GRIN 2024

Cardiff, Wales

Presented abstracts

Registry-based long-term follow-up of a cluster randomized controlled trial in Danish Nursing Homes. [Sif Helene Arnold]	**siar@sund.ku.dk**	**The Research Unit for General Practice and Section of General Practice, Department of Public Health, University of Copenhagen, Denmark**

Rationale:
In 2018-2019, we performed a cluster RCT (cRCT) in 22 Danish nursing homes. We trained staff through a short seminar on urinary tract infections (UTI) and introduced a new tool for evaluating residents and improving communication with the GP. We evaluated effectiveness using data from nursing home records and found significant reductions in antibiotic prescriptions without increasing mortality. The follow-up period lasted four months, which is insufficient to detect longer-term outcomes like antibiotic resistance. Moreover, some outcomes could not be measured with the available data during the trial. Recently, a new register has made it possible to identify nursing home residents accurately through Danish registries.

Objective:
To evaluate long-term effects of the intervention on antibiotic use, patient safety and healthcare use.

Design:
The study employs a cohort design that incorporates the nested cRCT design and allows for the admission and attrition of nursing home residents. It spans one year before the intervention implementation and continues for three years after the follow-up period. Primary outcomes focus on antibiotic use (UTI, other indications). Secondary outcomes include patient safety measures (antimicrobial resistance (AMR), Clostridioides difficile infections, mortality) and healthcare consumption indicators (general practice services, out-of-hour services, lab services, hospitalizations). Data analysis will use a Poisson regression model with generalized estimating equations.

Discussion and next steps:
The discussion will cover pitfalls in measuring key outcomes through registries, including UTI and AMR, strategies of accounting for COVID-19, and critical factors influencing long-term sustainability of interventions in nursing homes.

Development of a digital learning intervention for improving management of suspected urinary tract infections in nursing home residents. [Louise Bidstrup Jørgensen]	**louise.bidstrup@sund.ku.dk**	**The Research Unit for General Practice and Section of General Practice, University of Copenhagen**

Rationale: Providing optimal care for nursing home residents suspected of having a UTI requires coordination among stakeholders with different professional backgrounds. Previous studies have shown that interventions delivered at in-person seminars are effective in improving the quality of care in UTI management. However, in-person seminars are resource-intensive and hinders national scalability. This underscores the necessity for an asynchronous, easily accessible educational approach.
Objective: To develop an interprofessional digital case-based learning intervention targeting nursing homes and general practice based on previous experiences from in-person interventions.
Design: We use the four stages of Action Design Research (ADR) to develop a prototype for feasibility testing. The stages are: 1) Problem formulation, 2) Building, intervention and evaluation, 3) Reflection and learning, 4) Formalisation of learning.
Discussion and next steps: We are currently working on two studies to identify barriers and facilitators for implementing digital learning (Problem identification). At the GRIN meeting, we are at the early stages of designing the prototype (Building, intervention, and evaluation). We hope to discuss your experiences with the development of digital interventions aiming to improve rational antibiotic use in primary care.

The effect of focused lung ultrasonography on antibiotic prescribing in patients with acute lower respiratory tract infections in Danish general practice: a pragmatic randomized controlled trial. The PLUS-FLUS Trial. [Julie Jepsen Strøm]	**jrjepsen@dcm.aau.dk**	**Center for General Practice at Aalborg University, Denmark**

Rationale
Focused lung ultrasonography (FLUS) has an excellent accuracy for diagnosing pneumonia in hospitalised adults. However, limited knowledge exists on the use of FLUS in patients presenting to general practice with acute lower respiratory tract infection (LRTI) symptoms. We initially conducted a cohort study showing that general practitioners (GPs) can learn to perform FLUS very well and recognize most common FLUS pathology following a fitted training program. However, pathology with high specificity for pneumonia were infrequent.

Objective
To investigate if adults with acute LRTI symptoms, initially suspected of pneumonia, are prescribed antibiotics less often when FLUS is added to usual care in general practice.

Design
A randomised controlled trial has been initiated, including the last of almost 400 participants by June 2024. Participants are provided usual care and are randomly allocated to either the control group (usual care) or to an additional FLUS conducted by the GP (+FLUS). The primary outcome is the proportion of participants who are prescribed antibiotics at index consultation. Clinical course comparisons will involve data from a patient diary (days 0-21) and electronic medical records (days 0-60).

Discussion
We would like to discuss the influence that most common sonopathologic findings in the population are compatible with, however, unspecific for pneumonia and discuss the potential for antibiotic reduction by adding FLUS to usual care in general practice.
Also, in case of antibiotic reduction, this must not compromise the clinical course for patients. How do you find the design for clinical course comparison?

Next steps
Results from the RCT will be submitted for the GRIN 2025 meeting.

What is a respiratory tract infection, according to the International Classification of Primary Care? An overview and recommendation. [Leo Larsen]	**leo.larsen@uib.no**	**University of Bergen**

Rationale
Several studies and antimicrobial stewardship programs use the International Classification of Primary Care (ICPC) to define respiratory tract infections (RTIs) and subgroups of RTIs. However, there is no clear consensus on which codes to include, especially when it comes to symptom codes.
Objective
We aim to compare different ICPC definitions of RTIs and subgroups of RTIs from published studies, and to propose a unified definition.

Design
Different ICPC-based definitions of RTIs will be collected using a literature search. Our main criteria are primary care studies with broader definitions of RTIs, such as using both diagnosis codes and symptom codes. Based on this overview, we will conduct a simplified Delphi process and develop unified definitions of RTIs and RTI subgroups.

Discussion
A unified definition of RTIs based on ICPC codes will reduce the need for constantly developing new RTI definitions and allow for easier comparison between future studies. Translating the definition to ICPC-3 should also be possible and will keep the definition relevant with the implementation of ICPC-3. The inclusion of feedback from academics and primary care clinicians in other countries and settings will strengthen the study, as there may be differences in coding practices, especially regarding symptom codes.

Next steps
We will complete a literature review and identify stakeholders for a simplified Delphi process.

The Nivel Primary Care Database Sentinel Practices: a primary care surveillance network and research infrastructure. [Nienke Veldhuijzen]	**n.veldhuijzen@nivel.nl**	**Nivel**

Rationale

The Nivel Primary Care Database Sentinel Practices is a long-standing primary care surveillance network for respiratory infections in the Netherlands. Additionally, it offers an infrastructure for primary care research. Examples of current research topics are: causes of community acquired pneumonia; blepharitis; and self-sampling of nose/throat swabs for respiratory surveillance.

Objective

The primary objective of the Nivel Sentinel Practices network is to serve as the national primary care respiratory surveillance network in the Netherlands. This constitutes of both epidemiological surveillance of influenza-like-illness and the collection of nose and throat swabs for virological surveillance. An important secondary objective is to conduct primary care research projects. This includes both infectious and non-infectious disease topics.

Design

Approximately 120 general practices, distributed across geographical regions, take part in the virological surveillance and related research. Among these practices, almost 30 practices are also involved in epidemiological surveillance and primary care research projects. For this purpose these practices are connected to an electronic data collection system which allows real-time case verification and questionnaire-based research. The electronic data collection system is partially integrated with the general practitioner information system. The questionnaire can be accessed in a separate online portal.

Discussion

The Nivel Sentinel Practices network offers a research infrastructure and covers a representative sample of the Dutch population.

Next steps

It is our ambition to attract and implement relevant primary care research projects and to further improve the digital data collection system and invest in recruitment and retention strategies.

Effectiveness of text messages from general practice encouraging people to access an online postal testing platform on sexually transmitted infections (Texting for Testing). [David Gillespie]	**gillespied1@cardiff.ac.uk**	**Cardiff University**

Rationale: Sexually transmitted infections (STIs) have long-term health effects, with rising cases in Wales and England. Travel and stigma deter clinic testing, but free online postal tests are available in some UK regions, including Wales. Awareness of these services is low, especially among those not accessing sexual health services. Text messages have encouraged testing mainly in targeted groups, but their wider impact is unclear. In a pilot study, GPs texted all adult patients to promote online testing. This approach was well-received and reached those not previously tested. Its scalability across Wales remains uncertain.

Objective: To determine whether a text invitation to all patients aged 16+ from a GP practice to a free online STI postal testing platform increases the uptake of STI tests, test positivity, and is acceptable to GP practice staff and patients.

Design: Controlled interrupted time series design using anonymised routinely collected data with integrated process evaluation. Outcomes will include STI test ordering and test positivity. Process evaluation measures will include text message click-throughs, acceptability to GP practice staff and patients, stigma around STIs, and unintended consequences. Sub-group analyses are planned by gender, age, sexual orientation, deprivation, rural/urban residency, and ethnicity.

Discussion: This work will inform the Wales HIV Action Plan, which seeks to increase access to testing services and reduce stigma around testing. The research will also impact testing programmes across the UK and internationally where online testing exists.

Next Steps: We are currently seeking funding for this work and are open to discussions regarding multi-country evaluation.

