

# Examples of Clinical Scenarios that Would Benefit from Interoperability

The Medical Device Plug and Play (MD PnP) program has been acquiring clinical scenarios related to interoperability.

Additional scenarios can be contributed by:

- Entering them on the HealthStories workstation
- Completing the Clinical Scenarios Form
- Emailing to [clinical@mdpnp.org](mailto:clinical@mdpnp.org)

We ask clinicians:

*“Which obstacles to safety, efficiency, and teamwork could be reduced or eliminated by medical device interoperability?”*

## CLINICAL SCENARIOS

### Example 1

**Current Clinical Experience:**

“A 32-year-old woman had a laparoscopic cholecystectomy [gall bladder removal] performed under general anesthesia. At the surgeon's request, a plane film x-ray was shot during a cholangiogram. The anesthesiologist stopped the ventilator for the film [to prevent movement of the diaphragm and blurring of the image]. The x-ray technician was unable to remove the film because of its position beneath the table. The anesthesiologist attempted to help her, but found it difficult because the gears on the table had jammed. Finally, the x-ray was removed, and the surgical procedure recommenced. At some point, the anesthesiologist glanced at the EKG and noticed severe bradycardia. He realized he had never restarted the ventilator. This patient ultimately expired.”

(APSF Newsletter, Winter 2004)

**Proposed Clinical Scenario with technology/workflow enhancement to prevent unwanted outcome:**

A 32-year-old woman had a laparoscopic cholecystectomy performed under general anesthesia. At the surgeon's request, an x-ray was shot. **The x-ray and anesthesia machine ventilator are synchronized so that the x-ray is taken at the desired phase of ventilation, such as end-inspiration or end-expiration. When the technician pushes the exposure button, the image is taken at a synchronized point triggered by the respiratory waveform. If necessary, the ventilator is instructed to supply a brief breath-hold.** The technician was unable to remove the film because of its position beneath the table. The anesthesiologist attempted to help. **The ventilator was not stopped for the x-ray, so the patient was never in danger from hypoventilation.** Finally, the film was removed, and the surgical procedure recommenced.

### Example 2

**Current Clinical Experience:**

A 49-year-old woman underwent an uneventful total abdominal hysterectomy.

Postoperatively, the patient complained of severe pain and received intravenous morphine sulfate in small increments.

She remained alert and oriented and, while in the post-anesthesia care unit (PACU), she began receiving a continuous infusion of morphine via a patient-controlled analgesia (PCA) pump. A few hours after leaving the PACU and arriving on the floor, she was found pale with shallow breathing, a faint pulse, and pinpoint pupils. The nursing staff called a “code” and the patient was resuscitated and transferred to the intensive care unit on a respirator. A search for reversible causes was unrevealing and, despite aggressive supportive care, the patient had no improvement in her mental status. Several days later, an electroencephalogram result revealed no brain activity. The patient ultimately died.

(AHRQ Mortality and Morbidity website)

**Proposed Clinical Scenario with technology/workflow enhancement to prevent unwanted outcome:**

A 49-year-old woman underwent an uneventful total abdominal hysterectomy. Postoperatively, the patient complained of severe pain and received intravenous morphine sulfate in small increments. She remained alert and oriented and, while in the post-anesthesia care unit (PACU), she began receiving a continuous infusion of morphine via a patient-controlled analgesia (PCA) pump, and was transferred to the floor. **The PCA pump has a safety interlock. Therefore, when the SpO<sub>2</sub> level falls below normal range the PCA pump is stopped and the nurse is notified. The nurse can then restart the pump after checking the status of the patient.**

### Example 3

**Current Clinical Experience:**

A 62-year-old man was recovering in the ICU following open heart surgery. His arterial blood pressure and pulmonary artery blood pressure were continuously monitored with invasive catheters and IV-pole mounted transducers. On post-operative day #1, the head of the patient's bed was elevated for his comfort, and a diuretic was administered to eliminate the excess fluid that was producing elevated pulmonary arterial pressure and moderate hypertension. The patient complained of nausea and dizziness, so the bed was returned to the flat position. The clinician observed that the patient's blood pressure was 25% below target values. When the head of the bed was elevated earlier in the day, the position of the pressure transducers was not adjusted on the IV pole, causing erroneous over-reading of the blood pressure values, and misguided therapy.

**Proposed Clinical Scenario with technology/workflow enhancement to prevent unwanted outcome:**

A 62-year-old man was recovering in the ICU following open heart surgery. His arterial blood pressure and pulmonary artery blood pressure were continuously monitored with invasive catheters and IV-pole mounted transducers. On post-operative day #1, the head of the patient's bed was elevated for his comfort, which raised the patient's heart level above the transducers. **The bed transmits height and angle information to the bedside monitor, allowing the monitor to automatically correct the displayed blood pressure value as the bed height changes relative to the transducer height.**

