Table S1. Baseline clinical characteristics of all patient, clinician, environment, product, technology and infusates factors with summary statistics influencing PIVC failure.

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable**  | **Categorisation** |  **PIVC Failure** | **Overall (N=391)** |
|  |  |  **Yes (N=118; 30%)** |  **No (N=273; 70%)** |  |
| **Patient Gender** | Male | 56  | 30% | 132  | 70% | 188  | 48% |
| Female | 62  | 31% | 141  | 69% | 203  | 52% |
| **Size** | Emaciated/Underweight | 29  | 40% | 44  | 60% | 73  | 18% |
| Normal | 46 | 27% | 124 | 73% | 170  | 43% |
| Overweight | 32 | 36% | 57 | 64% | 89  | 23% |
| Obese | 11 | 19% | 48 | 81% | 59  | 15% |
| **\*Skin Shade** | 1 (lightest) |  |  |  |  | 68 | 17% |
| 2 | 97 | 31% | 220 | 69% | 185  | 47% |
| 3 |  |  |  |  | 64  | 16% |
| 4 |  |  |  |  | 44  | 11% |
| 5 | 11 | 7% | 48 | 93% | 26  | 7% |
| 6 (darkest) |  |  |  |  | 4  | 1% |
| **Skin Condition** | Good | 46 | 24% | 144 | 76% | 190  | 49% |
| Fair | 31 | 30% | 73 | 70% | 104 | 27% |
| Poor | 41 | 42% | 56 | 58% | 97  | 25% |
| **VIA SCORE** | I (6 VV) | 26 | 24% | 81 | 76% | 107  | 27% |
| II (4 VV) | 20 | 31% | 45 | 69% | 65  | 17% |
| III (3 VV) | 25 | 30% | 59 | 70% | 84  | 21% |
| IV (1 VV) | 25 | 32% | 44 | 68% | 69  | 18% |
| V (0 VV | 22 | 33% | 44 | 67% | 66 | 17% |
| **Vein Palpability** | Palpable with and without tourniquet | 47 | 29% | 115 | 71% | 162  | 41% |
| Only palpable with tourniquet | 67 | 32% | 142 | 68% | 209 | 53% |
| Never palpable | 4 | 20% | 16 | 80% | 20  | 5% |
| **Location of PIVC** | Back of the Hand | 16 | 29% | 39 | 71% | 55 | 14% |
| Wrist | 12 | 28% | 31 | 72% | 43 | 11% |
| Forearm | 21 | 28% | 55 | 72% | 76 | 19% |
| Ante Cubital Fossa | 68 | 31% | 137 | 69% | 205 | 52% |
| Upper Arm | 1 | 8% | 11 | 92% | 12 | 3% |
| **Confusion** | Yes | 20 | 44% | 25 | 56% | 45 | 12% |
|  | No | 98 | 28% | 248 | 72% | 346 | 88% |
| **Sepsis** | Yes | 16 | 53% | 14 | 47% | 30 | 8% |
|  | No | 102 | 28% | 259 | 72% | 361 | 92% |
| **Chemotherapy**  | Yes | 7 | 25% | 21 | 75% | 28 | 7% |
|  | No | 111 | 31% | 252 | 69% | 363 | 93% |
| **Diabetes** | Yes | 24 | 39% | 38 | 61% | 62 | 16% |
|  | No | 94 | 29% | 235 | 71% | 329 | 84% |
| **DIVA** | Yes | 2 | 29% | 5 | 71% | 7 | 2% |
|  | No | 116 | 34% | 252 | 66% | 384 | 92% |
| **Clinician Role** | Nurse | 9  | 26% | 26  | 74% | 35  | 9% |
| Medical Student | 11  | 58% | 8  | 42% | 19  | 5% |
| Intern | 12  | 29% | 29  | 71% | 41  | 10% |
| RMO | 51 | 30% | 117 | 70% | 168  | 43% |
| Registrar | 19 | 33% | 38 | 67% | 57 | 15% |
| Consultant | 7 | 27% | 19 | 73% | 26  | 7% |
| Phlebotomist | 9 | 20% | 36 | 80% | 45 | 12% |
|  |  |  |  |  |  |  |  |
| **Numerical Experience**  | 0-300 | 30 | 28% | 76 | 72% | 106  | 27% |
| 301-1000 | 26 | 24% | 83 | 76% | 109 | 28% |
| >1000 | 62 | 35% | 114 | 65% | 176 | 45% |
|  |  |  |  |  |  |  |  |
| **Aseptic non-touch technique** | Did not breach  | 32 | 22% | 111 | 78% | 143  | 37% |
|  | Clinical breach | 86 | 35% | 162 | 65% | 248 | 63% |
