**Research & Development**

**Support Services**

**COVID-19**

**PPE Evaluation**

**Services Offered**

Our large (160 m3) halochamber allows testing of PPE under ‘in use’ conditions to quantify the protection afforded by PPE against viral particles simulated by an aerosol challenge of salt nanoparticles. We also offer testing of face masks and respirators in accordance with BS EN 149 and other international standards.

* Evaluation of PPE while performing physical tasks within a salt nanoparticle environment.
* Salt nanoparticles are produced as a polydisperse aerosol using a high flow generator.

**Our Supporting R&D Experience**

Evaluation of the performance of respiratory protective equipment during physical tasks common to clinical environments within a simulated COVID-19 contaminated environment.

**Detection**

**Services Offered**

Quantitative evaluation of chemical and explosive detector performance under controlled, realistic or extreme conditions of use.

* Recovery of a volatile toxic industrial chemical from the skin surface, expressed as a function of exposure duration and time post exposure.
* Isolation of a chemical-specific Raman signature (lower line) from a mixture (upper line) using a novel, signal-enhancement technology.

**Our Supporting R&D Experience**

Development of generic technology platforms to improve existing methods and novel technologies for the retrospective identification of exposure to toxic substance based on “man as detector” concept.

**Protection**

**Services Offered**

Assessment of protective materials and equipment from individual components to whole ensemble using internationally-approved methodologies (swatch and MIST) or bespoke study designs utilising robotic mannequins.

* Assessment of a safe undress procedure using quantitative whole body fluorescence imaging to demonstrate cross-contamination of wearer.
* Evaluation of a PPE ensemble (with simultaneous physiological monitoring of wearer) within the TRG large volume exposure chamber.

**Our Supporting R&D Experience**

Design and evaluation of safe undress procedures and development of quantitative, whole body chemical dosimetry for analysis of vapour exposures.

**Decontamination**

**Services Offered**

We provide an internationally renown**ed** service for quantifying the effectiveness and safety of decontamination products against chemical, biological and radiological threats using a globally unique laboratory test system in conjunction with confirmatory clinical studies.

* Specialist system for simultaneous evaluation of hair and skin decontamination products.
* Evaluation of a large volume water process for mass casualty decontamination.

**Our Supporting R&D Experience**

Design and validation of a novel diffusion cell system for laboratory determination of hair and skin decontamination products. Development of personal, infrastructure, vehicle and equipment decontamination systems.

**Medical Diagnostics**

**Services Offered**

We can design and perform laboratory and clinical studies to support development of prototypes and regulatory approval of devices.

* Prototype pupillometer measuring the effect of a CNS depressant on pupillary reflex with time post administration.
* Determination of the optimum thickness of a protective skin cream performed as part of a GCP-compliant clinical study.

**Our Supporting R&D Experience**

Pioneering development of sebomics for forensic applications and chromodynamic pupillometry as a generic diagnostic/prognostic indicator of exposure to toxic materials and infections.

**Forensic & Chemical Analysis**

**Services Offered**

We provide chemical analytical services such as screening for substances of abuse, toxic industrial chemicals, heavy metals, pharmaceuticals, CW agent simulants and toxins in a variety of matrices for forensic and research applications.

* Use of confocal Raman microscopy to identify and map areas contaminated with a controlled substance on the internal surface of a syringe barrel.
* We pride ourselves in running a highly adaptable R&D facility within the framework of a formal quality management system to provide analysis for a range of applications.

**Our Supporting R&D Experience**

Application of SEM-XDS for visualisation of micronutrients within cellular structures, time-resolved localisation of therapeutic agents within skin tissue by micro-autoradiography and development of a multiplex assay for simultaneous analysis of multiple prohibited substances.

**Training, Exercising and Education**

**Services Offered**

Educational programmes on CBRN threat agents and associated detection and medical countermeasures. Practical training of first responders in accordance with IOR and PRISM incident response processes under realistic environmental conditions. Design, planning and implementation of large-scale exercises.

* Example of a bespoke illustration to supplement first responder training for chemical incidents involving emergency decontamination of casualties.
* Large scale, multi-agency incident response exercise involving more than 500 responders, volunteers and support personnel to evaluate new US federal guidance (PRISM).

**Our Supporting R&D Experience**

Performance of quantitative, multi-agency, large-scale exercises and subsequent derivation of evidence-based guidance and training documentation.

