Aims Paediatric populations are generally considered to be at a lower risk of mortality from COVID-19 infection compared with adult populations. Regardless, a notable number of deaths from COVID-19 have been reported in paediatric populations. Therefore, the purpose of our work was to conduct a scoping review of the literature to assess the risk factors for COVID-19 mortality among paediatric populations.

Methods Our review was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR). Searches were performed in PubMed, Scopus, medRxiv, and WHO Coronavirus Database. There were no restrictions placed for searches based on date. Papers that were written in English, included at least one paediatric death from COVID-19, and described at least one risk factor for the death and/or clinical presentation of the child(ren) were eligible for inclusion. The paediatric population was defined as children aged 18 years and younger.

Results Searches generated a total of 5828 papers and, of those, 75 were eligible for inclusion. There was a pooled total of 876 paediatric deaths. Significant risk factors for paediatric mortality included having co-infection of other pathogens, and at least one comorbidity; the comorbidities most frequently associated with mortality were malignancies, heart conditions, kidney disease, and genetic disorders such as Down Syndrome. The development of Paediatric Multisystem Inflammatory Syndrome (PMIS) was also consistently demonstrated to be a risk factor. Common clinical complications associated with paediatric COVID-19 infection resulting in mortality were sepsis, acute respiratory distress syndrome (ARDS), and acute kidney injury (AKI).

Conclusion Our review has highlighted prominent risk factors for mortality from COVID-19 amongst paediatric populations. It is vital to consider the risk factors in order to assist prognostication and clinical decisions for severe paediatric infections of COVID-19. Our findings also highlight the importance of COVID-19 vaccination in paediatric populations.

Aims Adverse reactions to antibiotics are common, however the incidence of true allergy is much lower, confounded by intercurrent infections or predictable side effects. Routine use of second-line antimicrobials due to falsely-labelled drug allergies is a cost burden to the health service and denies patients optimum therapies. Children with penicillin allergy report more medical attendances, antibiotic prescriptions and expensive drug prescriptions compared to the general population.

The primary aim of this study is to evaluate the safety and efficacy of drug provocation challenges (DPC) to ‘delabel’ antibiotic allergies in the paediatric population in a large University district general hospital using a risk stratification tool and shorter testing schedule, compared to previous schedules. Our secondary aim was to explore waiting times.

Methods Retrospective case review of children referred to an existing paediatric drug allergy service for antibiotic allergy was performed from March 2016 to February 2022. All patients underwent a DPC, initially four doses then a home course for up to seven days. In August 2020 DPC doses were reduced to three (high risk), and one or two doses for low-risk challenges followed by a two-day home course. Risk was elicited using a validated stratification tool.

Results 61 patients attended drug allergy clinics for antibiotic allergies from 2016-2022 with 77% of challenges to the penicillin family (n=47), 59 were successfully delabeled (97%). One case of anaphylaxis and four immediate reactions (7%) occurred in the 2016-2020 cohort, with no reactions in the 2020-1 cohort. Three patients (5%) reported delayed reactions after discharge in the 2016-20 cohort; one reported a delayed reaction in the 2020-1 cohort. There were no associated hospital admissions.

The median duration on antibiotic therapy in the 2016-20 cohort was 3 days (max 8; min 1) and 2 days in the 2020-2 cohort (max 3; min 1). For referrals made prior to August 2020 median patient wait for drug provocation was 9.3 months (SD 5.8) and 6.2 months (SD 4.2) thereafter.

Conclusion The use of a risk-stratification tool and shorter DPC are efficacious and safe in our population of children with suspected antibiotic allergies. In our population 97% of participants were successfully delabeled.

Economic modelling concluded that delabeling is cost effective if 16.9% of patients are delabeled (2.9% in Europe), with an incremental benefit of $2204 (USD) over not performing testing.1 Continued development of abbreviated antibiotic DPC in the outpatient setting and further evaluation of cost-benefit is merited.

REFERENCE
Methods This study considered 77 children with active TB who were diagnosed between January 2011 and March 2021. Data was collected on these patients using electronic records and then entered on to a pro forma. The percentage yields for sputum, bronchoalveolar lavage (BAL), gastric aspirate (GA), stool culture and lymph nodes (pus/tissue) were then identified and compared in both pulmonary and extra-pulmonary TB (figure 1). Extra-pulmonary TB in this case comprised of CNS, lymph node and gastrointestinal TB.

Results BAL exhibited an overall culture yield of 100% (2/2) compared to 50% (3/6) for lymph node swab samples, 46% (12/26) for sputum samples, 27% (4/15) for GA and 20% (2/10) for stool culture (figure 2). These yields varied according to whether it was pulmonary or extra-pulmonary TB; BAL (100% for both), neck swab (67% vs. 40%), sputum (46% vs. 50%), GA (27% vs. 100%) and stool culture (20% vs. 0%). The number of tested patients who were confirmed as TB on culture was 40% (19/47).

Conclusion The yield percentages for cultures were generally quite low, except for BAL, albeit with a small sample size. However, these culture yields were higher than most recent literature would suggest for paediatric TB and were on a par with adult TB yields.2,5 Gastric aspirate and stool culture have been found in this audit to be unreliable indicators of TB diagnosis in children. The first line sputum culture has given a higher-than-expected yield in this audit however this yield percentage is still quite low compared to diagnostic tests for other conditions. Therefore, many patients in the paediatric TB cohort are being missed using the microbiological diagnosis alone. Some differences were noted in the yields for pulmonary and extra-pulmonary TB, most notably the GA yield being much increased in extra-pulmonary cases. Finally, the number of patients being tested using 3 respiratory samples should be increased from its current levels to maximise the diagnostic yield from these cultures as only around 65% (47/72) of appropriate patients were tested using these samples.

REFERENCES

Aims GeneXpert is a molecular TB test which detects the presence of TB DNA in samples such as sputum and can publish results in less than 2 hours. It can also be used to detect resistance to the drug Rifampicin, important in the management of TB. In this study, a retrospective audit of the paediatric TB cases from a tertiary paediatric unit was carried out, looking at the sensitivity of GeneXpert in diagnosing TB in this population using sputum and lymph node samples.

Methods This study considered 77 patients with active paediatric TB who were diagnosed between January 2011 and March 2021. Data was collected on these patients using electronic records and then entered on a pro forma. The sensitivity of GeneXpert in diagnosing both pulmonary and extra-pulmonary TB in these patients was recorded and analysed. Extra-pulmonary TB in this case includes CNS and lymph node TB.

Results GeneXpert exhibited an overall sensitivity of 55% (11/20) when all sample types are amalgamated (figure 1). Sputum samples exhibited a sensitivity of 54% (7/13) for pulmonary TB and 100% (1/1) for extra-pulmonary TB. The lymph nodes samples gave a 100% sensitivity for pulmonary (2/2) as well as extra-pulmonary (3/3) TB. It was also noted that only 26% (20/77) of TB patients in this audit were tested using GeneXpert.

Conclusion Based on the above results, GeneXpert has a greater sensitivity for extra-pulmonary samples, with lymph node being the most reliable sample type. The results for GeneXpert in this audit are lower than have been recorded in past studies, with much higher sensitivity rates being recorded previously.1 However, it must be noted that the utilisation of GeneXpert in our hospital was relatively low and more patients should be tested using this method in the future to fully elucidate the efficacy of this test.2,3 Furthermore, the sensitivity of this test compares favourably to that of sputum cultures, stool cultures and gastric aspirate samples from this audit, indicating its potential effectiveness at diagnosing TB.