| **Needle Redirections** | 1 | 76 | 30% | 174 | 70% | 250  | 64% |
|  | 2,3 | 30 | 30% | 71 | 70% | 101 | 26% |
|  | 4+ | 12 | 30% | 28 | 70% | 40 | 10% |
| **FTIS** | Yes | 46 | 24% | 144 | 76% | 308  | 79% |
|  | No | 31 | 30% | 73 | 70% | 83 | 21% |
| **Hospital** | Hospital 1 | 66 | 32% | 138 | 68% | 204  | 52% |
|  | Hospital 2 | 52 | 28% | 135 | 72% | 187  | 48% |
| **Australian Triage Category**  | 1. Immediately life threatening  | 4 | 31% | 9 | 69% | 13 | 3% |
| 2. Imminently life threatening | 49 | 40% | 75 | 60% | 124 | 32% |
| 3. Potentially life threatening | 41 | 33% | 134 | 77% | 175 | 45% |
| 4. Potentially life serious | 24 | 31% | 53 | 69% | 77 | 19% |
| 5. Less Urgent | 2 | 100% | 0 | 0% | 2 | 1% |
| **Specialty**  | Medical  | 73 | 37% | 122 | 63% | 195 | 50% |
| Surgical | 25 | 27% | 66 | 73% | 91 | 23% |
| Cancer (Haematology /Oncology) | 6 | 27% | 16 | 73% | 22 | 6% |
| Cardiology | 9 | 64% | 5 | 36% | 14 | 4% |
| Emergency | 5 | 7% | 64 | 93% | 69 | 17% |
| **PIVC Gauge (G)** | 14-18G | 32 | 29% | 78 | 71% | 110  | 28% |
|  | 20G | 75 | 30% | 178 | 70% | 253 | 64% |
|  | 22G-24G | 11 | 39% | 17 | 61% | 28 | 7% |
| **Connector\*\*** | J-Loop | 94 | 31% | 214 | 69% | 308  | 79% |
|  | NFC/Bung |  |  |  |  | 77  | 20% |
|  | Stopcock/None | 24 | 33% | 59 | 67% | 6 | 0.2% |
|  | None |  |  |  |  | 5  | 1% |
| **CT Scan** | No CT Scan | 69 | 28% | 179 | 72% | 248  | 63% |
|  | Non-Contrast CT | 26 | 35% | 49 | 65% | 75 | 19% |
|  | Contrast CT | 23 | 44% | 45 | 66% | 68  | 17% |
| **Ultrasound** | Yes | 4 | 45% | 5 | 55% | 9 | 2% |
|  | No | 114 | 30% | 268 | 70% | 382 | 98% |
| **Crystalloid Fluids** | Yes | 68 | 33% | 135 | 67% | 203 | 52% |
|  | No | 50 | 27% | 138 | 73% | 188 | 48% |
| **Colloid Fluids** | Yes | 0 | 0% | 17 | 100% | 17 | 4% |
|  | No | 118 | 32% | 256 | 68% | 374 | 96% |
| **Antibiotics Medication** | Yes | 49 | 42% | 69 | 58% | 118 | 31% |
|  | No | 69 | 25% | 204 | 75% | 273 | 69% |
| **Steroids Medication** | Yes | 5 | 45% | 6 | 55% | 11 | 3% |
|  | No | 113 | 30% | 267 | 70% | 380 | 97% |
| **Analgesia Medication** | Yes | 13 | 33% | 26 | 67% | 39 | 10% |
|  | No | 105 | 30% | 247 | 70% | 352 | 90% |
| **Antipyretic Medication**  | Yes | 5 | 33% | 10 | 67% | 15 | 4% |
|  | No | 113 | 30% | 263 | 70% | 376 | 96% |
| **Cardiac Medication** | Yes | 14 | 58% | 10 | 42% | 24 | 6% |
|  | No | 104 | 28% | 263 | 72% | 367 | 94% |
| **Other Medications\*\*\*** | Yes | 20 | 28% | 52 | 72% | 72 | 18% |
|  | No | 98 | 31% | 221 | 69% | 319 | 83% |
| **IVT infused** | Yes | 99 | 34% | 191 | 66% | 290 | 74% |
|  | No | 19 | 19% | 82 | 81% | 101 | 26% |

*\*Skin shade failure rates reflect grouping of 1-3 and 4-6* \*\* Combined NFC/BUNG/OTHER/None for analysis; \*\*\* Combination of Medication: heparin infusions; protein pump inhibitors; IV poisons medication; IV vitamins. PIVC peripheral intravenous catheter; VIA venous international assessment; DIVA difficult intravenous access; FTIS first time insertion success; NFC needle-free connector; CT computerized tomography; IVT intravenous therapy.