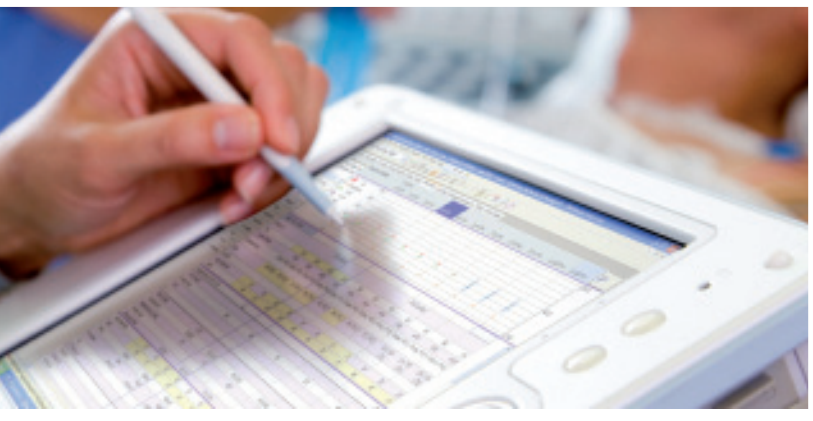




IntelliSpace Critical Care and Anesthesia Success Stories 2012

Learn how Philips Healthcare solutions are being used to enhance clinical outcomes

PHILIPS

sense and simplicity

Sharing Success

At Philips, we aim to improve people's lives through meaningful innovation.

We're proud that clinicians and clinics like yours use our solutions to simplify clinician workflow, improve financial outcomes, and help improve and save lives. With this booklet, we showcase customer stories about how they have used Philips IntelliSpace Critical Care and Anesthesia to improve clinical outcomes.

From improving compliance to enhancing patient education – these stories show how the IntelliSpace Critical Care solution helps clinicians closely analyze and manage the care they give, in order to improve practice and implement new protocols.

We hope sharing these "lessons learned" will inspire and inform you about how Philips can help improve patient care in your clinical environment. We appreciate your support and look forward to your continued success.

Contributing Authors
Royal Glamorgan Hospital (Llantrisant, UK)
Cardiff University (Cardiff, UK)
Katherine Shaw Bethea Hospital (Illinois, USA)
St. Joseph's Healthcare Hamilton (Ontario, Canada)
Valley Health System (New Jersey, USA)

2012 Table of Contents

Royal Glamorgan Hospital

Effect of bundle compliance on reducing ventilator associated pneumonia in a mixed medical-surgical ICU

Szakmany T, Pain T, Beckett F, Jerrett H, Hermon A

CHALLENGE

Ventilator associated Pneumonia (VAP) is a common problem on UK ICUs: 4.9 – 49.5/1000 ventilator days.

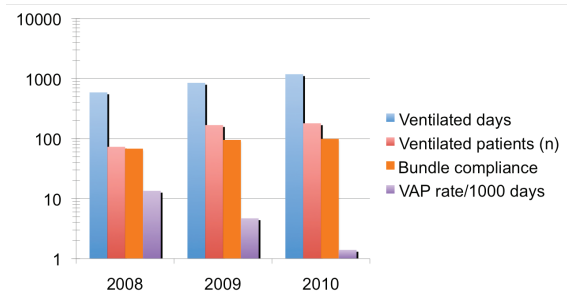
- *Usually multiresistant organisms with high mortality and morbidity if appears.*
- *Prior to initiating the bundle the VAP rate was 21/1000 ventilator days.*
- *MRSA, Acinetobacter and multiresistant pseudomonas key contributors.*
- *Mortality >40%*
- *VAP occurred ~8 days of ventilation.*

SOLUTION

Objectives: (1) To implement, monitor and evaluate the effect of the VAP Bundle to reduce the incidence of VAP and improve patient outcomes. (2)To identify gaps in process compliance.

Method: A robust education program was rolled out targeting nurses, Senior medical staff and rotating junior medical staff.

- Every ventilation patient had a daily sedation break if Fi0<0.5, head elevated >30, peptic ulcer prophylaxis and DVT prophylaxis.
- Used ICIP clinical Information system (CIS) to provide an easy, reliable, robust, and accessible method for monitoring VAP bundle compliance.
- Nurses documented on the flowchart every shift using simple drop down menus and compliance reports were compiled from the ICIP database every month.



RESULTS

VAP Rate

2008 - 8 VAP in 6 months

3 Pseudomonas, 1 Acinetobacter, 2 E. Coli, 2 MRSA

Mortality 3/8

2009 - 4 VAP in 12 months

2 Pseudomonas, 1 E. Coli, 1 MSSA

Mortality 1/4

2010 – 2 VAP in 12 months

1 Pseudomonas, 1 MSSA

Mortality 0/2

Time to VAP: **8±3 days to 16±3 days**

CONCLUSION

- Our data shows that implementation of care bundles can significantly and sustainable reduce VAP on the ICU without extra expenditure.
- Our CIS helped us to monitor compliance and to reinforce the message with high medical staff turnover.

LESSONS LEARNED

- Focus on process measures rather than outcomes
- Multiple practices rather than single intervention
- Before-after design

  Hawthorn Effect
- Ceiling effect on already embedded practices
- Incorporate new evidence to change practice

Royal Glamorgan Hospital, Vwm Taf LHB, Llantrisant, Wales, UK

Cwm Taf NHS Wales GIG Cymru

ELIMINATING CATHETER RELATED BLOODSTREAM INFECTION ON THE INTENSIVE CARE UNIT: NOT A MYTH!

