as statins and oral anticoagulants.
- **Health Service Research** - this involves the design and assessment of new health technologies (such as medicines, diagnostics, telehealth, robotics), service delivery models, new therapeutic guidelines and public health resource management. Examples of research areas/topics include the Scottish Patient Safety Programme, the NHS Scotland General Practice Clinical Pharmacy workforce, antibiotic guidelines (Scottish Antimicrobial Prescribing Group), adoption of technology to support medicines supply, decision support and administration systems, and programmes to influence pharmaceutical policy and services in South America and Africa.
- **Drug Utilisation and Health Policy** - this involves national and cross-national drug utilisation comparison studies to understand and to develop strategies to improve the rational use of medicines. Examples include antibiotic surveillance programmes and studies, particularly across Africa, aimed at improving antibiotic use and combating the threat of antimicrobial resistance (AMR) through the design, development and implementation of antimicrobial stewardship programmes; and cross-national (DK, NL, SE, DE) collaborative project focusing on oral anticoagulants.

Selected examples of current funded projects (illustrative only):

Pharmacoepidemiology/ Drug Utilisation and Health Policy

- The Cancer Medicine Outcome Programme (CMOP, Phase 1 2016-2020 and Phase 2 2020-2023) (Scottish Government & NHS Greater Glasgow and Clyde)
- Cardiovascular disease and COVID-19: using UK-wide linked routine healthcare data to address the impact of cardiovascular disease on COVID-19 and the impact of COVID-19 on cardiovascular disease (EPSRC-IAA)
- Leveraging CoviD-19 to Build Confidence in Vaccination and Promote Antimicrobial Stewardship in South Africa (National Research Foundation, South Africa)

- Assessing the prevalence and drivers of over-the-counter sales of antibiotics among community pharmacies and over-the-counter medicine sellers in Ghana to develop mitigatory behaviour change interventions to tackle AMR-Ghana (International Society of Antimicrobial Chemotherapy (ISAC)
- Assessment of cardiovascular diseases risk profile and management in HIV-infected patients in Kenya: A local situation analysis to inform future development of quality improvement interventions (Scottish Funding Council - Global Challenge Research Fund)
- Precision Therapeutics: Risk Prediction in Pharmacoepidemiology. (Rutherford Fund Fellowship. Medical Research Council (MRC) / UK Research and Innovation (UKRI))

Health Service Research

- Primary Care Pharmacy Resilience: Pharmacy Service in the Time of COVID-19 (NHS Education for Scotland)
- Implementation of the Pharmacotherapy Service within Primary Care: Health Outcomes Evaluation
- National Evaluation of Scotland's Non-steroidal Anti-inflammatory Drugs (NSAIDs) community pharmacy care bundle NHS Healthcare Improvement Scotland)
- SIPA2: Improving the Pharmaceutical Care of Older People with Sensory Impairment (Dunhill Medical Trust)
- Antimicrobial Stewardship in Community Pharmacies in Scotland (NHS Education for Scotland)
- Patient Involvement in Medicine Safety (Healthcare Improvement Scotland)

Selected examples of current Doctoral research projects:

- Driving innovation in personalised care through use of Big Data - the application of implementation science to examine the introduction of a novel CDI risk assessment tool in the management of healthcare associated infections (HAIs)
- Application of pharmacoepidemiological approaches to generate real world evidence on the use and impact of colorectal cancer medicines in Scotland
- Utilisation Trend and Clinical Outcomes of Antidiabetics in Type II Diabetes Patients in Scotland over the Period of 2010-2019: a multi-studies project
- Quality Improvement of antibiotics with a narrow therapeutic index

Recent Publications (illustrative only)

Pharmacoepidemiology/ Drug Utilisation and Health Policy

1. Amanj Kurdi, Nouf Abutheraa, Lina Akil, et al. A systematic review and meta-analysis of the use of renin-angiotensin system blockers and COVID-19 outcomes: what is the evidence so far and the implications? *Pharmacology Research and Perspectives* September 2020;8(6:) e00666. <https://doi.org/10.1002/prp2.666>
2. Amanj Kurdi, Rachel A Elliott, Li-Chia Chen. Lessons from the failure of implementing the 'Better Care Better Value' prescribing indicator for renin-angiotensin system drugs in England: A qualitative study of general practitioners' perceptions using behaviour change framework. *BMJ Open* 2020;10:e035910. Doi:10.1136/ bmjopen-2019-035910
3. Renata do Nascimento, Tanja Mueller, Brian Godman, et al. Real-world evaluation of the impact of statin intensity on adherence and persistence to therapy: A Scottish population-based study. *British Journal of Clinical Pharmacology* 2020; 86:2349-2361. <https://doi.org/10.1111/bcp.14333>
4. Kelly Baillie, Tanja Mueller, Jiafeng Pan, et al.. Use of record linkage to evaluate treatment outcomes and trial eligibility in a real-world metastatic prostate cancer population in Scotland. *Pharmacoepidemiology and Drug Safety* 2020;29(6):635-663 <https://doi.org/10.1002/pds.4998>

