Preventing hospital-acquired pneumonia (HAP) outside of the ventilator-associated pneumonia bundle

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A 2014 study published in the *New England Journal of Medicine* identified hospital-acquired pneumonia (HAP) and surgical site infections as the most common healthcare-associated infections (HAIs), both accounting for 22 percent of infections in hospitalized patients.[1] The authors of the study noted that as device- and procedure-related infections decrease, healthcare personnel should work to expand surveillance and prevention activities to focus on other HAIs, including pneumonia. LifePoint Health, Inc., was ready for this challenge.

LifePoint Health was selected as one of 26 Hospital Engagement Networks (HENs) by the Centers for Medicare & Medicaid Services (CMS) in 2010, and hospitals in all HENs were challenged to reduce specific types of harm to patients. The analyses upon which this publication is based were performed under Contract Number HHSM-500-2012-00014C Partnership for Patients, sponsored by CMS. The LifePoint HEN targeted HAP as a harm and launched an improvement collaborative that consisted of 12 of the company's hospitals. Initially, the LifePoint HEN instructed the 12 participating hospitals to work on preventing pneumonia by implementing the ventilator-associated pneumonia (VAP) bundle in their intensive care units. But a problem arose that was unexpected. One of the facilities was a critical access hospital that did not admit ventilated patients. Therefore, we were faced with the option of disenrolling the hospital from the collaborative or reviewing data in an attempt to identify patients who were at risk for developing HAP that was not associated with a ventilator.

LifePoint Health Support Center personnel reviewed the Centers for Disease Control and Prevention (CDC) guidelines on pneumonia prevention and identified two distinct patient populations to target (other than ventilated patients)—post-op patients and patients receiving tube feedings. The critical access hospital admitted patients from both of these populations, so we then reviewed the guidelines for items specific to these two groups and developed safe practice bundles based on those items.

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COMPONENTS OF THE HAP BUNDLES

The safe practice bundles for both post-op patients and tube-fed patients are shown here.

Post-operative patient bundle

- Maintain head of bed at 30 to 45 degrees, especially while the patient is recovering from anesthesia or while at risk for aspiration.
- Provide mouth care at least twice daily.
- Assess the oral membranes and notify the physician of any breaks in the membranes.
- Instruct the patient how to use an incentive spirometer at least once per hour.
- Encourage the patient to turn, cough, and deep breathe at least once hourly.
- Ambulate the patient as soon as medically possible.
- Educate the patient and/or family on preventing HAP.
- Assess the patient's immunization status and administer influenza and pneumonia vaccines as appropriate.

