

A Multidimensional Quality Improvement Initiative to Reduce Pediatric Healthcare-Associated Viral Infections

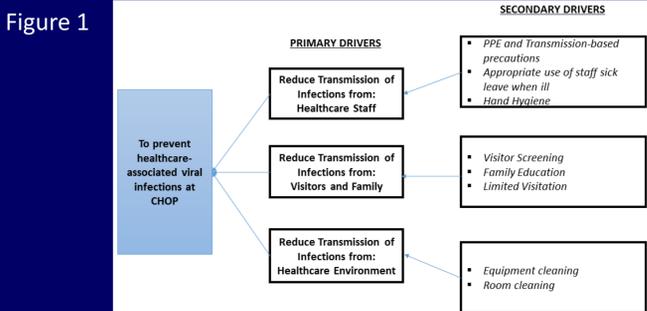
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BACKGROUND

- Healthcare-associated viral infections (HAVI) are common in hospitalized children and can lead to poor outcomes, including death.
- Transmission occurs via spread by healthcare workers, visitors, or families or through contact with contaminated surfaces or objects.
- HAVI were identified as a major cause of healthcare-associated infections (HAI) among hospitalized children at our institution.
- During FY2012, HAVI comprised 32% of all HAI reported, more than CLABSI and SSI.
- Few data are available on quality improvement (QI) initiatives to reduce HAVI in pediatric populations.
- Our objective was to create, implement, and sustain a multidimensional QI bundle and assess its impact on the rate of HAVI.

METHODS

- All HAVI between July 2012 – June 2016 were identified from existing surveillance data and met National Healthcare Safety Network (NHSN) criteria for upper respiratory infections, pneumonia, or gastroenteritis caused by laboratory-confirmed viral pathogens.
- Due to removal of the lower respiratory tract infection (i.e. tracheitis) definition by NHSN in 2015, all previously reported cases were excluded.
- A HAVI Prevention Team was formed to promote a systems-based and data-driven culture for accountability in patient safety.
- Major elements, perceived barriers, and methods to monitor progress were collected and used to create a Key Driver Diagram to frame future work.



- A novel QI bundle was developed containing critical processes in order to prevent viral infections (Figure 2).
- The HAVI Prevention Team was responsible for implementing and sustaining practices through active participation by inpatient unit representatives, team leaders, and executive sponsors.
- Hand hygiene and visitor screening compliance data were collected and reported at monthly HAVI Prevention Team meetings as well as Infection Prevention and Control committee meetings.
- A retrospective observational study compared the monthly rate of HAVI (per 1000 patient days) and bundle compliance over a 4-year period. Nonparametric trend analyses on monthly HAVI rates grouped by fiscal year were performed with STATA SE 12.1 (College Station, TX).

