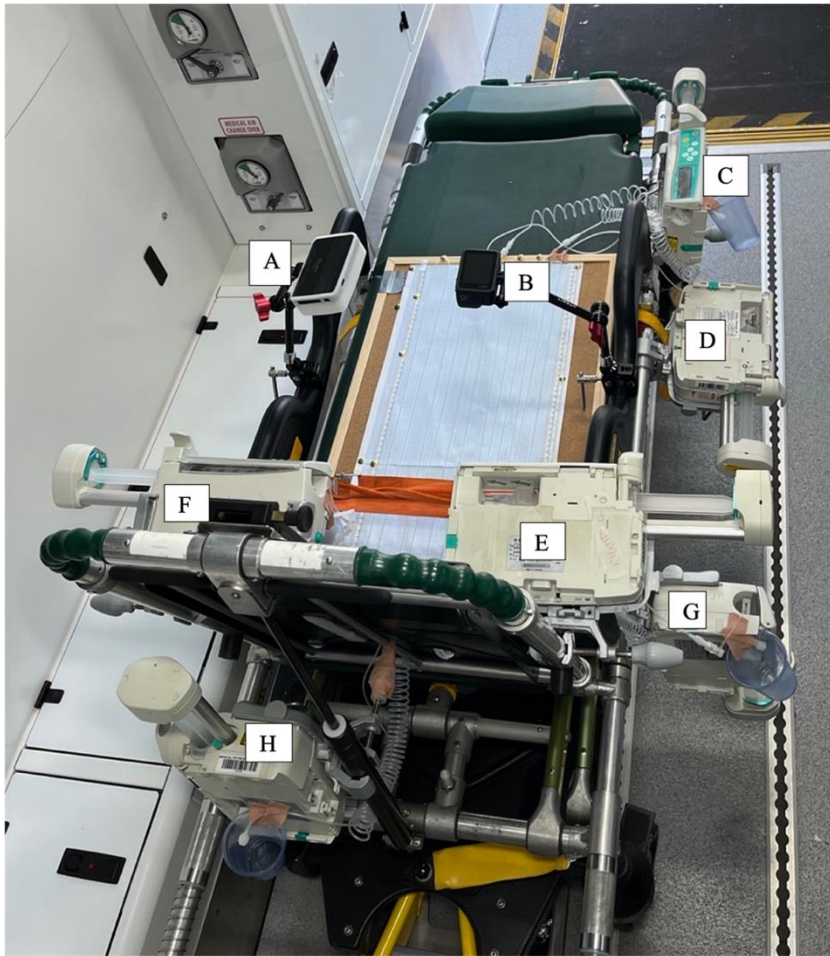


## Supplementary data

Figure S1



Phase 2 set up: A: LED light, B: Hero10 Black, C: Forward pump, D: Backward pump, E: Right pump, F: Left pump, G: up pump, H: Down pump

Figure S2



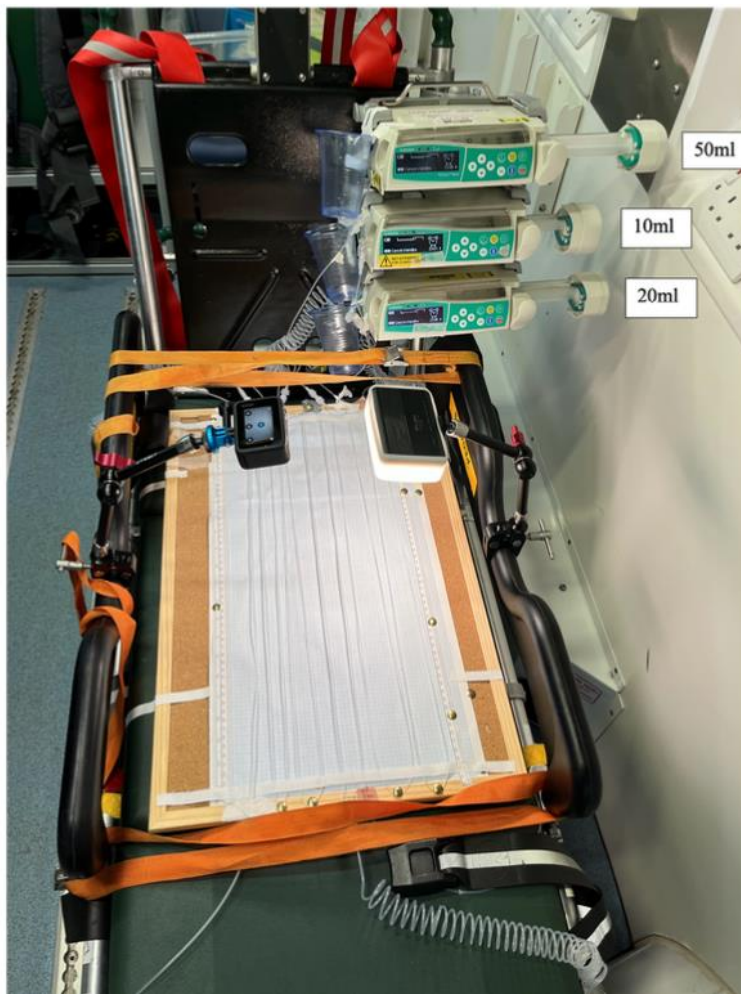
Set up of phase 3: One pump mounted on a gimbal, the other secured to the trolley with a clamp, pointing in the same direction

