

In May this year, I attended the British Toxicology Society (BTS) annual congress, held at Spaces at The Spine in Liverpool. I am grateful to have been awarded the BTS Pre-Doctoral Student Bursary to support my attendance, which also allowed me to present some of the key findings from my PhD as a poster. The conference was a fantastic opportunity to discuss my work and its potential applications, meet like-minded researchers, and hear about novel work, with the symposium 'Knowledge gaps in e-cigarette toxicology' being a particular highlight.

To begin the symposium, Dr. Rebecca Richmond of the University of Bristol discussed the epigenomic effects of e-cigarette use, presenting findings from multiple studies that show that e-cigarette use notably alters the methylation patterns of DNA compared to people who do not use e-cigarettes. Interestingly, Dr. Richmond described that the changes to DNA methylation associated with e-cigarette use are generally distinct from those associated with traditional cigarette use, with epigenomic assessment successfully differentiating between individuals who smoke traditional cigarettes and those who use e-cigarettes. Due to these differential effects on DNA and gene expression, it was suggested that cigarettes and e-cigarettes may cause disease in different ways, which could have important clinical implications.

Following this, Professor Alan Boobis of Imperial College London went on to discuss the direct and indirect risks of e-cigarette use. To begin, it was explained that, though e-cigarettes are not necessarily completely safe, they were introduced to the market as a safer alternative to traditional cigarettes to aid in quitting smoking. In particular, Professor Boobis presented data demonstrating that many of the components of e-cigarettes – including flavourings (many of which are also used in food!) and delivery vehicles – are relatively non-toxic at standard concentrations while other components – such as heavy metals and nicotine – may pose risk, but are also present in traditional cigarettes, and often at greater concentrations. Importantly, the presentation reiterated that e-cigarettes still represent a safer alternative to traditional cigarettes that, when used as intended, can help smokers quit. However, while current smokers make face less risk from e-cigarettes than traditional cigarettes, this is not the case for all e-cigarette users. Given that an increasing number of young people are taking up e-cigarette use without any history of traditional smoking – more 11–17-year-olds now use e-cigarettes than traditional cigarettes –, Professor Boobis highlighted a major concern about young people exposing themselves to unnecessary risk due to the perceived attractiveness of e-cigarette use, for instance due to interesting flavours and packaging widely available.

The final presentation within this symposium was delivered by Professor Chris Pudney of the University of Bath on the detection of synthetic cannabinoids – e.g., 'spice' – in e-cigarettes seized from English schools. Spice is a synthetic cannabinoid that, while designed to mimic the effects of cannabis, has been described as "worse than heroin" by some of its users due to its highly addictive nature. Professor Pudney described that there had been localised spates of unexplained collapses and severe illnesses in schools, which may have been associated with drug or e-cigarette use. Therefore, his research group used rapid in-field tests to test for the presence of drugs in e-cigarettes seized from schools. A particularly shocking statistic presented by Professor Pudney was that spice was detected in 17% of e-cigarettes seized from schools. Professor Pudney went on to describe that investigation into the origins of these spice-containing e-cigarettes identified that, in

general, students believed that they were purchasing e-cigarette liquid containing THC, not spice, but that spice was likely used by producers as it is far cheaper. As spice-containing disposable e-cigarettes are very uncommon, the team found that these liquids could be identified visually due to the liquid colour, price and branding. As a result, the researchers, in collaboration with local police forces, were able to create awareness posters and run in-school sessions to help young people identify e-cigarettes and refillable liquids that contain spice so that they could make more informed decisions, which helped reduce the incidence of sudden collapses and illnesses in schools. However, Professor Pudney highlighted that, although selling such products violates the terms of many social media platforms, they are still widely available on social media. Therefore, a stronger enforcement of laws requiring social media platforms to remove posts advertising harmful products is required to more adequately protect young people from harm, particularly when they may be unknowingly exposed.

I would like to reiterate my thanks to the BTS for this award and for organising such a great event, and I look forward to attending future congresses!