Figure 2

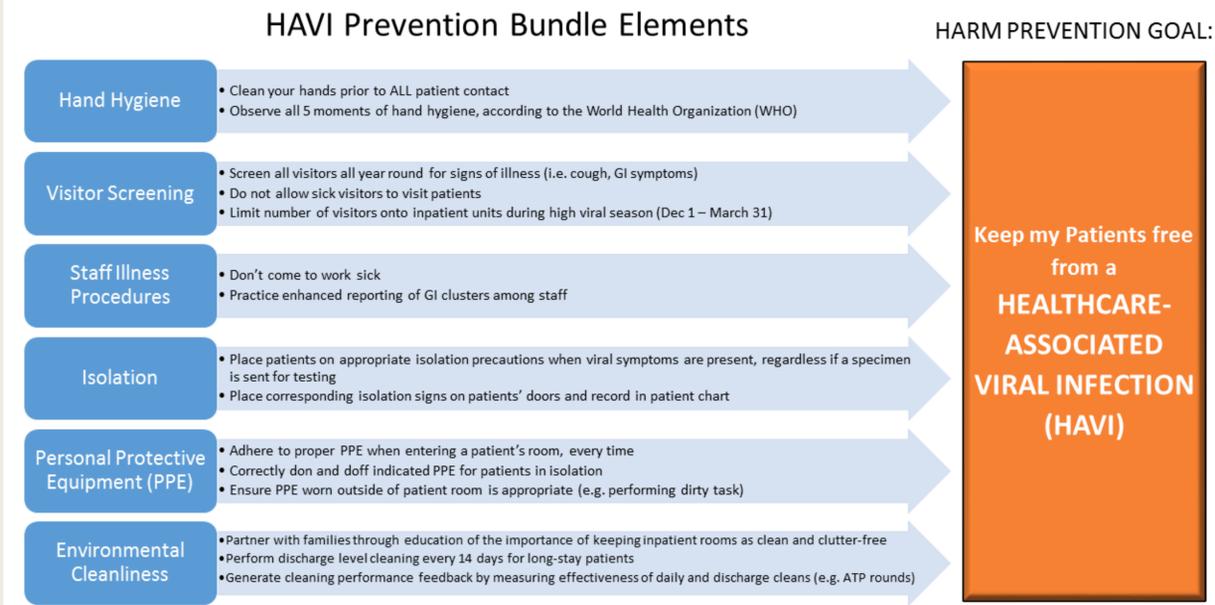


Figure 3a

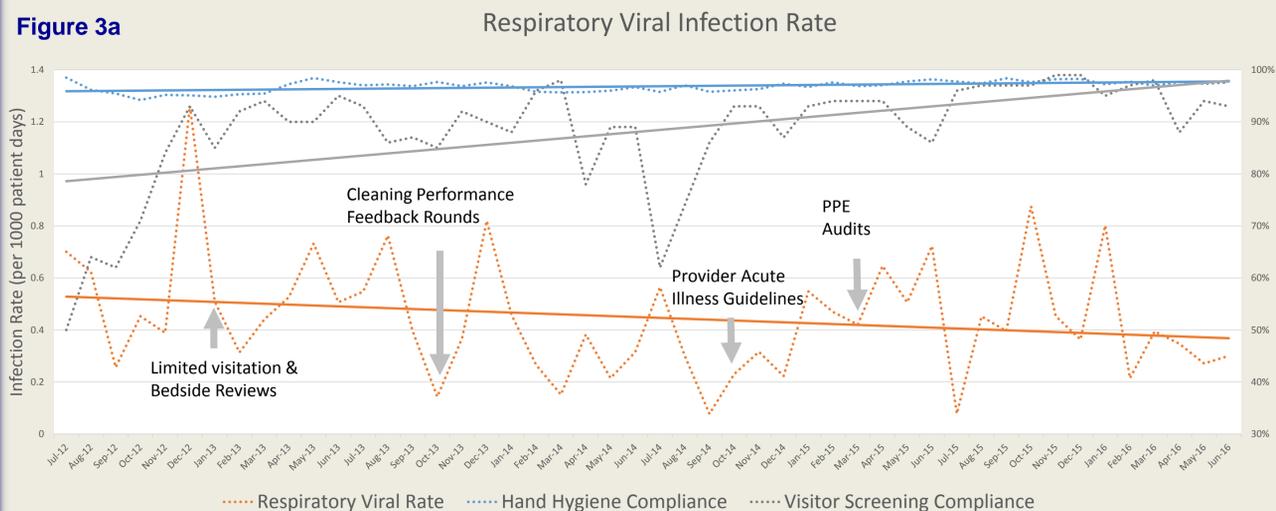
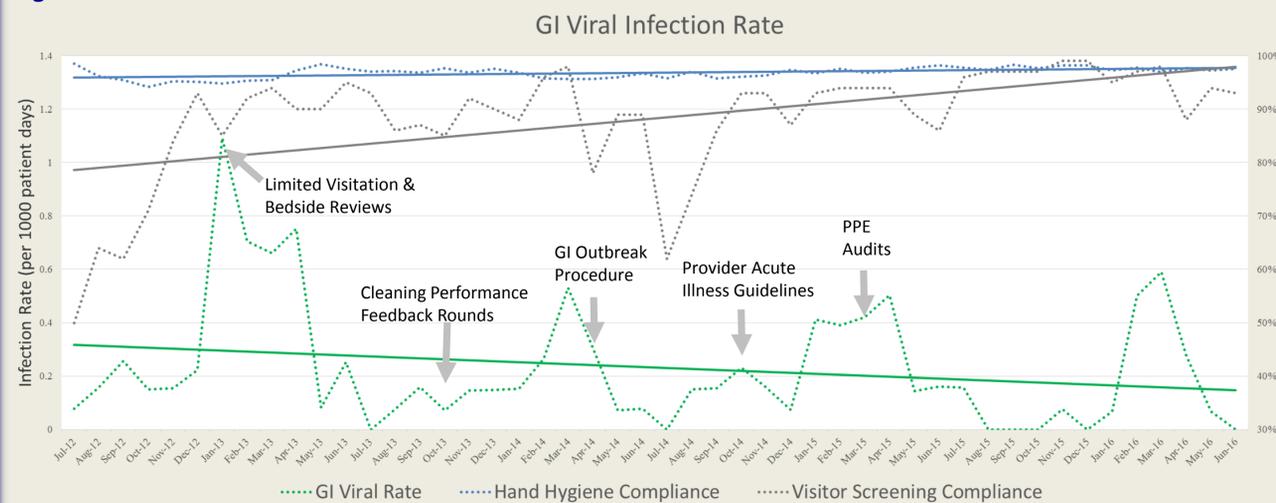