**Relevant Publications**

T. Ehtezazi, D.G. Evans, P.A. Evans, V.J. Vadgama, J. Vadgama, F. Jared, N. Gre, R.P. Chilcott. SARS-CoV-2: Characterisation and mitigation of risks associated with aerosol generating procedures in dental practices. Br Den J, 7 (2021) 1–7.

H. Matar, S.C. Price, R.P. Chilcott, Further studies of the efficacy of military, commercial and novel skin decontaminants against the chemical warfare agents sulphur Mustard, Soman and VX, Toxicol In Vitro, 54 (2019) 263-268.

H. Matar, A. Pinhal, N. Amer, M. Barrett, E. Thomas, P. Hughes, J. Larner, R.P. Chilcott, Decontamination and management of contaminated hair following a CBRN incident, Toxicol Sci, 171 (2019) 269-279.

J. Larner, A. Durrant, P. Hughes, D. Mahalingam, S. Rivers, H. Matar, E. Thomas, M. Barrett, A. Pinhal, N. Amer, C. Hall, T. Jackson, V. Catalani, R.P. Chilcott, Efficacy of Different Hair and Skin Decontamination Strategies with Identification of Associated Hazards to First Responders, Prehosp Emerg Care, (2019) 1-14.

R.P. Chilcott, J. Larner, H. Matar, UK's initial operational response and specialist operational response to CBRN and HazMat incidents: a primer on decontamination protocols for healthcare professionals, Emerg Med J, 36 (2019) 117-123.

R.P. Chilcott, J. Larner, A. Durrant, P. Hughes, D. Mahalingam, S. Rivers, E. Thomas, N. Amer, M. Barrett, H. Matar, A. Pinhal, T. Jackson, K. McCarthy-Barnett, J. Reppucci, Evaluation of US Federal Guidelines (Primary Response Incident Scene Management [PRISM]) for Mass Decontamination of Casualties During the Initial Operational Response to a Chemical Incident, Ann Emerg Med, 73 (2019) 671-684.

S.S. Shetage, M.J. Traynor, M.B. Brown, R.P. Chilcott, Sebomic identification of sex- and ethnicity-specific variations in residual skin surface components (RSSC) for bio-monitoring or forensic applications, Lipids Health Dis, 17 (2018) 194-194.

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H. Lydon, C. Hall, H. Matar, C. Dalton, J.K. Chipman, J.S. Graham, R.P. Chilcott, The percutaneous toxicokinetics of VX in a damaged skin porcine model and the evaluation of WoundStat™ as a topical decontaminant, J Appl Toxicol, 38 (2018) 318-328.

C.A. Hall, R.P. Chilcott, Eyeing up the Future of the Pupillary Light Reflex in Neurodiagnostics, Diagnostics (Basel), 8 (2018) 19.

C. Dalton, C. Hall, H. Lydon, J. Jenner, J.K. Chipman, J.S. Graham, R.P. Chilcott, The percutaneous absorption of soman in a damaged skin porcine model and the evaluation of WoundStat™ as a topical decontaminant, Cutan Ocul Toxicol, 37 (2018) 172-179.

R.P. Chilcott, H. Mitchell, H. Matar, Optimization of Nonambulant Mass Casualty Decontamination Protocols as Part of an Initial or Specialist Operational Response to Chemical Incidents, Prehosp Emerg Care, (2018) 1-12.

S.S. Shetage, M.J. Traynor, M.B. Brown, T.M. Galliford, R.P. Chilcott, Application of sebomics for the analysis of residual skin surface components to detect potential biomarkers of type-1 diabetes mellitus, Sci Rep, 7 (2017) 8999-8999.

H. Matar, J. Larner, V. Viegas, S. Kansagra, K.L. Atkinson, S. Shetage, J.T. Skamarauskas, B. Theivendran, V.S. Goldman, R.P. Chilcott, Evaluation of a new topical skin protectant (RD1433) for the prevention and treatment of incontinence-associated dermatitis, Cutan Ocul Toxicol, 36 (2017) 211-219.

H.L. Lydon, C.A. Hall, C.H. Dalton, J.K. Chipman, J.S. Graham, R.P. Chilcott, Development of haemostatic decontaminants for treatment of wounds contaminated with chemical warfare agents. 3: Evaluation of in vitro topical decontamination efficacy using damaged skin, J Appl Toxicol, 37 (2017) 976-984.