Optimizing sore throat assessment and antibiotic prescribing in primary care: early results from the BASTA trial. [Carl Wikberg]	**carl.wikberg@allmed.gu.se**	**University of Gothenberg**

Context:
The global over-prescription of antibiotics contributes to the rise of antibiotic-resistant bacteria. Sore throat, a common reason for antibiotic prescriptions in primary care, is often viral and does not require antibiotics.
Objective:
The Best Assessment of Sore Throat and Antibiotic Prescribing (BASTA) trial aims to evaluate if restructuring patient flow away from general practitioners to trained nurses or pharmacists can optimize antibiotic prescriptions.
Study Design and Analysis:
This cluster-randomized study involves three arms: general practitioners, trained nurses, and trained pharmacists. Twelve primary healthcare centers and twelve pharmacies form twelve clusters, randomized into one of the three arms. The study targets 450 patients aged 6 and older presenting with an acute sore throat at these sites.
Intervention:
Patients with sore throat are initially assessed by a general practitioner, nurse, or pharmacist, depending on the study arm. All patients undergo a throat swab and a final assessment by a general practitioner.
Outcome Measures:
Primary outcomes are the proportion of patients prescribed antibiotics and the comparison of assessment results across the study arms against the general practitioner's final assessment.
Results:
Recruitment is ongoing, with 53 participants enrolled. Initial findings suggest the study design is effective, and pharmacies report no significant operational issues.
Expected Outcomes:
We hypothesize that redirecting patient flow from general practitioners to nurses and pharmacists will reduce antibiotic prescriptions and enhance adherence to sore throat assessment guidelines by these professionals. This approach can lead to optimized antibiotic prescribing practices, thereby contributing to the fight against antibiotic resistance.

Managing acute respiratory tract infections in general practice: can information sheets facilitate patient-centred communication and reduce antibiotic use? [Lotti Eggers-Kaas]	**lottiek@dcm.aau.dk**	**Center for General Practice at Aalborg University, Aalborg, Denmark**

Rationale:
To support patient-centered communication, when managing acute respiratory tract infections in Danish general practice, four information sheets have recently been developed.
The information sheets can be used with patients presenting with symptoms indicative of either acute otitis media, acute pharyngotonsillitis, acute rhinosinusitis or acute bronchitis.

Objective: The aim of this project is to 1) investigate the feasibility of four information sheets targeting antibiotic prescribing for acute respiratory tract infections and 2) evaluate their effect on antibiotic prescribing and patient-centered communication.

Design:
First, the feasibility of the four information sheets in Danish general practice will be investigated applying a mixed-methods design. Next, a stepped wedge cluster randomised trial is planned to evaluate the effect of the information sheets on antibiotic prescribing rates and patient-centered communication.

Discussion:
This project has the potential to facilitate a more balanced understanding of benefits and harms of antibiotics for acute respiratory tract infections – and consequently reduce antibiotic consumption.
Questions for discussion:
- Experience with alike topic/studies from other GRIN members?
- Suitable type of RCT design?

Next steps:
A PhD project – lead by Lotti Egger-Kaas - will start in August 2024.

Adoption of point-of-care C-reactive protein testing in primary care: a comparative health services analysis [Oliver Van Hecke]	**oliver.vanhecke@ugent.be**	**Ghent University, Belgium**

Rationale
There is good evidence that the use of point-of-care C-reactive protein testing (POCT-CRP) in primary care can reduce antibiotic prescribing without negatively impacting on patient outcomes. The introduction of rapid diagnostics involves multiple actors and processes within a wider national context and may explain the reason that only a handful of countries globally routinely use POCT-CRP. We are less clear about the factors that lead to the successful implementation of POCT-CRP in routine primary care. This has implications for the future adoption of novel POCT in primary care.

Objective
To systematically map studies that assessed the use of POCT-CRP in primary care to their routine adoption in clinical practice, and broader inception into national guidelines, AMR national action plans and the wider national context.

Design
Multi-pronged approach including but not limited to: a scoping review of the literature; an extensive search of the websites of relevant healthcare organisations, guidelines per specific country; expert stakeholder input through existing networks e.g; GRIN, and qualitative interviews. The NASSS framework (non-adoption, abandonment, spread, scale-up and sustainability of healthcare technologies) will be used to identify factors that contribute to the adoption of POCT in primary care.

Discussion
The data generated will fill a fundamental gap in the evidence base that will help researchers and policymakers gain an enhanced understanding of the factors needed for successful implementation of novel POCT and reproduce antibiotic prescribing reductions observed in research studies.

Next steps
Invitation for collaborators and partners, refine study design etc.

Non-antibiotic interventions to prevent recurrent urinary tract infections in women: protocol for an umbrella review of systematic reviews and meta-analyses of randomised controlled trials. [Miriam Santer]	**m.santer@soton.ac.uk**	**University of Southampton**

Background
Recurrent urinary tract infection (rUTI) in women (2 or more UTIs in the last 6 months or 3 or more UTIs in the last 12 months) are common, have substantial impact on quality of life, and are a major cause of antibiotic use. International guidelines on rUTI differ regarding antibiotic-sparing preventative strategies. Umbrella reviews may be helpful in a context where the evidence base has developed quickly in recent years.

Review questions
1. What non-antibiotic interventions for prevention of rUTI have been tested for efficacy in randomised controlled trials?
2. Is there evidence for effectiveness, acceptability and adherence to non-antibiotic interventions for prevention of rUTI?

Methods
Databases (MEDLINE, EMBASE, CINAHL, Google Scholar and Cochrane) from 1 January 2014 to 31 March 2024 were searched for systematic reviews of interventions to prevent rUTI in adult women, excluding comparisons of different regimens of oral antibiotics. Titles, abstracts and, where necessary, full texts were screened by 2 independent reviewers, data extraction and AMSTAR2 critical appraisal is currently being completed by 2 independent assessors.

Results
34 systematic reviews meet inclusion criteria evaluating evidence for; probiotics (6 papers), methenamine (4), cranberry (4), D-mannose (2), vaginal oestrogen (2), vaccine (2), increased fluid intake (2), herbal medicine (2), systemic oestrogen (1), acupuncture (1) or a combination of strategies (8). Full results will be available by the time of the conference.

Discussion
This umbrella review of systematic reviews will be a step towards providing evidence-based resources for women wishing to prevent rUTI without recourse to antibiotics.

Experiences and expectations among men with lower UTI in primary care. A qualitative study. [Mia Tyrstrup]	**tyrstrup@hotmail.com**	**Lunds universitet**

Background

Physicians in primary health care regard urinary tract infection in men challenging to manage. Qualitative studies exploring mens' experiences of lower urinary tract infection (LUTI) are lacking. Improved knowledge regarding these patients' expectations and needs is essential in order to improve the care.

Aim

To investigate symptoms, expectations and experiences in men with LUTI in primary health care.

Method

We used qualitative methods with semi-structured interviews. 18 patients with the mean age of 74 years were interviewed with questions regarding UTI symptoms, healthcare seeking and treatment and antibiotic resistance. We analyzed the interviews using thematic analysis.

Results

We identified four themes; (1) Narrative. Communication and search for reason. Magical thinking, (2) How LUTI affects life and how to adapt, (3) Healthcare relations and challenges, (4) Believes about treatment.

Discussion

Patients' delay is common for LUTI in men and therefor important for healthcare personnel to book urgently. GP's should be open to discuss the patients concerns regarding their symptoms, as they could be based on myths and believes for which there is no supporting evidence.

Understanding the potential causes of recurrent UTI using metagenomic sequencing. [Gail Hayward]	**gail.hayward@phc.ox.ac.uk**	**University of Oxford**

Background
Recurrent UTI affects over 6% of women and causes significant morbidity. There is limited understanding of the aetiology of recurrent UTI in human women. Each UTI could arise through de novo colonisation of uropathogens ascending from the perineum into the bladder via the urethra, but recent work in mice and in vitro bladder tissue suggests that recurrence could occur via re-emergence of intracellular bacterial colonies.

Aim,
We aimed to use metagenome sequencing approaches in samples provided by participants in the MERIT trial to explore these two potential mechanisms of recurrent infection.

Methods,
Participants submitted a urine sample at baseline when asymptomatic and a second sample if they experienced a UTI during the 6 month study period. Samples were cultured and metagenomic sequencing was performed, in partnership with Systems Biology Limited. 36 paired samples showed no growth at baseline and E.coli on culture when symptomatic, 40 had E.coli on culture at both timepoints The bacterial profiles from metagenomic sequencing will be compared and participants will be stratified into those where it is plausible that the uropathogen was already present when the participant was asymptomatic, and those where a de novo infection is more likely.

Results
Will be available for presentation at the conference

Discussion
This work will offer early insight from women presenting to primary care regarding the most likely cause of recurrent UTI. In future there may be potential to use these approaches to test tailored therapy.

Effect of methenamine hippurate to reduce episodes of recurrent urinary tract infections in older women – a triple-blind, randomised, placebo-controlled, phase IV trial (ImpresU). [Silje Rebekka Heltveit-Olsen]	**s.r.heltveit-olsen@medisin.uio.no or sigurd.hoye@medisin.uio.no**	**University of Oslo**

Objective: To investigate the effect of the preventive drug methenamine hippurate on recurrent urinary tract infections (rUTIs) in older women.
Design: Triple-blind, randomised, placebo-controlled phase IV trial with a six-month treatment period and a six-month follow up period.
Setting: Participants were recruited from general practice in Norway, Sweden, Poland and The Netherlands. Recruitment started December-19 and follow up was completed at end of June-23.
Participants: 289 Women ≥ 70 years with rUTIs (≥ two UTIs the last six months and/or ≥ three UTIs the last twelve months).
Intervention: Participants were randomized to methenamine hippurate 1g x 2 or placebo tablets 1 tablet x 2 for six months. After completing the treatment period, all participants were followed up with registrations for another six months. In addition to registrations of acute UTIs, participants were contacted by the study team every 30 days during the treatment period, at end of treatment (day 180) and at end of study (day 360) for follow up.
Main outcome measures: The primary outcome was number of antibiotic treatments for UTIs during the six-months treatment period. Secondary outcomes included number of antibiotic treatments for UTIs during the six-months follow up period, symptom severity, symptom duration and complications.
Results: Preliminary results will be presented at the conference.
Trial registration: ClinicalTrials.gov Registry (NCT04077580); EudraCT: 2018-002235-15.

