Professor Sir Munir Pirmohamed

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Professor Sir Munir Pirmohamed is a clinician scientist who has an outstanding international profile as a leader in clinical pharmacology, drug safety, pharmacogenomics and personalised medicine. He is a Consultant Physician at the Royal Liverpool Hospital. Against a highly competitive national field, he was awarded the only UK NHS Chair of Pharmacogenetics in 2007. His leadership roles include Director of the MRC Centre for Drug Safety Science, Vice-President Clinical for the British Pharmacological Society and Executive Director of Liverpool Health Partners (the AHSC for Liverpool). He established the Wolfson Centre for Personalised Medicine, which has a multi-disciplinary team of 73 individuals. He is inaugural NIHR Senior Investigator and Fellow of the Academy of Medical Sciences and was knighted by the Queen in June 2015 for services to Medicine. His cutting edge research has gained him international recognition as evidenced by invitations to speak at over 170 national and 160 international conferences. His scientific contributions/breakthroughs can be summarised as follows:

- Largest epidemiological studies in the world on the burden of adverse drug reactions as a cause of hospital admission (6.5% in adults, 2.9% in children) and in hospital in-patients (14.7% in adults and 17.7% in children). These have informed further research worldwide, education and training of healthcare professionals and regulatory interventions.
- Pioneering studies which have provided insights into how drugs interact with specific HLA molecules and lead to serious immune-mediated adverse drug reactions. This has resulted in the implementation of *HLA-B*57:01* genotyping prior to the prescription of abacavir, which has virtually eliminated abacavir hypersensitivity reactions. Further work has identified HLA associations with carbamazepine hypersensitivity (*HLA-A*31:01*), flucloxacillin hepatitis (*HLA-B*57:01*), clozapine-agranulocytosis (*HLA-DQB1*), nevirapine-induced Stevens-Johnson syndrome (*HLA-C*04:01*) and anti-thyroid agranulocytosis. Unpublished work has identified several new HLA allele associations with amoxicillin anaphylaxis and drug-induced toxic epidermal necrolysis. A novel 24-allele HLA biomarker panel is being developed for clinical implementation with MC Diagnostics (i4i funding).
- Demonstration of the clinical utility of genotype-guided dosing of warfarin when compared to standard care, demonstrated in a randomised controlled trial (published in the *NEJM*), after work as part of the international warfarin pharmacogenetics consortium. The work has resulted in 36 articles on warfarin pharmacogenetics, and genotype-guided dosing is currently being implemented in UK primary care clinics using a point-of-care genotyping platform (developed by LGC) which provides genotype results in 45 minutes.
- Innovative drug repurposing strategies are now being used to prevent adverse drug reactions. Two examples which have progressed from cellular models, through animal models to phase II clinical trials include the use of telmisartan to ameliorate antiretroviral-induced insulin resistance in HIV-positive patients (377 recruited to trial, currently in follow-up), and the use or rosuvastatin to prevent aminoglycoside-induced nephrotoxicity in children with cystic fibrosis (50 children being recruited).

Pirmohamed has a prolific publishing record with over 400 articles (including in journals such as *NEJM, Lancet, BMJ, Nature Genetics* and *Nature*) with an H-index of 68 (Scopus) or 81 (Google Scholar), with 58 articles that have over 100 citations each. He is a Thompson-Reuters 2015 Highly Cited Researcher and has won over £50M in grant funding including from NIHR, MRC, Wellcome Trust and the EU. Current grant income is £17M.

He is passionate about training; he has supervised 10 NIHR academic clinical fellows, 5 clinical lecturers, and 42 higher degrees. He led the team which was awarded the MRC Clinical Pharmacology Training Scheme, a £3M scheme in collaboration with Industry (GSK and Astra Zeneca) which has successfully recruited 13 clinical fellows.

Pirmohamed has been advisor to the MHRA since 1996; he is Chair of the Pharmacovigilance Expert Advisory Group and has been a member of the Commission on Human Medicines since 2006. He has been involved in assessing many drug safety issues, which have led to changes in prescribing

recommendations and sometimes market withdrawal to protect public health. Conversely, he has also been involved in the assessment of many new medicines introduced onto the market since 2006. Pirmohamed was also a Member of the Expert Scientific Group on Phase I trials ("Duff Committee") following the Northwick Park Incident in 2006. He then became a member of the MHRA Clinical Trials Expert Advisory Group and thus has extensive experience of the processes required for safe conduct of early phase trials.

Pirmohamed actively supports PPI activities, acting as a patron for SJS Awareness UK. He has spoken at many science festivals (including Cheltenham) and worked with a theatre company to develop a play on personalised medicine which was performed at schools through the UK and at the Royal Albert Hall.