

## Measurements for drug delivery

Infusion is an important way of supplying critical drugs to vulnerable patients, but it is essential to know the amount of the drug delivered. Knowing the flow rate of the drugs, or how fast a quantity of drug is delivered, is vital for safe health care. Currently, drug delivery at low flow rates cannot be set up with sufficient accuracy to meet prescribed treatments. Very low flow delivery rates are difficult to validate and inaccuracy in delivery can be dangerous to vulnerable patients.

The EMRP project **HLT07 Metrology for drug delivery** developed measurement capabilities for low flow rates, between 1 nanolitre per minute and 100 millilitres per minute, and assessed the performance of commercial flow meters and drug delivery systems. It also made drug delivery more reliable by improving calibration services and producing best practice guides.



The project:

- **Developed primary standards and compared facilities at European NMIs to demonstrate equivalence for low liquid flow rates** suitable for drug delivery for palliative care and anaesthesia.
- **Assessed the accuracy of commercially available flow meters** and found that environmental factors such as temperature, back pressure and viscosity did not significantly affect performance.
- **Assessed and characterised complete infusion drug delivery systems** including the pump, and disposable syringes, tubes and needles; and demonstrated that the flow rates can be seriously affected by using non-compatible components.

Drug delivery by infusion is used to deliver anaesthetics, insulin and vasoactive drugs to millions of patients every year, but dosing errors can occur. This project examined infusion technology in clinical settings to develop a better understanding of the causes of errors and ways to minimise and avoid them.

Low and ultra-low flow infusion devices are particularly difficult to accurately calibrate and improved knowledge of calibrating infusion equipment in clinical environments will reduce errors in precision drug delivery. The knowledge and experience developed in the project have been shared with infusion equipment suppliers and the healthcare community, as well as collated into a best practice guide available in an e-learning format. A flow instrumentation manufacturer has achieved accreditation for low flow calibrations so ensuring the robustness of the measurements made by its products, and two hospitals in Europe have also been able to validate the performance of their in-house reference flow meters used to calibrate clinical infusion pumps.

<b>More information is available at</b>	HLT07 Metrology for drug delivery (MeDD) <a href="http://www.euramet.org/project-HLT07">www.euramet.org/project-HLT07</a>	
<b>Contact</b>	Peter Lucas	<a href="mailto:plucas@vsl.nl">plucas@vsl.nl</a>