Better Diagnosis of Urinary Tract Infections in General Practice: A Burning Issue. [Stefan Cox]	**s.cox@maastrichtuniversity.nl**	**CAPHRI, Maastricht University**

Background: Urinary tract infections are one of the main reasons for patients to visit their general practitioner. Current Dutch guidelines recommend diagnosing patients with symptoms indicative of a urinary tract infection using a urinary dipstick or sediment analysis and, if necessary, a urinary culture with resistance testing. The urinary dipstick provides results within a few minutes but is unreliable. The urinary culture is the gold standard, but takes 2-3 days to get a definitive result. Therefore, there is a demand for innovative diagnostics.
Aim: We aim to compare three innovative tests with the urinary dipstick and urinary culture in a prospective validation study.
Methods: We included urine samples from adult patients whose urine was sent from primary care to the diagnostic lab at Maastricht University Medical Centre+. Samples underwent routine diagnostics before the innovative tests were performed. The first test is based on catalase activity in urine, the second test is based on the binding of uropathogens to surface-imprinted polymers, and the third test is a PCR-based test. Results of the different tests will be compared with the outcome of the urine culture in 2x2 tables to determine test characteristics. Sensitivity analyses will demonstrate whether the tests perform equally well for different uropathogens.
Results and Discussion: Since the study is still ongoing, results are as of yet unknown. During the GRIN 2024 meeting, results of the 900 included samples will be presented. We will present the diagnostic values of each test compared to the urinary culture as the gold standard.

Barriers and facilitators to the implementation of antibiotic-sparing treatment approaches in women with acute uncomplicated urinary tract infections: a scoping review. [Andreas Plate]	Andreas.Plate@usz.ch	Institute of Primary Care, University of Zürich and University Hospital Zürich

Background: Antibiotic sparing treatment approaches (AST), like symptomatic treatment and delayed antibiotics, seem to have great potential to reduce antibiotic consumption for uncomplicated urinary tract infections (uUTI). However, AST are hardly used in Swiss Primary Care. To improve implementation, a better understanding of the factors influencing treatment decisions for uUTIs is needed.
Aim: The aim of the ongoing scoping review is to assess the evidence on the factors influencing the implementation and use of AST in female patients with uUTI.
Methods: We searched Medline, Embase and the Cochrane Library for studies on AST published between 2000 and 2024. Experimental and quasi-experimental study designs, observational studies, qualitative studies and reviews were eligible for inclusion.
The review included research published in English and conducted in high-income countries that reported on experiences, facilitators, or barriers to the use or implementation of AST in female patients with uUTI. We considered all evidence from outpatient settings, such as primary care, general practice, family medicine practices, emergency rooms, or pharmacies.
Three independent researches assessed the articles and data were extracted using a pilot tested data extraction tool.
Results: The search strategy identified 4'865 studies. After removing duplicates, 3'286 studies were screened for inclusion.
We will present the preliminary results during the meeting.
Discussion: Understanding the use, facilitators and barriers to AST is crucial to design sustainable interventions to support AST in primary care. Given the high incidence of uUTI, more widespread use of AST could lead to a reduction in antibiotic use in the long term.

A randomised multi-arm, open label trial of nasal sprays and a behavioural intervention for acute respiratory illness in primary care (The Immune Defence Study). [Paul Little]	**p.little@soton.ac.uk**	**University of Southampton**

Background. Limited evidence suggests that nasal sprays, or physical activity and managing stress, could reduce acute respiratory infection (ARI) duration.
Aim. To assess the impact on ARIs of nasal sprays or a behavioural website promoting physical activity and stress-management
Methods. 13799 participants aged >=18 years with a co-morbidity, and/or >=3 ARIs/annum were randomised to: i) usual care ii) Vicks-First-Defence nasal spray iii) saline spray , or iv) a behavioural website. Primary outcome: ARI illness days over 6 months.
Results. 54% of usual care had incident infections, reduced by the website (adjusted risk ratio (RR) 0.95, 95% CIs 0.91,0.99) but not sprays . Sprays reduced ARI illness days: usual care mean 8d; Vicks 6.5d (incidence rate ratio (IRR) 0.82, 99% CIs 0.76,0.90,p<0.0001), Saline 6.4d (0.81; 0.74,0.88,p<0.0001), behavioural website 7.4d (0.97; 0.91,1.04,p=0.46); for those reporting an illness it was 15,12,11.8 and 14 days respectively. Antibiotic use was lower for all interventions (IRRs (95% CIs) respectively 0.65 (0.50,0.84;p=0.001), 0.69 (0.45,0.88;p=0.003), 0.74 (0.57,0.94;p=0.02)), as were more severe symptoms, and days of normal activity/work lost. Vicks resulted in more headache (7.8% vs 4.8% usual care).
Discussion. Using sprays at the first sign of ARIs reduces illness duration, severe symptoms, interference with work/activities and antibiotic use - with considerable potential impact for patient health, antimicrobial stewardship, and the wider economy.

Health seeking behaviours and beliefs around ear infection symptoms: a questionnaire of parents in England. [Catherine Hayes]	catherine.hayes@ukhsa.gov.uk	UK Health Security Agency

Background: In the UK, an estimated half a million primary care consultations are due to middle ear infections annually; 85% of children who consult are prescribed antibiotics. Understanding consulting behaviours can inform interventions to empower patients to manage infections, while being aware of serious signs.
Aim: To understand parents' experiences, beliefs, and actions related to a recent episode of ear infection symptoms experienced by their child.

Methods: Basis Research facilitated data collection of an online questionnaire with parents of children 10 years or younger who had experienced ear infection symptoms in the previous 12 months in England. Descriptive analyses are complete, logistic regression models will be conducted.

Results: 503 parents participated. Earache (74%), redness/swelling (59%), and fever (77%) were most often reported symptom. Most perceived their child's symptoms to be mild (26%) or moderate (65%) and lasting a week or less (84%). Difficulty sleeping (72%) and missing school/nursery (68%) were common concerns. Consulting healthcare was the most reported action (90%); 74% consulted within 1-2 days. 34% believe children with ear infections always require antibiotics to get better. Among those prescribed treatment, half were given immediate antibiotic tablets. For those who did not consult healthcare the main reason was feeling able to self-manage symptoms (63%).

Discussion: There is opportunity to reduce primary care consultations and antibiotic use by encouraging parents to self-care for children with mild and moderate ear infections. With introduction of 'Pharmacy First' in England including earache, impacts on health seeking behaviours and antibiotic use should be monitored.

Improving the use of diagnostic codes for respiratory infections in primary care: a mixed methods study. [Polly Duncan]	**polly.duncan@bristol.ac.uk**	**University of Bristol**

BACKGROUND:
Improving clinician use of diagnostic codes for respiratory infections facilitates the provision of peer-referenced antibiotic prescribing rates and accurate disease surveillance.

AIM:
To develop and assess the effectiveness of an intervention to improve the use of diagnostic codes for acute lower respiratory tract infections (aLRTIs) in primary care.

METHODS:
Four GP practices took part (~82,000 registered patients). A rationalised list of six aLRTI diagnostic codes was created and refined during two stakeholder meetings with seven primary care clinicians. An intervention, comprising training and a prompt, was developed to encourage clinicians to use diagnostic codes in medical notes. The prompt appeared within the electronic GP records on entering a symptom code (e.g. cough) or prescribing an antibiotic and asked whether the patient had a suspected respiratory infection. If 'yes', a template appeared including diagnosis (drop down list). Intervention effectiveness was assessed by comparing the proportion of patients with probable aLRTI (determined during a manual notes review of patients prescribed amoxicillin or doxycycline) and any aLRTI diagnostic code at baseline and six months, in 400 randomly selected adults at each time point.

RESULTS:
The proportion of aLRTI linked to a diagnostic code at baseline varied between practices from 9% to 43%, and overall (combined data from all practices) increased 64% from 33% at baseline to 54% at six months ($p<0.001$).

DISCUSSION:
We provide encouraging evidence that clinicians can change diagnostic coding behaviour. Future research should investigate whether these changes can be sustained, improving aLRTI prevalence estimates, and antibiotic prescribing stewardship.

Sociodemographic Factors Strongly Associated with Complicated Lower Respiratory Tract Infections including COVID-19. [Hanneke Borgdorff]	**e.d.van_dokkum@lumc.nl**	**Leiden University Medical Center**

Background
International studies suggest that ethnic minority groups and those with lower socioeconomic status (SES) face higher severity of lower respiratory tract infections (LRTI).

Aim
Our aim was to investigate the sociodemographic determinants of complicated LRTI (before and during the COVID-19 pandemic) in The Hague, The Netherlands.

Methods
We conducted a retrospective cohort study using sociodemographic and claims data from Statistics Netherlands, covering The Hague's adult population from 2014-2019 and in 2020. We performed a multivariable multiple-failure Cox regression on complicated LRTI incidence and 30-day mortality. A LRTI was considered complicated in case of a referral to the emergency department with subsequent hospital admission, or death within 14 days.

