

Effects of Oral Care on Hospital-Acquired Pneumonia in the Intermediate Care Setting

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Objective of the intervention

This prospective, interventional, 2-arm pilot study compared the actual rates of hospital-acquired pneumonia (HAP) and clinical nursing practices before and 1 month after the implementation of a comprehensive oral care protocol involving the use of a pre-packaged oral care kit. The objective of the intervention was to decrease HAP and length-of-stay (LOS) rates in activities of daily living (ADL)-dependent, non-ventilated patients in the Intermediate Care (IMC) Unit (Inova Fairfax Hospital) from the third and fourth quarters of 2007 by 30% and 20%, respectively. An additional objective was to determine whether nursing compliance and satisfaction increased 1 month after the pre-packaged oral care kit was introduced. A larger clinical trial was expected to follow based on the lessons learned from this pilot study, unless confounding variables were identified.

Background

- HAP is a preventable complication with numerous ramifications affecting patients and healthcare delivery.¹ HAP is currently identified as the leading cause of mortality attributable to nosocomial infections in the United States and is associated with longer hospital stays and excess medical costs ranging from \$12,000 to \$40,000 per patient.^{2,3}
- In 2007, Weber et al reported that a 3-year prospective study examining the pneumonia-causing pathogens in 556 patients identified *Staphylococcus aureus* as the pathogen most frequently responsible for HAP, followed by Gram-negative bacilli.⁴ These pathogens are different from those identified as being responsible for ventilator-associated pneumonia (VAP).⁵
- In 2003, the Centers for Disease Control and Prevention (CDC) published a Category II recommendation (suggested for implementation and supported by suggestive clinical or epidemiologic studies or by strong theoretical rationale) for the prevention of HAP.⁶ In this document, the CDC proposed "oropharyngeal cleaning and decontamination with an antiseptic agent" for patients in acute care settings or for residents in long-term-care facilities who are at high risk of HAP.
- In 2007, the IMC Unit at Inova Fairfax Hospital had 251 patients with HAP based on IMC Science data. This group of patients had an average LOS of 20.5 days, which is approximately 16 days longer than the expected average LOS. This population also had an average mortality rate of 16.3%; 41 of the 251 patients died. Therefore, HAP was identified as a problem that needed to be addressed.
- Current recommendations for oral care in non-ventilated patients at Inova Fairfax Hospital involve the removal of bacteria and biofilm from the teeth and mouth twice per day; however, a formalized policy does not exist. Implementation of a specific oral care protocol for ventilated patients at the hospital resulted in a significant reduction in the number of pneumonia cases in this patient group. On the basis of these data, a formal oral care program was implemented as part of a pilot study in non-ventilated patients.
- The purposes of this study were to compare HAP rates and clinical nursing practices before and 1 month after the implementation of a comprehensive oral care protocol for ADL-dependent, non-ventilated patients in the IMC Unit at Inova Fairfax Hospital.

Intervention methods

- A 2-arm pilot study was conducted to obtain data from a convenience sample of non-verified patients in the IMC Unit. Arm 1 (before intervention) consisted of a review of the patients' medical records to determine the oral care procedures that had been implemented and the corresponding HAP rates in the third and fourth quarters of 2007. Arm 1 also included the administration of a survey ("Oral Care Survey for Non-ventilated Patients") about oral care knowledge, oral care products, and product satisfaction to the staff. The survey used a Likert scale and consisted of 6 questions with unreported validity and reliability.
- Arm 2 (intervention) consisted of a formalized oral care education program for nursing and ancillary staff regarding the association between oral care and HAP, and instructions for implementing a new oral care protocol.
- The following oral care protocol was carried out every 4 hours in the abovementioned patient population:

Oral Care Protocol

- Set up suction equipment.
- Position patient's head to the side or place in a semi-Fowler's position and provide Yankauer oral suction as needed
- Brush teeth every 12 hours with a suction toothbrush and a sodium bicarbonate antiplaque solution.
 - Brush for approximately 1 to 2 minutes.
 - Exert gentle pressure while moving toothbrush in short horizontal or circular strokes.
- Gently brush the surface of the tongue.
- Apply mouth moisturizer inside the mouth.
- Apply lip balm if needed
- Use suction swabs with sodium bicarbonate for the next 2 oral care sessions with antiseptic oral rinse to clean the teeth and tongue.
 - Place swab perpendicular to the gum line, applying gentle mechanical action for 1 to 2 minutes.
 - Turn swab in clockwise direction to remove mucous and debris.
- Apply mouth moisturizer inside mouth.
- Apply lip balm if needed.