Tube-fed patient bundle

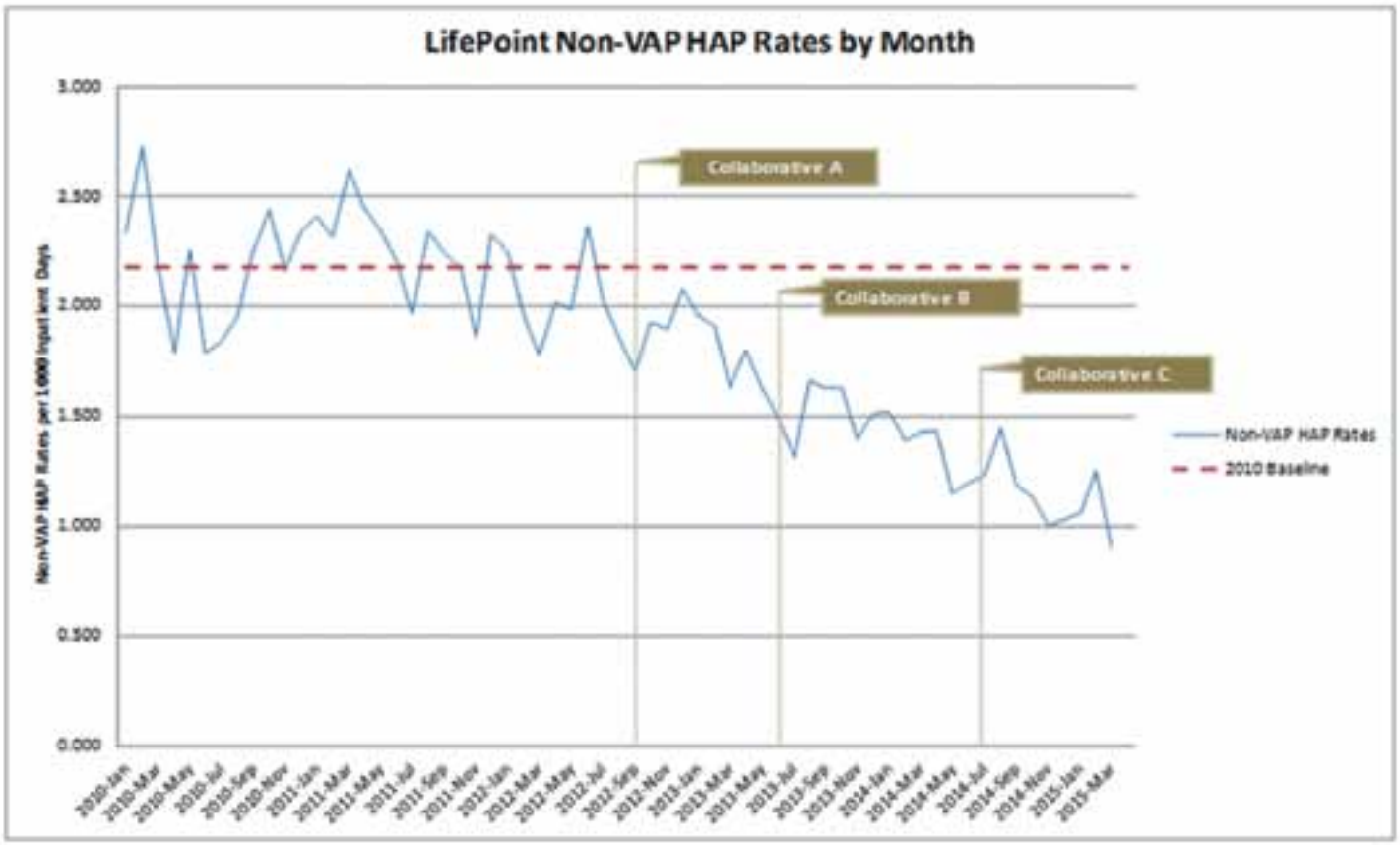
- Maintain the head of the bed at 30 to 45 degrees.
- Verify the placement of the feeding tube prior to starting each feed.
- Check residuals prior to starting each feeding; if the residual is greater than 200 cc or other ordered limits, hold the feeding and contact the physician for additional orders.
- Provide mouth care to the patient at least twice daily with an antiseptic.
- Administer peptic ulcer prophylaxis, unless contraindicated.
- Assess the oral membranes and notify the physician of any breaks in the membranes.
- Assess the patient's immunization status and administer influenza and pneumonia vaccines, as appropriate.

As the initial improvement collaborative (Collaborative A) progressed, we introduced the HAP bundles to all participating hospitals for implementation in September of 2012. In June 2013, a second HAP collaborative (Collaborative B) was launched with four hospitals from Collaborative A and 21 additional hospitals. Finally, a third group of hospitals (Collaborative C) was launched in July of 2014.

Collaboratives B and C hospitals received the same information as those in enrolled in Collaborative A, but content was delivered through one teaching webinar followed by three monthly small group coaching calls. Four to five similarly sized facilities made up each small group, allowing each hospital to share ideas and concerns. This was different from Collaborative A where we conducted one-on-one coaching calls with the teams from each hospital. Collaborative C was delivered using the same format as Collaborative B, although the time between the small group coaching calls was compressed to once every three weeks.

Feedback received from the collaborative teams indicated the small group coaching calls were more effective in providing useful information, and team performance demonstrated that the compressed timeframe

GRAPH 1. PERFORMANCE OF LIFEPOINT HEALTH FOR HOSPITAL-ACQUIRED PNEUMONIA REDUCTION, JANUARY 2010–MARCH 2015; ALL FACILITIES.



between coaching calls was optimal for task completion. Sharing between the teams allowed everyone to understand they were all facing similar challenges and barriers. During the calls, the hospitals collected nuggets of information they took back and implemented into their own processes. The teams also identified barriers encountered by other teams and used that information to navigate around similar issues at their own facilities.

MEASUREMENT

LifePoint collected HAP data for the company's 57 hospitals between the first quarter of 2010 and the first quarter of 2015. Graph 1 shows the cumulative performance for HAP reduction by all LifePoint hospitals and demonstrates the reduction of HAP starting with the launch of Collaborative A in September 2012, and continuing through Collaborative C. A trend of sustained and consistent reduction since the introduction of the HAP bundles is evident.

LifePoint has experienced a 54 percent reduction of HAP across the company since the completion of both collaboratives. Table 1 shows a 19 percent reduction in HAP for all LifePoint Health facilities following the first collaborative, progressing to a 40 percent reduction following the second collaborative, and finally a 54 percent reduction at the completion of the third collaborative. Collaborative A hospitals have experienced a 54 percent reduction in non-VAP, hospital-acquired pneumonias following completion of their six-month collaborative, while Collaboratives B and C hospitals have experienced a 43 percent and 33 percent reduction, respectfully, following a four-month program each.