Results
We identified 5,136 complicated LRTI cases in 2014-2019 (estimated average population of 415,924 annually) and 1,689 in 2020 (estimated total population of 434,337). In the 2014-2019 period, the lowest SES quintile displayed the highest complicated LRTI incidence (aHR 3.29 [95% CI, 2.80–3.85]), and 30-day mortality (aHR 5.96 [95% CI, 3.50–10.14]), compared to the highest SES quintile, after adjustment for age, sex, comorbidities, household type and migratory background. Analyses of 2020 showed similar effects. The most affected groups were Dutch natives in 2014-2019, and those with a migratory background in 2020.

Discussion
We found a strong association between lower SES and higher incidence of LRTI complications and mortality. Migrants were at increased risk during the COVID pandemic, but not before 2020. These results emphasize the need for re-evaluating risk profiles of complicated LRTI for prevention and treatment strategies in public health and primary care.

Complicated courses of sinusitis in general practice in an era of antibiotic stewardship. [Marius Skow]	**mariusskow@gmail.com; maskow@uio.no**	**University of Oslo**

Background:
Acute sinusitis is commonly treated in general practice, where antibiotics are often prescribed despite growing evidence suggesting that uncomplicated cases do not benefit from such treatment. Previous research from Norwegian general practice revealed no significant protective effect of antibiotics against hospitalizations or severe complications following acute sinusitis. Given the low risk of severe complications, this study investigates whether antibiotics prescribed for sinusitis can prevent milder complications.
Aim:
We aim to explore complicated acute sinusitis episodes managed outside hospital settings, comparing episodes treated with and without antibiotics.
Methods:
By linking data from several national health registries, we will examine episodes of acute sinusitis in adult patients diagnosed in general practice from 2012 to 2019. For each episode, we will obtain information on antibiotic prescriptions, GP consultations, sickness certificates, as well as contacts with Ear, Nose, and Throat (ENT) specialists. Using a difference-in-difference approach, we will compare episodes receiving antibiotics to episodes not treated with antibiotics, and analyze the differences of the outcome frequencies in the 12 weeks after an acute sinusitis episode compared with the 12 weeks before the episode.
Results:
Our cohort comprises 415,781 adult patients, accounting for a total of 627,344 acute sinusitis episodes. The analyses are not finished at the time of submission but will be presented at the meeting.
Conclusions:
Conclusions are pending and will be drawn based on the final analysis of our data.

Examining the longer-term outcomes of a community pharmacy-led sore throat test and treat service: a retrospective, longitudinal data linkage study. [Efi Mantzourani]	**Mantzouranie1@cardiff.ac.uk**	**Cardiff Unviersity / Digital Health and Care Wales**

Abstract not available

Prophylactic antibiotic use amongst women with recurrent UTIs and risk of antimicrobial resistance: Target Trial emulation using the SAIL databank. [Leigh Sanyaolu]	**sanyaoluln@cardiff.ac.uk**	**Cardiff University**

Background
Recurrent UTIs (rUTIs) have a significant impact on morbidity and quality of life, and result in frequent healthcare use and antibiotic exposure. The main preventive strategy is prophylactic antibiotics. This is a concern as antibiotic exposure drives antimicrobial resistance (AMR) and resistant UTIs increase morbidity, healthcare use, and costs. There is limited real-world evidence of the risk of AMR associated with rUTI prophylactic antibiotic use.

Aim
To estimate the risk of AMR amongst women with rUTIs who use prophylactic antibiotics.

Methods
We conducted a retrospective cohort study using the Target trial framework to emulate a randomised trial. We included women aged 18 years and older and compared prophylactic antibiotic use to non-use between 2015-2020 in Wales using the SAIL Databank. We used cloning, censoring, and inverse probability weighting to prevent immortal time bias and adjust for potential confounders between prophylactic antibiotic use and AMR. The outcomes of interest include:
1. Hospital admission with a resistant infection,
2. Hospital admission with a resistant UTI,
3. Bacterial resistance on urine culture,
4. Bacterial resistance on urine culture to two or more antibiotics.

This study is ongoing and final analyses are being undertaken.

Results
The study will be completed soon and results will be available for presentation.

Discussion
Using the Target Trial framework, we will present and quantify the risk of AMR associated outcomes with the use of prophylactic antibiotics for rUTIs. This is crucial to support shared decision-making around the use of prophylactic antibiotics.

Identifying the level of recommendation for preventive strategies against recurrent urinary tract infections in non-pregnant women: a scoping review. [Caroline Skovsbo Clausen]	**caroline.clausen@sund.ku.dk**	**Department of Public health, Section of General Practice**

1. Background:
Recurrent urinary tract infections (rUTI) are highly prevalent and lead to considerable patient morbidity[4]. Antibiotics can be used as prophylaxis for rUTI, but with a risk of promoting bacterial resistance and side effects [3, 5]. Numerous studies on non-antibiotic preventive strategies for rUTIs have been conducted, but they often lack robust evidence due to issues with study design or execution [6]. This makes it a challenging task for general practitioners when guiding these patients. Therefore, research investigating the level of recommendation of preventive strategies used against rUTIs remain warranted.

2. Aim:
The objective of the scoping review is to systematically identify recommended preventive strategies against rUTIs in pre-menopausal women in the scientific literature.

3. Methods:
We searched Pubmed, Embase, Cochrane, Web of Science and CINAHL, for peer reviewed studies, published between 01.01.2013-08.12.2023, which were either reviews, guidelines or journals regarding the prevention of rUTIs in pre-menopausal women without any severe co-morbidities. Core charting topics include ‘preventive strategy’, ‘recommendation’ (with options for degree) and ‘why is it recommended/not recommended’.

4. Results:
The charting is ongoing, but we plan to present an overview of the preventive strategies, variations in which strategies are recommended across countries as well as the strengths of the recommendations.

5. Discussion:
The scoping review will provide an overview of the variety of preventive strategies recommended in the scientific literature and can possibly identify strategies which should be further investigated.

Antimicrobials for urinary tract infection in primary care – investigating associations between antibiotic prescribing and resistance in urinary tract infections caused by Escherichia coli at a national level. [Ashley Hammond]	**ashley.hammond@bristol.ac.uk**	**University of Bristol**
Background: Antimicrobial resistance (AMR) is considered one of the greatest threats to public health globally. Primary care is responsible for >75% of all antibiotics prescribed, and an important contributor to community AMR. UTIs are the most common confirmed bacterial infection in primary care. Antibiotic resistant UTIs last longer, are more expensive to treat than susceptible infections, and can lead to life-threatening urosepsis. National surveillance data provides an opportunity to explore associations between antibiotic dispensing and AMR. Aim: To quantify associations between antibiotic dispensing and AMR in E. coli-confirmed UTIs. Methods: Antibiotic susceptibilities for E. coli UTIs, and primary care antibiotic dispensing data was collected from the UK Health Security Agency Second Generation Surveillance System. Data was extracted from January 2017 to January 2024 for all 42 Integrated Care Boards (ICB) in England. Logistic time-series multilevel models will be constructed to explore lagged associations between antibiotic dispensing and AMR against common UTI treatments (trimethoprim, nitrofurantoin, pivmecillinam, fosfomycin). Analysis will include associations between age, sex, ethnicity and deprivation, at ICB-level. Results: Analysis is currently underway. Understanding associations between antibiotic dispensing and AMR nationally using the most up-to-date data for the whole of English primary care ensures antimicrobial stewardship guidelines can be updated to reflect current evidence. Discussion: Our findings will inform the development of interventions in areas where the AMR ‘problem’ is highest. These interventions will be tested as part of a Programme of research involving an efficient-design series of cluster randomised controlled trials across ICBs in England, known as IPAP-UTI.		
Remote consultations for acute cystitis before and during the COVID-19 pandemic; antibiotic treatment and clinical outcomes, a retrospective cohort study. [Lars Emil Aga Haugom]	**lars.haugom@uib.no**	**Department of Global Public Health and Primary Care, University of Bergen, Bergen, Norway**
Abstract not available		

Discordance of Antibiotic Prophylaxis in Recurrent Urinary Tract Infection and Subsequent Outcomes: Target Trial Emulation using Electronic Health Records. [Declan Dudley]	**dudleyd@cardiff.ac.uk**	**Cardiff University**

Background: Recurrent UTIs (rUTI) affect 6% of women and pose a substantial risk of anti-microbial resistance (AMR). Long-term low-dose antibiotic prophylaxis can reduce the burden of rUTI. Antibiotic prophylaxis is considered concordant if the urinary organism is sensitive and discordant if resistant. Recent work demonstrates population-level discordance rates of up to 20%. The impact of discordance on subsequent outcomes remains unclear.

Aim: Explore the impact of prophylactic antibiotic discordance on a) recurrence of UTI, b) time to recurrence, c) hospitalisation with UTI or bloodstream infection, d) death within 28 days of UTI.

Methods: This retrospective cohort study used individually linked general practice, hospital admission, and microbiology health records (in Wales) held by the SAIL Databank. We included women ≥18 years old newly prescribed prophylactic antibiotics (at least three sequential prescriptions of nitrofurantoin, trimethoprim or cefalexin) and categorised prophylactic antibiotic prescribing as concordant or discordant based on the most recent positive urine culture (Growth ≥ 10^8 cfu/L, where organism growth is not candida). We used target trial framework to compare outcomes in discordant vs concordant prescribing.

Results: This study is ongoing, with findings of the target trial available at presentation. This includes: recurrence, hospitalization and death (logistic regression) and time to recurrence (cox regression).

Discussion: It is intuitive that antibiotic concordance leads to better outcomes than discordance. If demonstrated, we must optimise prophylactic antibiotic initiation to ensure concordant treatment. If discordance is associated with equivalent (or better) outcomes, we need to carefully explore the implications in rUTI management.