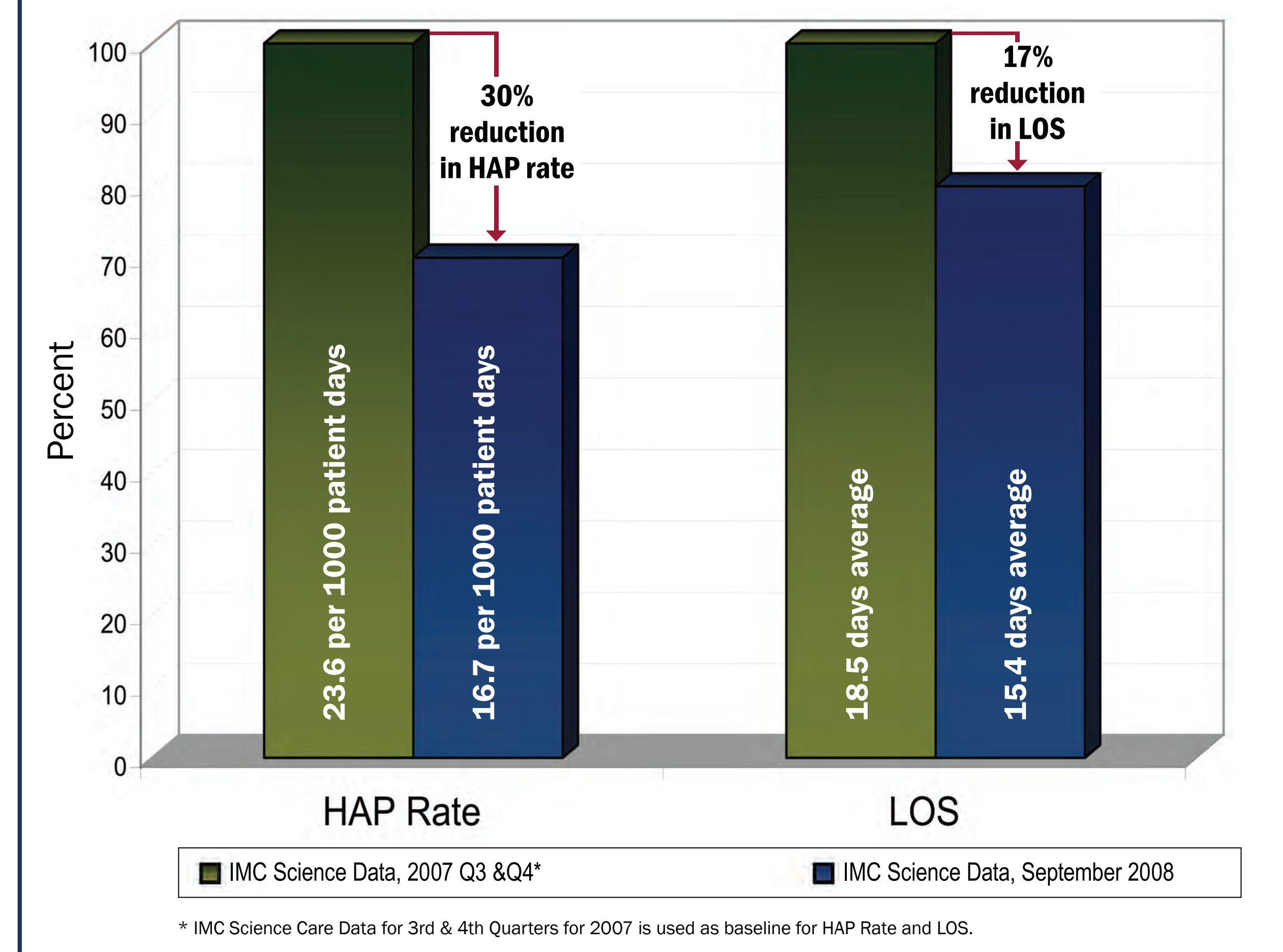
- Thirty days after the implementation of the intervention, the patients' records were reviewed to determine the oral care procedures that had been implemented and the corresponding HAP rates.
- Another survey was then distributed to the medical care team to determine their perception regarding the association between oral care and HAP after the intervention and to assess staff satisfaction with the prepackaged oral care products.
- Compliance with the oral care protocol was determined by reviewing the patients' bedside oral care charts.
- A statistical analysis was conducted to determine whether implementation of the comprehensive oral care protocol resulted in a 30% reduction in the HAP rate and in a 20% reduction in LOS relative to the IMC Science data from the third and fourth quarters of 2007. A chi-square test was used to determine significance, and an independent t test was used to assess whether the switch to the pre-packaged oral care protocol improved nursing compliance and nursing satisfaction.
- An analysis of variance was conducted to compare HAP rates with oral care compliance rates: <50% of group 1, 50%-79% of group 2, and 80-100% of group 3 were compliant with oral care.