5. Bennie, M, Malcolm, W, McTaggart, S, Mueller, T. Improving prescribing through big data approaches – Ten years of the Scottish Prescribing Information System. *Br J Clin Pharmacol.* 2020; 86: 250– 257. <https://doi.org/10.1111/bcp.14184>
6. Amanj Kurdi, Rachel Elliott, Li-Chia Chen. Clinical and economic implications of therapeutic switching of Angiotensin Receptor Blockers to Angiotensin-Converting Enzyme Inhibitors: A population-based study. *Journal of Hypertension* 2019, 37:1285–1293. [DOI: 10.1097/HJH.0000000000002009](https://doi.org/10.1097/HJH.0000000000002009)
7. Weir NM, Preston K, Newham R et al. A mixed-method study of community pharmacy staff's use, perceptions and acceptance of barcode scanning technology. *Health Pol Technol.* 2020 <https://doi.org/10.1016/j.hlpt.2020.11.005>
8. Siebinga H, Robb F, Thomson AH. Population pharmacokinetic evaluation and optimization of amikacin dosage regimens for the management of mycobacterial infections, *J Antimicrob Chemother* 2020;75:2933-40. <https://doi.org/10.1093/jac/dkaa277>
9. Colin PJ, Elvend DJ, Thomson AH. Genetic algorithms as a tool for dosing guideline optimisation: application to intermittent infusion dosing for vancomycin in adults. *CPT-PSP* 2020; 9: 294-302 DOI: <https://doi.org/10.1002/psp4.12512>
10. Semple Y, Bennie M, Sneddon J, Cockburn A, Seaton RA, Thomson AH. Development and evaluation of a national gentamicin and vancomycin quality improvement programme. *J Antimicrob Chemother* 2020;75:1998-2003. <https://doi.org/10.1093/jac/dkaa096>
11. Lindsay A Robertson, Mairi-Anne McLean, Colette Montgomery Sardar, et al. Evaluation of the prescribing decision support system Synonyms in a primary care setting: a mixed-method study. *International Journal of Pharmacy Practice* 2020;28: 473–482.<https://doi.org/10.1111/ijpp.12629>
12. Jones M, Franklin BD, Watson MC, Raynor DK. User-testing guidelines to improve the safety of intravenous medicines 2 administration: a randomised in-situ simulation study. *BMJ Qual Saf* 2021;30:17-26. [doi:10.1136/bmjqs-2020-010884](https://doi.org/10.1136/bmjqs-2020-010884)
13. Jones MD, Franklin BD, Watson MC, Raynor DK. User testing to improve retrieval and comprehension of information in guidelines to improve medicines safety. *J Patient Safety* 2020. [doi: 10.1097/PTS.0000000000000723](https://doi.org/10.1097/PTS.0000000000000723)
14. Carter M, Nishtala P, Chapman S, Watson MC. What influences evidence-based prescribing behaviour in UK general practice? A qualitative study. *BMJ Open* 2021;11: :e041460. [doi:10.1136/bmjopen-2020-041460](https://doi.org/10.1136/bmjopen-2020-041460)
15. Fellenor J, et al (Watson MC last author). Medicines optimisation: a multi-stakeholder approach to the prioritisation of the research agenda. *BMC Health Services Research* 2021;21:64. <https://doi.org/10.1186/s12913-021-06056-5>

Health Service Research

16. Lindsay A Robertson, Mairi-Anne McLean, Colette Montgomery Sardar, et al. Evaluation of the prescribing decision support system Synonyms in a primary care setting: a mixed-method study. *International Journal of Pharmacy Practice* 2020;28: 473–482.<https://doi.org/10.1111/ijpp.12629>
17. Weir NM, Newham R, Dunlop E, et al. Factors influencing national implementation of innovations within community pharmacy: a systematic review applying the Consolidated Framework for Implementation Research. *Implement Sci.* 2019 Mar 4;14(1):21. [doi: 10.1186/s13012-019-0867](https://doi.org/10.1186/s13012-019-0867).
18. Stewart D, Maclure K, Newham R, et al. A cross-sectional survey of the pharmacy workforce in general practice in Scotland. *Fam Pract.* 2020 Mar 25;37(2):206-212. doi: 10.1093/fampra/cmz052. PMID: 31536620.
19. Watson MC, Silver K, Watkins R. "What counts can't always be measured": A qualitative exploration of general practitioners' conceptualisation of quality for community pharmacy services. *BMC Fam Pract* 2020;21:244. <https://doi.org/10.1186/s12875-020-01319-2>
20. Weir NM, Newham R, Bennie M. A literature review of human factors and ergonomics within the pharmacy dispensing process. *Res Soc Admin Pharm.* 2019 Aug 12. doi: 10.1016/j.sapharm.2019.08.029

21. Akram, G., Corcoran, E. D., MacRobbie, A. et al (2017) Developing a model for pharmaceutical palliative care in rural areas—experience from Scotland. *Pharmacy*, 16;5(1):6. [doi: 10.3390/pharmacy5010006](https://doi.org/10.3390/pharmacy5010006)