Clinical effectiveness of a diagnostic algorithm including a decision tree, point-of-care C-reactive protein testing and safety-netting advice on antibiotic prescribing rate and further management of acutely ill children presenting to ambulatory care: a multicentre pragmatic cluster-randomized controlled combined superiority and non-inferiority trial (ARON trial). [Ruben Burvenich]	**ruben.burvenich@kuleuven.be**	**KU Leuven, Ghent University**

Background: Many acutely ill children are unnecessarily prescribed antibiotics in ambulatory care, driving antimicrobial resistance.
Aim: To assess the clinical effectiveness of a diagnostic algorithm including a decision tree, point-of-care C-reactive protein testing, and safety-netting advice in acutely ill children (6mo-12yo) presenting to ambulatory care on antibiotic prescribing, days until recovery, re-consulting, hospital referral/admission, additional testing, and mortality.
Methods: Multicentre pragmatic cluster-randomized controlled combined superiority and non-inferiority trial. We recruited 171 Belgian GP and community-based paediatrician practices, randomized to intervention or usual care in a 1:1 ratio (2021-2023). We analysed the (co-)primary endpoint(s) using mixed-effects logistic regression analysis to account for the clustering at practice level (intention-to-treat). We performed subgroup and sensitivity analyses.
Results: The intervention significantly reduced antibiotic prescribing (index consultation): 15.6% vs. 21.7%, OR (95%CI)=0.72 (0.55-0.94), p=0.02. Days until recovery, additional testing (index consultation and/or follow-up), re-consulting (follow-up), and antibiotic prescribing (after index consultation) were non-inferior given the non-inferiority margin was not reached (95%CI's upper limit). For antibiotic prescribing (after index consultation), we found an OR (95%CI) of 0.77 (0.605-0.977). Adherence to the algorithm was 72%-99% and we observed no mortality throughout the trial.
Discussion: The algorithm reduced antibiotic prescribing without compromising patient safety. This suggests benefits for healthcare resource optimization, supports the implementation of the algorithm in ambulatory care, and should inform national clinical guidelines. Further research should assess the algorithm's clinical and cost-effectiveness in other settings/countries.

Clinical prediction models for serious infections in children: external validation in ambulatory care. [David Bos]	david.bos@kuleuven.be	KU Leuven

Background: Distinguishing mild from serious infections (SI) is challenging in children in ambulatory care. Clinical prediction models (CPMs) assisting physicians' diagnoses require external validation before clinical use.
Aim: To externally validate four CPMs, developed in emergency departments, in ambulatory care.
Methods: We applied the CPMs in acutely ill children presenting to general or paediatric practices, or to emergency departments in Flanders, Belgium. For two multinomial regression models, feverkidstool and Craig-model, discriminative ability and calibration were assessed and model update was performed. For two risk scores, SBI-score and PAWS, diagnostic test accuracy was assessed.
Results: In 8211 children, 498 SI and 276 serious bacterial infections (SBI) were diagnosed. Feverkidstool had a c-statistic of 0.80 (0.77-0.84) with good calibration for pneumonia, and 0.74 (0.70-0.79) with poor calibration for other SBI. The Craig-model had a c-statistic of 0.80 (0.77-0.83) for pneumonia, 0.75 (0.70-0.80) for complicated urinary tract infections, and 0.63 (0.39-0.88) for bacteraemia, with poor calibration. Model update resulted in improved c-statistics for all outcomes and good overall calibration for feverkidstool and Craig-model. SBI-score and PAWS had sensitivities of 0.12 (0.09-0.15) and 0.32 (0.28-0.37).
Discussion: Feverkidstool and Craig-model show good discriminative ability for predicting SBI, confirming good external validity in a low prevalence setting. Their rule-out values at low-risk probabilities were limited. Their potential for early recognition and management of SBI should be evaluated in broad impact studies in ambulatory care. SBI-score and PAWS showed poor diagnostic performance.

Assessing health-related quality-of-life in young children with acute illness: A comparison between EQ-5D-Y proxy, FLACC, and Wong-Baker Faces Pain scales. [Erinn D'hulster]	**Erinn.dhulster@kuleuven.be**	**KU Leuven**

1. Background: The utilization of patient-reported outcome measures in children has increased and a broad range of health-related quality of life (HRQoL) scales for the pediatric population has been developed. However, consensus regarding the optimal scale for specific demographics and health strata remains lacking.

2. Objective: This study aims to examine three HRQoL scales (EQ-5D-Y proxy, FLACC, and Wong-Baker Faces Pain scale) by assessing their construct validity and developing mapping algorithms to predict EQ-5D values from the latter two. Prior to mapping, we explore the conceptual legitimacy of this process: 'Is HRQoL in young children defined by pain?'.

3. Methods: HRQoL data was collected alongside the ARON randomized controlled trial, involving acutely ill children (6mo-12yo) in Belgian primary care. Parents completed an app-based questionnaire encompassing the three HRQoL scales at regular time points until recovery. Construct validity was evaluated by comparing clinical trial observations (e.g., illness severity) with HRQoL scores. Exploratory factor analysis and regression models were used to investigate the underlying constructs associated with scale items. Mapping algorithms were explored through generalized linear modelling.

4. Preliminary results (more available at time of presentation): HRQoL data from 2979 children were collected. The construct validity of the scales varied across age and severity strata. The FLACC and Wong-Baker scale demonstrated strong correlation with the "having pain or discomfort" item in EQ-5D-Y.

5.Discussion: We found that scale selection should be guided by the target population's characteristics. Furthermore, our mapping algorithms provide an empirical foundation for estimating health utilities utilizing the user-friendly FLACC and Wong-Baker scales.

High-Antibiotic-Receiving Adults in a US Health Care System. [Jeff Linder]	jlinder@northwestern.edu	Northwestern University Feinberg School of Medicine

Background: Clinicians identify patient demand as a challenge in avoiding inappropriate antibiotic prescribing. Examining high-antibiotic-receiving patients could inform patient-centered stewardship interventions.

Aim: To describe the characteristics of high-antibiotic-receiving patients.

Methods: We examined patients ≥18 years old who had a Northwestern Medicine ambulatory encounter in 2022 or 2023, focusing on patients who received ≥4 antibiotics. To assess antibiotic appropriateness, we examined diagnosis codes within 0-3 days before antibiotic prescribing, characterizing patient-level antibiotic-receipt as “all appropriate,” “at least one potentially appropriate,” “all inappropriate,” and “no associated diagnoses.”

Results: Among 830,582 adult patients seen during the 2-year study period, 232,513 (28%) received at least one antibiotic. Among patients receiving antibiotics, 28,354 (12%) received ≥4. High-antibiotic-receiving patients had a mean age of 55, were 73% female and 82% white. High-antibiotic-receiving patients made a median of 29 (IQR, 13 to 41) clinician visits and sent 10 (IQR, 3 to 22) patient portal messages. The mean number of antibiotics received was 5.6 (SD±2.4) from a mean of 3.3 (SD±1.3) prescribers. The top 5 most common diagnoses associated with antibiotic prescriptions were acute sinusitis, urinary tract infection (UTIs), cough, dysuria, and cystitis. Only 3% of patients received antibiotics that were all appropriate; 87% had at least one potentially appropriate antibiotic; 8% had all inappropriate antibiotics; and 2% received all antibiotics with no associated diagnoses.

Discussion: Stewardship interventions addressing high-antibiotic-receiving adults must account for older patients, many visits, multiple prescribers, sinusitis and UTIs, along with non-specific, symptom-related diagnoses of variable appropriateness.

Standardised infection diagnosis coding to facilitate antimicrobial stewardship: a mixed methods feasibility study. [Monsey Mcleod]	**monsey.mcleod@nhs.net**	**NHS England**

BACKGROUND

A lack of standardised infection diagnosis digital coding hinders antimicrobial stewardship activities in primary care in England.

AIM

To explore the feasibility of developing a standardised list of common infection diagnosis digital codes (SNOMED CT) for use by primary care clinicians.

METHODS

This was a 3-phase mixed-methods study. The discovery phase identified barriers and facilitators to coding using a literature review and user journey interviews with general practice stakeholders. The design phase established a Clinical and Digital Reference Group (CDRG) using a modified Delphi method to iteratively create a shortlist of codes. The validation phase surveyed practising primary care clinicians to gauge consensus for the shortlist of codes.

RESULTS

Key themes from 34 papers include: coding difficulty when diagnosis uncertain; time constraints; implementation logistics; and uncertainty about purpose of data. These were confirmed by 8 user-journey interviews. The CDRG further identified a lack of “suspected infection” codes and a preference by some to code symptoms over diagnosis. Overall, 534 SNOMED CT codes were mapped to 54 common infections. The CDRG-recommended shortlist of codes formed the validation survey. Responses were received from 134 respondents (94% GPs). Forty codes met 60% agreement thresholds for 40 infections when an antimicrobial is prescribed and 12 codes for 12 infections when an antimicrobial is not prescribed.

DISCUSSION

This study has revealed the complexity of interacting factors influencing coding decisions in general practice. A shortlist of standard codes for infection diagnosis may be feasible for some infections but further research is required to test how these codes can be implemented.