Results

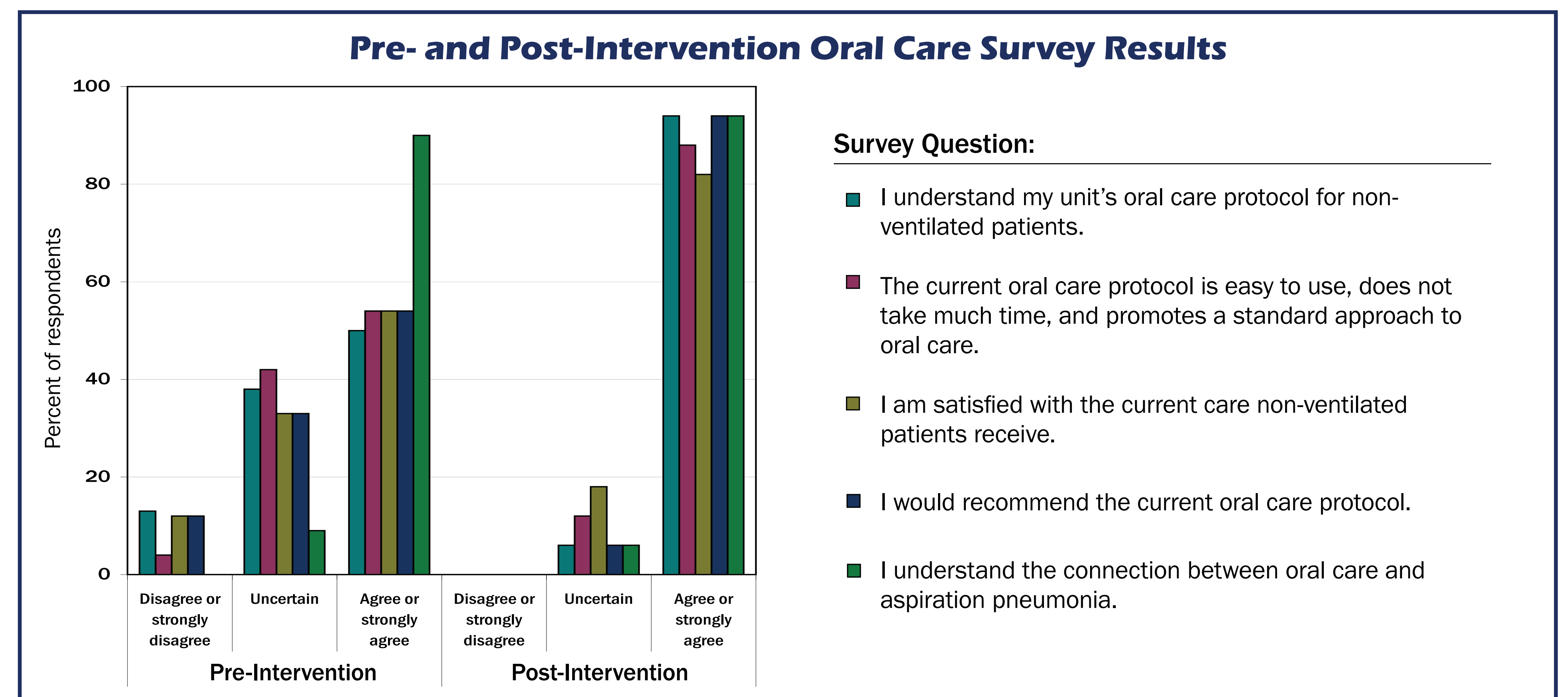
- The HAP rate decreased by 30%: from 23.6 cases in the third and fourth quarters of 2007 to 16.67* cases in September 2008 (1 month after the intervention).
- LOS for HAP patients decreased by 17%: from 18.5 days in the third and fourth quarters of 2007 to 15.4 days in September 2008 (1 month after the intervention; LOS in September 2008 for the entire IMC Unit was 4.11).
- Oral care was completed 80–100% of the time in 56% of the patients, 51–79% of the time in 25% of the patients, and <50% of the time in 19% of the patients.
- Results of the "Oral Care Survey for Non-ventilated Patients" indicated that the new oral care protocol increased nursing compliance and satisfaction and was recommended by more than 50% of the staff.

* Of the 14 patients, 4 performed their own oral care (not ADL-dependent), and 4 had pneumonia (not HAP) when they were admitted to the hospital

Reduction in HAP Rate and LOS, compared to baseline



100% of RNs either agreed or strongly agreed that keeping an oral care kit at the bedside saves time



Lessons Learned

- Comprehensive oral care reduced the HAP rate by 30% (September 2008) compared with the rate for the third and fourth quarters of 2007 (IMC Science data).
- Comprehensive oral care reduced LOS for HAP patients by 17% (September 2008) compared with the rate for the third and fourth quarters of 2007 (IMC Science data).
- Use of the pre-packaged oral care kit increased nursing compliance compared with compliance in the month immediately preceding the intervention.
- Use of the pre-packaged oral care kit increased nursing satisfaction relative to the use of products packaged separately.
- Larger-scale quality improvement studies need to be performed before definitive conclusions can be made.

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