



# Pittsburgh Regional Healthcare Initiative

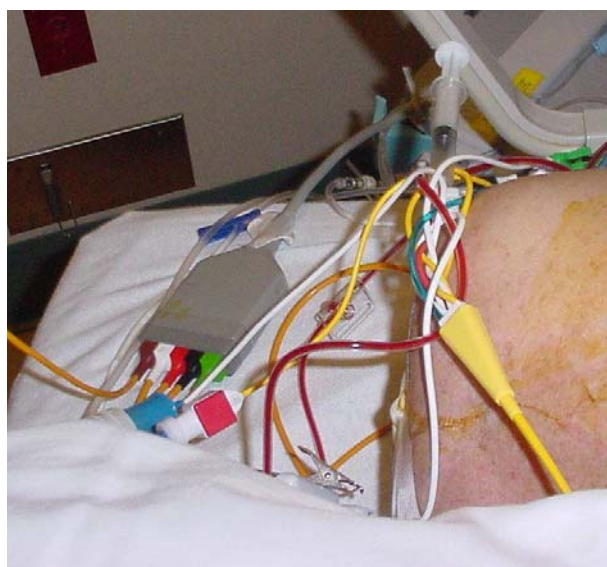
Reprinted from *PRHI Executive Summary*, January 2002

Naida Grunden, editor

## Untangling a problem at West Penn

Nurses in West Penn's Surgical Cardiac ICU noticed a troubling trend among patients arriving after coronary artery bypass graft (CABG) surgery: their IV lines were tangled. Untangling the lines took upwards of 20 minutes of RN time—a waste and a nuisance. But far worse, tangled IV lines represented a potential hazard for patients.

A group of workers teamed up to solve the problem. The ICU director, nurses, nurse anesthetists, and support generalists convened to discuss ways to make transfer from the OR to the ICU flawless. Step 1 had already been accomplished: the problem (an unfulfilled patient need) had been identified.



### **Step 1: Identify the problem**

***Patients arrive in ICU with tangled IV lines***

Repeating this question led them to discover:

- ✓ In the OR, the IV bags are held on 2 poles. During transfer, the bags are all loaded onto one. The tangle begins.
- ✓ During transfer from the OR to ICU, the oxygen bottle is placed at the foot of the bed, under the patient's feet. This leaves only one

### **Step 2: Define the ideal condition**

Using a mannequin, the nurses collaborated to show the other team members their ideal, the condition in which patients should arrive at the ICU. They showed every detail, including placement of incoming and outgoing lines, and placement of the IV bags.

### **Step 3: Find the root cause—5 whys**

Why couldn't the ideal condition be met? On its journey to the root cause of the problem, the team asked, "Why?" five times, as prescribed in the Toyota Production System.

**Step 2: Define the ideal**  
*Using a mannequin, the ICU nurses and nurse anesthetists showed the ideal condition in which each patient would arrive following CABG surgery.*



↑ **An ICU nurse devised a "Swan Pillow," above, to keep lines straight, and separate incoming from outgoing lines.**



**Step 3: Determine the root cause – 5 Whys**  
*Two IV poles hold separate banks of IVs in the OR. When all bags are placed on just one IV pole for transport, the tangle begins.*

place for the heart monitor: by the patient’s shoulder, on top of the IV lines, with the screen facing away from the person transporting the patient.

**Step 4: Design countermeasures**

The IV bags needed to be kept separated during transport—in left and right banks, just as in the OR. A nurse suggested using the bed’s IV pole to transfer one bank of IV bags, and a wheeled IV pole for the other.

The heart monitor needed to be held off the bed, off the patient, and off the IV lines during transport. A nurse anesthetist suggested using the portable table designed for the end of the bed. An added benefit: the screen now faces the transporter.

The new table for the heart monitor eliminated the storage “area” for the oxygen bottle, beneath the feet of the patient. The support generalist discovered a previously unused bed accessory made for the purpose and installed it on the beds used to transport CABG patients.

Solving one problem to its root cause allowed a team to address a host of issues, resulting in safer transfer of patients following heart surgery, and incidentally, saving valuable time of healthcare workers. ☞



**Step 4: Countermeasures** ↑  
*The heart monitor now rests on a table mounted to the foot of the bed—off the IV lines and visible to the person transporting the patient.*



↑  
*The oxygen bottle now rests in a bed-mounted basket designed for the purpose.*