Acute cough in outpatients: what causes it, how long does it last, and how severe is it for different viruses and bacteria? (EAST-PC). [Mark Ebell]	**ebell@Uga.edu**	**University of Georgia (for now)**

BACKGROUND and AIM: To describe the symptoms, duration, severity, and microbiologic etiology of lower respiratory tract infection (LRTI) in outpatients.
METHODS: Prospective cohort study of adults presenting to US outpatient sites with a complaint of cough and symptoms consistent with LRTI. Baseline data included demographics, signs, symptoms and PCR for 46 viruses and bacteria. Severity of symptoms was reported for up to 28 days follow-up via diary and text message. The Bronchitis Severity Score (BSS) assessed severity at baseline; overall severity was defined as the area under the symptom severity curve (AUC).
RESULTS: 618 patients had valid PCR results and 443 were followed until symptoms resolved. Symptoms more likely with viral or mixed infection included feverishness, chills, sweats, being generally unwell, interference with activity, appetite loss, fatigue, coryza, myalgias, and chest congestion, while moderate to severe sputum and colored sputum were associated with bacterial infection. Mean duration of cough was 14.7 days with viruses, 17.3 with bacteria, 16.9 with mixed infection and 18.4 with no detection. Severity did not differ at baseline by BSS; overall severity of cough by AUC was lower for viral infections (20.9 points) than for other groups (24.2-26.3). The most common pathogens were Haemophils influenza (28.0%), Moraxella catarrhalis (16.2%), Streptococcus pneumoniae (10.2%), rhinovirus (17.3%), influenza (12.8%), SARS-CoV-2 (11.5%), and seasonal coronaviruses (8.1%), with no differences in duration or severity.
DISCUSSION; Systemic symptoms suggested viral infection. The mean duration of cough was 16.4 days. The type of infection or potential pathogen was not an important predictor of the duration or severity of LRTI.

How likely is it that a virus or bacteria is causing a patient's symptoms? A case-control study of acute lower respiratory tract infections (EAST-PC). [Ronny Gunnarsson]	ronny.gunnarsson@infovoice.se	University of Gothenburg

Background: The likelihood that a detected virus or bacteria is responsible for symptoms has not been well described in outpatients with lower respiratory tract infection (LRTI).

Methods: We conducted a case-control study in US outpatient settings that enrolled patients aged 18 to 75 years with acute LRTI and controls without respiratory symptoms between 2019 and 2023. All patients underwent PCR testing for 46 bacterial and viral pathogens by the CDC Respiratory Branch Laboratory. The Positive-Etiologic Predictive Value was calculated to determine the probability that a virus or bacteria was the cause of symptoms.

Results: We enrolled 618 adults with acute LRTI who had a valid specimen for PCR, and 497 asymptomatic persons as controls. Viruses and bacteria were identified at a similar prevalence (28%) in symptomatic patients, while bacteria were detected more often than viruses in asymptomatic individuals (31% versus 12%). Viruses identified as highly likely to be pathogenic included influenza A and B, parainfluenza, human metapneumovirus, respiratory syncytial virus, SARS-CoV-2, and rhinovirus. Human seasonal coronaviruses were classified as probably pathogenic. Moraxella catarrhalis and Haemophilus influenza were the only bacteria likely be a pathogen when detected. Other than influenza, confidence intervals were broad for these potential pathogens, and too broad to draw firm conclusions for most bacteria.

Discussion: When detected, viruses are likely to be the cause of symptoms. This is less clear for bacteria, many of which are likely commensal. As multi-pathogen PCR tests become widely used, these results can help inform their interpretation and guide therapy decisions.

A novel approach to managing winter surges of acute respiratory tract infections in the community through Acute Respiratory Infection hubs. [Aleksandra Borek]	**aleksandra.borek@phc.ox.ac.uk**	**University of Oxford**

Background: Seasonal surges of acute respiratory infections (ARIs) pressurise primary care and emergency healthcare services while hindering prompt patient access. In England, hundreds of ARI hubs were introduced in the last two winters as a novel approach to help manage ARI pressures.

Aim: Identify how ARI hubs were implemented and their perceived role in managing ARIs in the community.

Methods: A qualitative interview study. We recruited professionals through a relevant professional network, purposefully sampling them from different locations and roles (including managers and clinicians). Remote semi-structured interviews were conducted, audio-recorded, transcribed and analysed thematically.

Results: Twenty-one (13 clinical, 8 non-clinical) professionals from 13 Integrated Care Boards across England participated. The findings showed that ARI hubs were established rapidly (often within days), with decisions driven by urgency, feasibility, and collaborative mobilisation efforts. Three main models of ARI hubs were implemented flexibly to fit with local contexts and commissioners' requirements. Several challenges and enablers to implementation were identified. Overall, professionals perceived the ARI hubs as having a critical role in, and positive impact on, offsetting winter pressure on general practice and other urgent care services and enabling same-day patient access. ARIs were mostly seen as suitable to be managed using different forms of ARI hubs.

Discussion: Learning from these pioneering ARI hubs can inform future delivery of this, or a similar, service. Further evaluation of the impact of this new service is needed, together with a broader consideration of the optimal approaches to managing surges of acute infections in the community.

Associations between pneumonia and diabetes mellitus and coronary heart disease: A national cohort study. [Henning Stenberg]	Henning.Stenberg@med.lu.se	Center for Primary Health Care Research, Lund University

Background: Diabetes mellitus (DM) and coronary heart disease (CHD) are diseases with a high global health burden. Patients with DM and CHD have higher risk for pneumonia and smaller studies have indicated higher prevalence of undiagnosed DM and subsequent risk of CHD among patients with pneumonia. However, the associations have not been comprehensively investigated, and previous studies have not included nationwide data from primary healthcare.

Aim: To explore associations between pneumonia and DM, and pneumonia and CHD.

Methods: An open nationwide cohort study of individuals aged 35–75 years in Sweden between 1997–2018. National registers and data from primary healthcare were used. Outcomes were DM and CHD, and the predictor was pneumonia. Cox regression models were used to calculate hazard ratios (HR) and 95% confidence intervals (95% CI) while adjusting for potential confounders.

Results: 4.4 million individuals without prior diagnosis of DM or CHD were included. The risks of DM and CHD were significantly higher among individuals with pneumonia (fully adjusted HR 1.35 (95% CI 1.34 to 1.36) for both outcomes) compared to those without pneumonia during the study period. However, risks of DM and CHD were not increased in individuals with pneumonia preceding DM/CHD compared to those without pneumonia.

Discussion: In this nationwide study, which included primary healthcare data, pneumonia was strongly associated with both DM and CHD. The sensitivity analyses, however, suggest that pneumonia does not seem to be a useful clinical predictor for DM and CHD. Further studies in other healthcare settings and populations are warranted.

Parent and Clinician Views on Not Using Antibiotics for Mild Community-Acquired Pneumonia. [Julie Szymczak]	julia.szymczak@hsc.utah.edu	University of Utah

Background: Preschool-aged children with mild community-acquired pneumonia (CAP) routinely receive antibiotics even though most infections are viral.

Aim: We sought to identify barriers to the implementation of a "no antibiotic" strategy for mild CAP in young children.

Methods: Qualitative study using semi-structured interviews conducted in a large pediatric hospital in the United States from January 2021 to July 2021. Parents of young children diagnosed with mild CAP in the previous 3 years and clinicians practicing in outpatient settings (pediatric emergency department [ED], community ED, general pediatrics offices) were included.

Results: Interviews were conducted with 38 respondents (18 parents, 20 clinicians). No parent heard of the "no antibiotic" strategy, and parents varied in their support for the approach. Degree of support related to their desire to avoid unnecessary medications, trust in clinicians, the emotional difficulty of caring for a sick child, desire for relief of suffering, willingness to accept the risk of unnecessary antibiotics, and judgment about the child's illness severity. Eleven (55%) clinicians were familiar with guidelines specifying a "no antibiotic" strategy. They identified challenges in not using antibiotics, including diagnostic uncertainty, consequences of undertreatment, parental expectations, follow-up concerns, and acceptance of the risks of unnecessary antibiotic treatment for many children if it means avoiding adverse outcomes for some children.

Discussion: While both parents and clinicians expressed broad support for the judicious use of antibiotics, pneumonia presents stewardship challenges. Interventions will need to consider the emotional, social, and logistical aspects of managing pneumonia, in addition to developing techniques to improve diagnosis.

Views and Experiences of Health Care Professionals, People with Asthma, and their Caregivers on the Prescription of Antibiotics in Acute Asthma Exacerbation: Systematic Review and Qualitative Synthesis. [Nour Odeh]	**n.odeh@soton.ac.uk**	**University of Southampton**

Background: Unnecessary antibiotic prescribing is a major driver of antibiotic resistance. There are currently insufficient data from published trials to support antibiotic treatment of acute asthma exacerbations (AAEs). Clinical practice guidelines therefore advise that antibiotics should not be prescribed for AAEs in the absence of clinical features of bacterial infection. Nevertheless, antibiotics are still prescribed in around 80% of asthma patients who present in primary care with suspected lower respiratory tract infection.
Aim: To explore the views and experiences of healthcare professionals (HCPs), people with asthma and their carers regarding antibiotic prescribing for AAEs.
Method: We searched MEDLINE, EMBASE, CINAHL and PsycINFO in August 2023. We included qualitative studies and mixed-methods studies which included a qualitative component. Following screening, included papers were thematically synthesised to infer views on antibiotic prescribing for AAEs.
Results: Our search retrieved 1510 studies. We included six studies, all but one study conducted in HCPs. Reasons for antibiotic prescribing included clinical presentation, fear of consequences of not prescribing, healthcare setting effect, and perceived patient pressure. Suggested strategies to reduce antibiotic prescribing included enhanced training on asthma management for HCPs, conducting audits and feedback on antibiotic prescribing, and using clinical decision support tools to guide management of AAEs.
Discussion: Our findings support existing recommendations to reduce unnecessary antibiotic prescribing for acute respiratory tract infections. Future research should aim to inform tailoring of these recommendations to support management of AAEs and explore the perspectives of asthma patients and their carers on antibiotic prescribing and use.

