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## Who pays the price for failed IV placements?

By Physeon

**Intravenous (IV) catheter placement is regularly performed on patients of all ages – from newborns to the elderly – to deliver a spectrum of therapies such as chemotherapy, antibiotics or simple fluids. Yet despite its wide-ranging and often life-saving applications, there is nothing routine about the process of placing a peripheral IV catheter.**

Placement “can be time intensive and requires significant skill”, said the authors of a study on the costs and complications of placing catheters in children (Goff et al. 2013, p. 185). In a literature review on cost containment and infusion services, Kokotis said proficiency in venipuncture is “not innate, but rather involves repetition and education” (2005, p. S28). And a recent Infusion Nurses Society whitepaper called infusion therapy “complex, invasive, high volume and risk prone” (Hadaway, Dalton & Mercanti-Erieg 2013, p. 1).

Successfully placing a peripheral IV catheter necessitates overcoming complications linked to both patients and practitioners. On the patient side, physical attributes such as a vein’s visibility or ability to be palpated, age, body weight, skin tone and existing medical conditions can affect the proper placement of a peripheral IV

catheter. On the practitioner side, education, experience and area of specialization can all play a role.

### A look at the figures

It costs approximately US\$ 45 to place a short peripheral catheter on the first attempt, when factoring in supplies and nursing time (Hadaway, Dalton & Mercanti-Erieg 2013). However, a significant percentage of placements are *unsuccessful* on the first attempt.

A study of 592 children in two U.S. pediatric hospitals revealed only 42% of first attempts were successful, at a median cost of US\$ 41 per placement (Goff et al. 2013). Since 72% of the children required one to two placement attempts, the authors adjusted the mean cost to US\$ 45. Costs ballooned – from US\$ 69 to over US\$ 125 per placement for supplies and practitioner time – for the remaining 28% of children studied, as they needed three or more attempts. “The biggest contributor to the total cost ... was the cost of nursing, nursing assistants, and child life personnel” (Goff et al. 2013, p. 187).

Kokotis extrapolated similarly low first-attempt success rates for placing peripheral IV catheters on a nationwide basis in the United States – only 40% – since data she reviewed showed the average was 2.18 attempts, at US\$ 69.76 per placement (2005). When patients are hospitalized even over the short term, and catheters must be changed every 72 hours, costs stack up quickly. Kokotis calculated US\$ 139.52 for the average 4.9-day stay, “and the patient experiences about five needle sticks,



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without considering phlebotomy, which many increase the needle sticks to 10” (2005, p. S27).

In a study on the costs of different catheter types, Horattas et al. found 30-35% of peripherally inserted central catheter (PICC) placements were unsuccessful, primarily due to poor venous access (2001). As a result, they said second procedures like radiographic or surgical port placements may become necessary,

which drive up costs significantly. With respect to IV access in general, they said “even a relatively small complication rate or cost savings on a per-patient basis can extrapolate into tremendous numbers on a national basis over time” (Horattas et al. 2001, p. 38).

### A balancing act

Today, most hospitals are tasked with fulfilling what may appear like conflicting agendas. “There is a growing emphasis on patient safety and measurement of patient satisfaction [and] the urgent need to rein in costs” (Hadaway, Dalton & Mercanti-Erieg 2013, p. 4). One way hospitals seek to cut costs and gain efficiencies is by reducing the specialist IV teams that use ultrasound-guided devices, which can assist in gaining IV access. Hospitals are spreading the responsibility for placing peripheral IV catheters with practitioners from every discipline. These practitioners, however, have varying degrees of education and experience, and often don’t have access to expensive ultrasound-guided devices.

In response to these developments, the Infusion Nurses Society has called for hospitals to consider their decisions from a business perspective. “A lack of attention to this invasive and potentially dangerous therapy increases problems, complications, patient dissatisfaction and costs” (Hadaway, Dalton & Mercanti-Erieg 2013, p. 5). Kokotis recommended proactive vascular access planning with infusion teams to help reduce costs linked to unsuccessful placements, patients’ lengths of stay, incomplete drug infusions and certain infections (2005). She estimated hospitals risk losing up to 20% of a diagnosis-related group payment from Medicare on the average PICC patient, versus 2% with proactive planning.

### The price of failure

The price of IV catheter placement failure can be far-reaching, especially since many costs are not reimbursed by insurers. “Excessive venipuncture attempts also increase the cost to the facility through delays in treatment;

waste of peripheral catheters, insertion kits, individual supplies and valuable nursing time; and the need for central venous access when peripheral access proves too difficult” (Hadaway, Dalton & Mercanti-Erieg 2013, p. 2).

When serious complications from IV catheter placements occur, hospitals may also pay the price of litigation. As an example, Kokotis compared the estimated cost of a successful peripheral IV catheter placement – US\$ 69.76 – with a single claim in the U.S. that resulted in a US\$ 650,000 settlement for nerve injury due to infiltration (2005, pp. S22, S27). Legal fees and settlement payments then drive up insurance costs, which get pushed back onto patients.

And patients ultimately pay the steepest price for failures. Goff et al. called IV access the “most common painful procedure in a children’s hospital” and reminded readers that “perhaps because it is so commonplace and essential, the difficulty with venous access and the trauma to the child incurred in placing IV catheters may be underestimated” (2013, pp. 191, 185). Kokotis called for establishing an 80% first-attempt venipuncture benchmark – not only for cost savings and patient satisfaction, but also for patient safety (2005). Indeed, the Infusion Nurses Society said in a list of 10 hospital-acquired conditions, three are infusion related: vascular device-associated infection, air emboli and blood incompatibility (Hadaway, Dalton & Mercanti-Erieg 2013).

Kokotis suggested “infusion teams that keep abreast of new technology and studies can provide valuable expertise and recommendations of process changes that will reduce operational losses and result in revenue savings” (2005, p. S30).

### Mitigating costs with Veinplcity

A new technology that can help hospitals mitigate costs is Veinplcity. This innovative venous access device assists practitioners in placing peripheral IV catheters. With rapid but gentle stimulation, Veinplcity increases local blood volume. More veins become available for venous access, and those veins are larger,

rigid and easier to palpate – right across patient populations.

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Thanks to this marked, physiological change in veins, practitioners from all disciplines and every level of experience are better able to overcome the complications of peripheral IV catheter placement. Fewer attempts and obstacles translate to lower financial burdens for hospitals. But most importantly, a reduction in failed placements means a reduction in unnecessary trauma and danger for all patients who require IV therapy.

### References

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