Figure 3b



RESULTS

	FY2013	FY2014	FY2015	FY2016	P-value
Respiratory	0.56	0.40	0.42	0.41	0.158
GI	0.38	0.17	0.23	0.14	0.028
Total	1.12	0.75	0.79	0.56	<0.001

- Average annual compliance with hand hygiene increased from 96.1% during year 1 to 97.7% during year 4. Average yearly compliance for visitor screening also increased each year, from 81% during year 1 to 96% during year 4.
- The yearly average rate of acquired respiratory viral infections decreased by 27%, from 0.56 infections/1000 patient days during year 1 to 0.41 infections/1000 patient days during year 4 (Figure 3a).
- The yearly average rate of acquired gastrointestinal viral infections decreased by 63%, from 0.38 infections/1000 patient days during year 1 to 0.14 infections/1000 patient days during year 4 (Figure 3b).
 - This was a statistically significant trend (Table 1).
- A decreasing trend in average annual HAVI for all viral pathogens rate was significant, $p < 0.001$ (Table 1).

DISCUSSION

- Decreasing rates of HAVI infections correlates with increasing hand hygiene and visitor screening compliance over a 4 year period (Figures 3a & 3b).
- During this time, other risk factors for HAVI were identified and informed additional interventions and policies (Figures 3a & 3b) that were incorporated into the final HAVI QI bundle (Figure 2).
- The decreasing rate of GI-HAVI significantly contributed to a total downward rate of HAVI over a 4 year period (Table 1).
- Limitations to interpretation of HAVI rates include:
 - Inability to account for community burden and seasonality.
 - Dependence upon physician orders for virology testing.
 - Inability to capture asymptomatic patients or viral infections that do not meet surveillance criteria.
 - Inability to account for family/visitor adherence to prevention practices.

CONCLUSION

- We highlight a novel interdisciplinary QI bundle that was created, implemented, and measured over a 4 year period, resulting in a lowered rate of HAVI in hospitalized children.
- Future work includes:
 - Including patient isolation and proper use of PPE in overall bundle compliance measurement.
 - Determining the overall effectiveness of the QI bundle.