PRUDENCE, Platform randomised controlled trial of point of care diagnostics for enhancing the quality of antibiotic prescribing for community acquired acute respiratory tract infection in ambulatory care in Europe: first results. [Alike Vandervelden]	**a.w.vandervelden@umcutrecht.nl**	**University Medical Center Utrecht**

Background
The threat of AMR requires antibiotics to be used more wisely, with over-prescribing for respiratory tract infection (RTI) to be addressed. Point-of-care (POC) testing could aid in better targeting antibiotics to those patients who are likely to benefit and/or withholding antibiotics from those who are unlikely to benefit. The full repertoire of POC tests that could appropriate antibiotic prescribing has never been properly evaluated in the European primary care setting.

Aim
To test the (cost-)effectiveness of a diagnostic testing strategy, involving CRP, Strep A, Influenza and SARS-CoV-2, in decreasing antibiotic prescribing for RTI without affecting patient outcomes.

Methods
PRUDENCE is multi-country (UK, Belgium, Ireland, Hungary, Spain, Germany, France, Georgia, Greece, Italy, France, Israel, Portugal), prospective, individually randomised, clinical trial. Patients presenting with RTI symptoms (sore throat <14 days, cough <28 days) where the clinician intended/was going to prescribe an antibiotic were randomised to usual care, or usual care with a POC testing strategy; the designated test(s) depended on the main symptom (sore throat/cough) and influenza season (yes/no). Patients were recruited in GP practices and long-term care facilities and followed for 28 days.

Results
Patients (n=2649) were recruited between 15Dec21 and 18JAN24; analyses are currently performed.
We will report on co-primary endpoints: antibiotic prescribing in the 28-days from inclusion (yes/no; estimating possible reduction), and time to return to usual daily activities (in days; estimating non-inferiority), and on secondary endpoints: effects of POC testing on clinician's decision-making process, re-consultations, antibiotic prescription at inclusion, and complications.

Discussion
TBD

What do patients and clinicians in European primary care think of point-of-care tests for community-acquired acute respiratory tract infection (CA-ARTI): a qualitative process evaluation in six countries. [Marta Wanat]	**marta.wanat@phc.ox.ac.uk**	**University of Oxford**

Background: Point-of-care tests (POCTs) are advocated for guiding antimicrobial prescribing for CA-ARTI in primary care, as they can reduce uncertainty about the need for antibiotics. The 13-country PRUDENCE trial is comparing prescribing and recovery outcomes for patients managed by clinicians with and without access to POCTs for CRP, Influenza, STREP-A, and SARS-CoV-2.
Aim: To understand patients' and clinicians' views of POCT tests and POCT impact on their prescribing behaviour.
Methods: An embedded process evaluation in Belgium, Ireland, Georgia, Germany, Greece, and UK involving semi-structured interviews with purposively sampled patients who consulted for CA-ARTI, and with the recruiting clinicians. Data was analysed using thematic analysis.
Results: Interviews with 56 patients and 32 clinicians showed that patients saw the value of POCTs as either supporting or as the main component in determining their treatment plan, with clinicians who perceived uncertainty in diagnosing RTIs as difficult to manage, valuing POCT most. Misalignment between the test result(s) and the initial diagnosis prompted clinicians to question their initial treatment plan which at times led to changing it, or questioning the test and/or its diagnostic value. Both patients and clinician views on specific types of POCTs (CRP, influenza, STREP A) seemed to vary depending on their experience of using the tests.
Discussion: While we are awaiting the trial results, the extent to which POCT can change clinicians' behaviour is uncertain, with the interviews suggesting that the value of POCT seems to lie in providing reassurance, with unexpected test results potentially changing prescribing decision either way.

Rapid respiratory microbiological POCTs and antibiotic use in primary care: the RAPID-TEST RCT. [Alastair Hay]	**alastair.hay@bristol.ac.uk**	**University of Bristol**

Background: Antibiotics are prescribed for over 50% of RTIs in primary care, despite good evidence most patients do not benefit. Rapid multiplex microbiological point-of-care-tests (POCTRM) determine the presence/ absence of respiratory pathogens in 15 minutes. Whether POCTRM reduce antibiotic prescribing without worsening patient outcomes is not known.

Aim: To investigate whether POCTRM can (i) reduce same-day antibiotic prescribing for children and adults presenting to primary care with RTIs; and (ii) change symptom severity on days 2 to 4.

Methods: Patients 12+ months with a RTI where the clinician and/or patient believed antibiotic treatment was, or may have been necessary, presenting to 16 GP practices in SW England. Patients individually randomised to BioFire® FilmArray® Torch 1 testing for 19 viruses and four atypical bacteria; or usual care.

Results: Recruitment opened December 2022 and ended April 2024. 552 participants randomised: 63% female; 86% aged 16+ years; 95% self-reported white ethnicity; 26% had chronic lung disease; 5% reported a temperature >38°C; 14% reported tachycardia (age-adjusted); 8% reported tachypnoea (age-adjusted); 1% had oxygen saturation <94%. 95% provided a dual throat and nasal swab, and clinician diagnoses included: acute cough (17%); common cold (14%); acute pharyngitis/ tonsillitis (13%); acute lower RTI (11%); chest infection (9%); sore throat (9%); infective exacerbation of chronic lung disease (7%). Outcome data completeness: 548 (99%) with antibiotic prescribing; 414 (76%) with day 2 to 4 symptom severity.

Discussion: Clinical and qualitative (abstract submitted by Brown – if both accepted, could be presented sequentially) results will be available for conference.

Using microbiological data to improve the use of antibiotics for respiratory tract infections: An individual patient data meta-analysis. [Taeko Becque]	**t.f.becque@soton.ac.uk**	**QMUL**

Introduction: Point-of-care tests may assist with antibiotic targeting by allowing primary care clinicians to establish if symptomatic patients have a viral, bacterial, combined(co-viral-bacterial) or no infection. However, it is important to know if the presence of the virus or bacteria at the time of consultation is associated with poorer prognosis. Previous research for acute respiratory tract infections has given conflicting results, with studies lacking statistical power.

Aim: To investigate the prognostic value of microbiological data in an individual patient data meta-analysis.

Methods: We systematically searched databases for studies of acute respiratory tract infections that included microbiological testing in primary care. The outcomes were symptom duration, symptom severity days 2 - 4 post consultation, repeated consultation with new or worsening illness and/or complications requiring hospitalisation. Authors of eligible studies were contacted to provide anonymised individual participant data. The data were harmonised, aggregated and a multivariable regression was conducted to determine the prognostic effect of microbiological data classified as viral, bacterial, both or neither on outcome measures.

Results: 4306 papers were retrieved, and 26 studies were included. Data from 14 studies with 15675 patients were analysed. 53% were female, 27% were children and 25% had comorbidities and lung conditions. 30% had no microbes, 29% had viral infections and 20% had bacterial or combined infections. Preliminary results suggest no statistically significant differences in symptom severity, symptom duration, reconsultation or hospitalisation in those with a virus, bacterial or combined infection compared to those with no organism detected. Final results will be available to present at the conference.

Diagnostic accuracy of point of care tests for acute respiratory infection: a systematic review of reviews. [Emily Brown]	**emily.brown@bristol.ac.uk**	**University of Bristol**

Background:
Acute respiratory tract infections (RTI) are a common reason for seeking healthcare. Accurate diagnosis of bacterial vs viral RTI is crucial to ensure appropriate treatment and avoid over-prescription of antibiotics.

Aim:
Conduct a systematic review regarding the diagnostic accuracy of symptoms, signs and point-of-care tests (POCTs) for adults with RTI in primary and emergency care.

Methods:
We included systematic reviews and primary studies (where no systematic review identified). Reference standards for viral and bacterial infections included laboratory testing, radiological assessment, expert consensus or clinical algorithms. We included host response POCTs (POCTHR) to diagnose bacterial RTI, and rapid microbiological POCTs (POCTRM) for influenza and respiratory syncytial virus. We extracted data to calculate sensitivity and specificity, conducting meta-analyses of primary studies where possible. We used QUADAS-2 and GRADE to assess the methodological quality and certainty of the evidence.

Results:
Data from 6 systematic reviews showed individual symptoms and signs have poor diagnostic accuracy for bacterial RTI. For example, the sensitivity of cough was 89.1% (95% confidence interval [CI] 66.4-97.1), but the specificity was 13.4% (95% CI 2.5-48.4). POCTHR were more accurate, particularly combination biomarkers (sensitivity 80-90%, specificity 82-93%). POCTRM involving nucleic acid amplification techniques had the highest diagnostic accuracy for influenza (sensitivity 91-99.8%, specificity 96.8-99.4%). Most evidence was considered low- or very low-certainty with GRADE.

Discussion:
Current evidence does not support the use of symptoms, signs or POCTs in primary and emergency care to determine the microbiological cause of RTIs. Further research is needed to investigate the cost-effectiveness of POCTs.