Data table S1

|                     | Line 1            |                   | Line 2            |                   | Line 3            |                   |
|---------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Controlled variable | Syringe size (ml) | Flow rate (ml/hr) | Syringe size (ml) | Flow rate (ml/hr) | Syringe size (ml) | Flow rate (ml/hr) |
| Plunger speed       | 50                | 1                 | 20                | 0.5               | 10                | 0.3               |
| Plunger pressure    | 50                | 0.5               | 20                | 1.7               | 10                | 3.3               |
| Delivery Rate       | 50                | 0.5               | 20                | 0.5               | 10                | 0.5               |

Set up of phase 4. Three pumps pointing to the left, all with different sized syringes in (10ml, 20ml, 50ml).

Figure S3



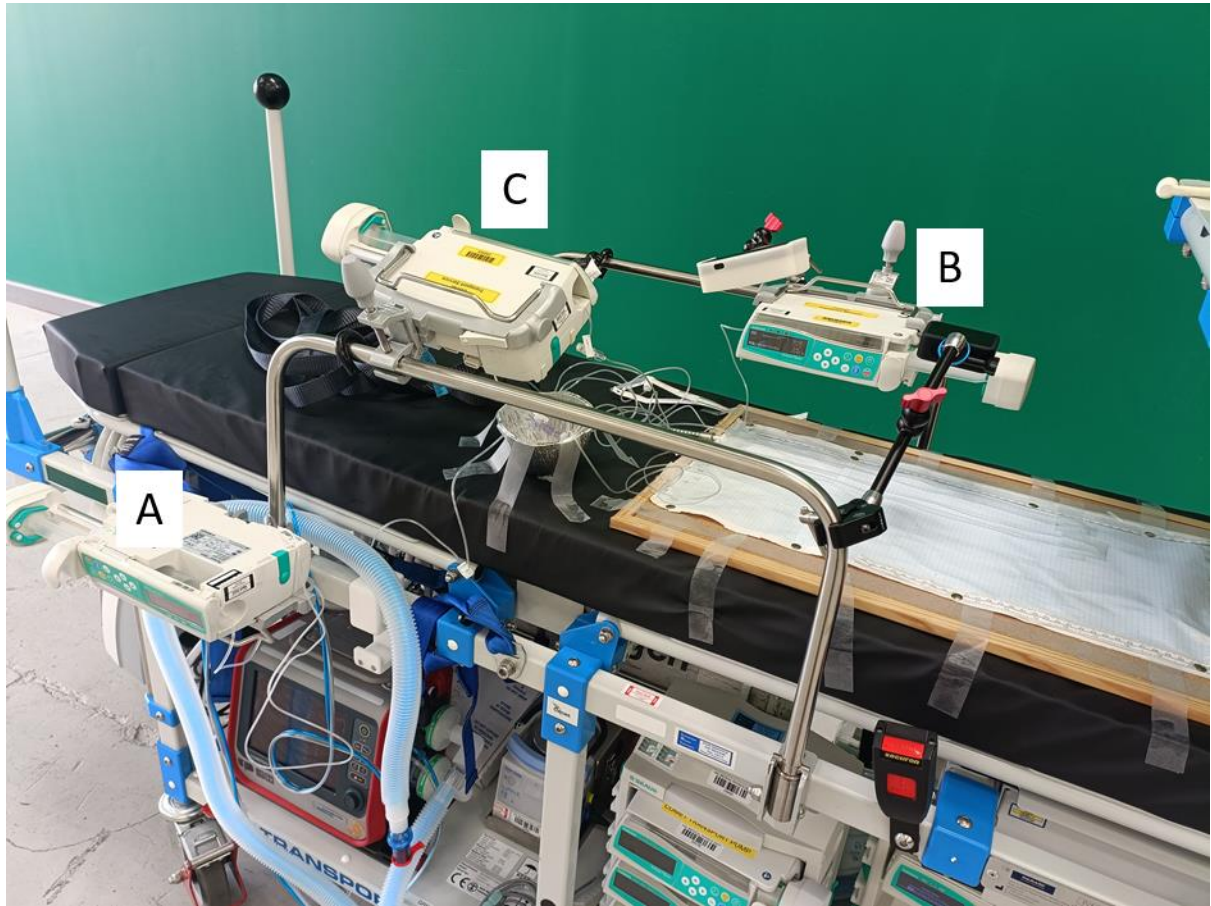
Set up of phase 4: Three pumps pointing to the left, all with different sized syringes in (10ml, 20ml, 50ml).

Figure S4



Set up of phase 5: One pump mounted to a gimbal the other pump secured to the trolley with the clamp. In the column of three, the bottom pump was utilised for the experiment, the top two were not in use.

Figure S5



Setup of phase 6: Net Zero and Near Zero displacement. Pumps A and B are diametrically opposite the end of the linked lines (in the silver pot), running at half speed, creating a net zero displacement. Pump C is as close to the end of the line as possible, so achieving near zero displacement.