THINGS WE LEARNED

Throughout the collaboratives, we discovered common inconsistencies in practice and challenges in multiple areas including mouth care, use of incentive spirometry, early ambulation, and identifying other patient populations at risk for aspiration.

While most post-op patients are capable of performing activities of daily living independently, they often lacked the tools to clean their teeth and mouth cavity adequately. During the admission assessment, several hospital teams discovered that once the nurse determined the patient was independent with activities of daily living, he or she often failed to ensure the patient had the tools needed for mouth care. Additional education has been provided to the nursing staff to ensure the patient possesses the necessary tools to complete the task. Independent patients are educated to perform oral care at least twice daily. The hospitals also require documentation of oral care in the patient's medical record each time this activity is completed.

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The incentive spirometer has been available as a tool for preventing pneumonia for many years, but it was noted during the collaboratives that use of the device was suboptimal. One hospital's observations determined that the nursing staff did not possess a good understanding of the physiology behind using the device and lacked the knowledge to adequately instruct the patient on proper use. In response, the hospital's respiratory therapy department conducted training sessions for the nursing staff, increasing their ability to instruct the patient on proper use of the incentive spirometer.

While conducting a point prevalence study, another hospital discovered that although patients had been instructed on the proper use of the incentive spirometer,

LifePoint average before collaboratives began	2.162	
LifePoint average after Collaborative A (before Collaborative B)	1.758	-19%
LifePoint average after Collaboratives A and B (before Collaborative C)	1.298	-40%
LifePoint average after Collaboratives A, B, and C	1.004	-54%
Collaborative A average before collaborative	2.715	-54%
Collaborative A after collaborative	1.237	
Collaborative B average before collaborative	2.105	-43%
Collaborative B after collaborative	1.198	
Collaborative C average before collaborative	1.678	-33%
Collaborative C after collaborative	1.121	

TABLE 1. REDUCTION IN INFECTION RATES REPORTED AS NUMBER OF INFECTIONS/1,000 PATIENT DAYS WITH PERCENTAGE OF CHANGE FROM PRE-COLLABORATIVE TO POST-COLLABORATIVE TIMEFRAME.

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the device was sometimes left out of reach, resulting in patients being unable to use the instrument at the appropriate times. The collaborative team arranged education for nursing and respiratory staff members to make sure that the incentive spirometer remained within reach of patients at all times. As an element of their weekly point prevalence study, the team continues to assess for this practice and tracks improvement. The results are shared with the front-line staff members to encourage ongoing improvement.

Work from Collaboratives A and B revealed a need to expand the tube feeding bundle for HAP reduction to include other patients at risk for aspiration. A screening tool has been introduced to assess patients for risk of aspiration, especially high-risk populations such as stroke patients and patients with dysphgia due to other causes. As we rolled out our third HAP cohort, hospitals were encouraged to initiate a screening process for aspiration risk for all patients. Examples of screening tools were provided in the HAP Prevention Toolbox for Collaborative C hospitals. These tools were used to aid the hospitals in development of a nursing bedside screening tool to assist in identifying patients at high risk for aspiration. As a company, LifePoint is now developing an aspiration risk-assessment screening process within the electronic medical record for use across the enterprise.

Collecting and sharing outcome and process measurement data with front-line staff at each hospital is a key component for success. As previously mentioned, point prevalence studies are conducted weekly while process changes are implemented, and the resulting data is presented to participating units. This allows the healthcare team to evaluate the effectiveness of those process changes on patient outcomes. The information is shared through various information streams such as staff meetings, committee meetings, newsletters, and quality improvement communication boards.

Monitoring and measuring compliance with bundle elements are methods used to assess the success of the collaborative. The improvement teams measure compliance with all (cumulative) bundle elements and also drill down to assess compliance with each individual element of the bundle. This allows the team and staff members to see exactly where problems exist. An example of identified non-compliance is in the area of mouth care for post-op patients discussed earlier in the article. Teams were able to quickly identify areas in need of future focus and began to develop an action plan to close the gaps.

While we recognize there are additional opportunities for improvement, we celebrate our successes and the lives saved by our talented and dedicated LifePoint Health hospital teams and collaborative facilitators at the LifePoint Health Support Center. PS

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READ MORE ABOUT HOSPITAL-ACQUIRED PNEUMONIA IN THE *AMERICAN JOURNAL OF INFECTION CONTROL*

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