Cluster RCT of Air Filtration to prevent Respiratory Infections (including COVID-19) in care homes: the AFRI-c trial. [Alastair Hay]	**alastair.hay@bristol.ac.uk**	**University of Bristol**

Background: RTIs are common in people in care homes. Transmission can be through direct contact or airborne particles. Portable high-efficiency-particulate-air (HEPA) filtration units remove airborne microbial particles, but it is unclear if this is sufficient to reduce infections.

Aim: To investigate the effectiveness of portable HEPA filtration units to reduce RTIs in care home residents.

Methods: 91 residential care homes randomised to HEPA filtration units in communal rooms and private bedrooms; or usual care. Primary outcome: number of RTIs recorded by care home staff. Secondary outcomes: other infections; falls /near falls; laboratory confirmed infections; hospitalisations; and staff sickness.

Results: 44 care homes randomised to intervention; 47 to usual care. 43% and 45% of intervention and control group care homes provided nursing care; 86% and 87% dementia care; and median (IQR) number of communal rooms were 4 (3 -6) and 4 (3-5). 1158 residents were consented, of whom 34 (3%) moved away; 172 (15%) died; and 5 stopped participating. Primary outcome data is 98% complete with 195,463 ‘resident days’ symptom data collected. Comparing intervention and control group residents: median (IQR) age was 87 (81-92) and 88 (82-92) years; 70% and 71% were female; 35% and 43% were receiving nursing care; 58% and 57% had dementia; frailty scores were 6 (4-7) and 6 (5-7); 95% and 94% received influenza; and 97% and 96% COVID vaccines.

Discussion: Clinical and qualitative process evaluation (abstract submitted by Rees – if both accepted, could be presented sequentially) results will be available for conference.

Understanding the acceptability and implementation of HEPA air filters in care homes: the AFRI-c trial process evaluation. [Sophie Rees]	**sophie.rees@bristol.ac.uk**	**University of Bristol**

Background: AFRI-c is a cluster randomised controlled trial (RCT) investigating the clinical and cost-effectiveness of portable HEPA filtration units in reducing respiratory infections in care home residents. A mixed methods process evaluation was embedded in the AFRI-c RCT to support interpretation of the AFRI-c main results. This paper will report the qualitative findings of the process evaluation.

Aim: To understand acceptability, fidelity, and implementation of the AFRI-c intervention and to contribute to the interpretation of effectiveness findings.

Methods: Qualitative remote and face-to-face interviews were carried out with care home staff, residents, and relatives at AFRI-c sites. We purposively sampled homes for variation in terms of care home size (number of residents), type (nursing/residential), and index of multiple deprivation. Data analysis used reflexive thematic analysis and drew on normalisation process theory to understand intervention implementation.

Results: Qualitative data was collected at 22 of the 91 participating care homes in AFRI-c. Fifty seven interviews were conducted with residents with capacity (n=20), staff (n=25), and personal consultees (n=12). Interviews took place across Winter 1 (n=11), Winter 2 (n=25), and Winter 3 (n=21). Topics explored included the acceptability of air filters in private and communal rooms, perceived effectiveness, challenges of using air filters in the care home setting, and views on future use.

Discussion: Analysis of the qualitative interview data will be presented at the conference. Findings are currently being held back to maintain masking of the team while data collection and analysis of the primary outcome are completed (abstract of these findings submitted by Hay – if both accepted, could be presented sequentially).

The Effectiveness of Interventions to Reduce the Transmission of Acute Respiratory Infections in Care Homes: A Systematic Review. [Deepthi Lavu]	d.lavu@exeter.ac.uk	University of Exeter

Background: Care home residents are at high risk from outbreaks of respiratory infections, such as influenza and COVID-19.
Aims: To determine which interventions (apart from vaccines) are effective at reducing transmission of acute respiratory illnesses (ARIs) in care homes.
Methods: A Systematic review of randomised controlled trials was conducted.
We searched CINAHL, Medline, Embase and Cochrane for randomised controlled trials (RCTs) of interventions to prevent transmission of ARIs in care homes (excluding vaccines), to April 2023.
Results: 21 articles met inclusion criteria. Two infection control interventions significantly reduced respiratory infections. Oseltamivir significantly reduced risk of symptomatic laboratory-confirmed influenza (OR 0.39, 95%CI 0.16 – 0.94, 3 trials), and influenza-like illness (OR 0.50. 95%CI 0.36-0.69), even in a vaccinated population. High dose vitamin D supplementation reduced incidence of ARIs (IRR 0.60; 95%CI 0.38–0.94, 1 trial). Nine RCTs of vitamin, mineral, probiotic and herbal supplements showed no significant effect.
Discussion: Transmission of respiratory infections in care homes can be reduced by educational interventions to improve infection control procedures and compliance by staff, by antiviral prophylaxis soon after a case of influenza has been detected, and by supplementation with high-dose Vitamin D3. Further research is needed to confirm the effect of high-dose Vitamin D3.

Routine data registries as a basis to analyse and improve the quality of antimicrobial prescription in Primary Care. [Martijn Sijbom]	**m.sijbom@lumc.nl**	**LUMC- Health Campus The Hague**

Background
Antimicrobial resistance (AMR) is increasing worldwide, largely due to the overuse of antimicrobial medication. In most countries, 80-90% of antimicrobial prescription originate from primary care.

Aim
With the goal of examining the quality of prescription, we explored its determinants in combined data from a primary healthcare registry and a national socioeconomic database.

Methods
Pseudonymized routine healthcare data from 269,547 patients (1,150,252 antimicrobial prescriptions) gathered between 2012 and 2020 from primary care practices in the region The Hague – Leiden were used. These data were linked with individual socioeconomic data to identify determinants of antimicrobial prescribing. The quality of prescription was analysed using predefined criteria based on primary care guidelines. Multivariable logistic regression analyses were performed to identify associations with appropriateness.

Results
Respiratory tract infections (RTI) were most commonly associated with overprescribing, with 14.5% of RTI prescriptions not following guidelines. For macrolide prescriptions, 77.1% did not correspond with 1st and 2nd guideline choices. Certain migration backgrounds, female gender, comorbidities, age, and primary care practice size, a proxy for continuity of care and consultation time per patient, were associated with poorer guideline adherence.

Discussion
Combined analyses of socioeconomic and routinely collected healthcare data does reveal relevant additional information to answer medical questions in a broader context, such as AMR. Most room for improvement was found for RTIs and macrolides, especially in specific risk groups. Assuring continuity of care and/or providing extended consultation time per patient might be essential elements to establish, before disseminating and implementing improvement strategies.

Impact of side effects and allergies on patients' attitudes and adherence to prescribed antibiotic use. [Liam CLayton]	**liam.clayton@ukhsa.gov.uk**	**UK Health Security Agency**

Background
Overuse and misuse of antibiotics is a known contributing factor for antibiotic resistance. The experience of adverse reactions to antibiotics is well documented, however little is known about how this can impact patients' adherence to recommended use.

Aim
This study aimed to explore the impact of side effects (SE) and allergies on users' attitudes and behaviours towards prescribed antibiotic use.

Methods
This mixed methods study included an online survey (n=1,059) and focus groups (n=21), with adults who had previously experienced SE to antibiotics.

Results
Respondents identified many antibiotic SE, usually presenting mildly (37%; 397/1,059) or moderately (45%; 474/1,059) shortly after consumption. 31% (325/1,059) were not aware of the possibility of SE prior to use, barriers included inaccessibility of patient information leaflets and lack of information about SE shared by healthcare professionals (HCPs). 42% (440/1,059) of respondents did not complete the course; 61% (269/440) of which sought HCP advice and 32% (142/440) personally decided to stop, many due to the SE impacting their life more than the infection being treated. Those with antibiotic allergies usually had this confirmed by a HCP (89%; 275/308), but 49% (152/308) had not experienced a reaction for over 10 years.

Discussion
Providing accessible information on SE prior to taking antibiotics may help to manage patient expectations, which could reduce subsequent consultations and improve antibiotic adherence. Patients diagnosed with an antibiotic allergy should be encouraged to have this reassessed to potentially de-label inaccurate allergies. Future research should involve parents whose children have experienced adverse reactions to antibiotics.

Exploring community pharmacy and general practice views on primary care communication and pathways to access antibiotics in England. [Ming Xuan Lee]	**Ming.Lee@ukhsa.gov.uk**	**UK Health Security Agency**

Background:
General practitioners (GPs) and community pharmacists (CPs) have complementary roles in antimicrobial stewardship (AMS) making inter-professional collaboration an important aspect in primary care.

Aim:
This exploratory qualitative study aimed to investigate challenges in the communication pathways between GPs and CPs and the pathways to access antibiotics in primary care, including impacts on AMS.

Methods:
Focus group and semi-structured interviews explored the experiences of GPs and community pharmacy teams independently. An inductive thematic analysis is on-going.

Results:
9 CPs, 3 pharmacy technicians and 12 GPs representing a range of location, years of experience and ethnicity participated. Both GPs and CPs report taking AMS seriously despite having a different remit: GPs ensure antibiotic prescriptions are appropriate whilst the CP role as essential for the quality assurance of antibiotic prescriptions. Many CPs, particularly those not connected to a GP surgery, report challenges in querying prescriptions with GPs. GP issues included having limited or no awareness of the availability of medicines at the point of prescription. Many held concerns about differences in antibiotic prescribing thresholds, especially in fully remote contexts.

Discussion:
Findings suggest the implementation of technology that can support primary care health professionals to better engage in stewardship actions such as a system to facilitate the sharing of topline patient notes with prescription or that tracks and summarises stock levels in an area. More direct communication lines between CPs and GPs i.e. central points of contact between groups, may support collaborative working and optimise AMS.