T. Szakmany[1,2], T. Pain[1], P. Beckett[1], H. Jerrett[1], A. Hermon[1]

[1]Royal Glamorgan Hospital, Anaesthetics, Theatres and Critical Care, Llantrisant, UK, [2]Cardiff University, Anaesthetics, Intensive Care and Pain Medicine, Cardiff, UK

Background

•Catheter related bloodstream infection (CRBSI) is still a common problem on UK ICUs

•42.3% of bloodstream infections in England are central line-related
Tacconelli E et al. J Hosp Infect 2009;72:97-103

•National Audit Office (2000) estimated the additional cost of a bloodstream infection to be £6,209 per patient

•The surveillance of central venous catheter (CVC) related infections became mandatory in Wales on the 1st September 2007 utilising HELICS defined infection criteria (Table 1).

•Implementation of care bundles have been advocated to reduce the infection rate
Pronovost PJ et al. BMJ 2010 Feb 4;340:c309. doi: 10.1136/bmj.c309.

Objective of the study

The aim of the study was to identify the different factors leading to reduction and elimination of CRBSI on our unit

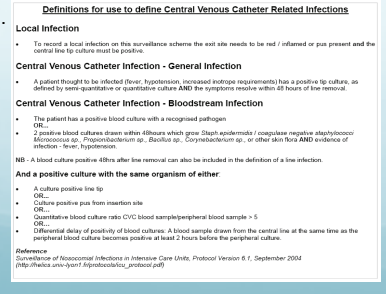
Methods

•Retrospective audit on the rate of CRBSI for a three months period before the implementation of the CVC bundle provided baseline data.
•Prospective audits for the corresponding three months were carried out after the CVC bundle was firmly embedded in clinical practice.
•We collected data on overall compliance with the bundle, mean dwell time, number of CRBSIs, site of infection and whether the patient left the unit with a CVC line in situ.
•For statistical analysis Chi-square test and Wilcoxon test were used.

The CVC bundle consisted:

hand hygiene (alcohol gel)
barrier precautions on insertion
(cap, sterile gloves, sterile gown, mask)
2% chlorhexidine skin preparation
using femoral site as last resort
daily review of necessity of central access
daily inspection of insertion site
use of TPN on a dedicated port
maintaining asepsis when accessing the line

Table 1.



Definitions for use to define Central Venous Catheter Related Infections

Local Infection

- To record a local infection on this surveillance scheme the exit site needs to be red / inflamed or pus present and the central line tip culture must be positive.

Central Venous Catheter Infection - General Infection

- A patient thought to be infected (fever, hypotension, increased inotrope requirements) has a positive tip culture, as defined by semi-quantitative or quantitative culture **AND** the symptoms resolve within 48 hours of line removal.

Central Venous Catheter Infection - Bloodstream Infection

- The patient has a positive blood culture with a recognised pathogen
  OR...
- 2 positive blood cultures drawn within 48hours which grow *Staph.epidermidis / coagulase negative staphylococci Micrococcus sp., Propionibacterium sp., Bacillus sp., Corynebacterium sp.*, or other skin flora **AND** evidence of infection - fever, hypotension.

NB - A blood culture positive 48hrs after line removal can also be included in the definition of a line infection.

And a positive culture with the same organism of either:

- A culture positive line tip
  OR...
- Culture positive pus from insertion site
  OR...
- Quantitative blood culture ratio CVC blood sample/peripheral blood sample > 5
  OR...
- Differential delay of positivity of blood cultures. A blood sample drawn from the central line at the same time as the peripheral blood culture becomes positive at least 2 hours before the peripheral culture.

Reference
Surveillance of Nosocomial Infections in Intensive Care Units, Protocol Version 6.1, September 2004 (http://helics.univ-lyon1.fr/protocole/icu_protocol.pdf)

Results

Compared to the initial audit period, we have observed:

•Increase in the compliance with the bundle

•Sustained reduction in mean dwell time
•Reduced CVC related infection rate

•Less patients transferred to the ward with CVC in situ

•We have seen a marked reduction in the rate of CRBSI once we changed to antiseptic impregnated catheters in 2009 (ArrowGuard Blue Plus, Arrow, UK)

•Compliance was enhanced by the introduction of pre-packed CVC insertion packs in 2010

•Once compliance with the CVC bundle reached 100% for more than a year we have not experienced any CRBSI

Year (quarter)	Catheter days	CVCs inserted (n)	CVC mean indwelling time (days)	Bundle compliance	CRBSI (n)	CRBSI/1000 catheter days	Patients transferred to ward with CVC in situ (n)
2006 (Q4)	503	114	4.41	55%	8	15.9	61
2007 (Q4)	628	122	5.14	92%	4	6.4	52
2008 (Q1)	547	103	5.30	96%	1	1.8 *	42
2008 (Q2)	561	125	4.48	95%	2	3.6 *	43
2008 (Q3)	493	105	4.69	95%	2	4.1 *	39
2008 (Q4)	511	104	4.91	100%	0	0.0 *	23
2009 (Q1)	**570**	**123**	**4.63**	**100%**	**2**	**3.5 ***	**21 ***
2009 (Q2)	518	83	6.24	100%	0	0 *	10 *
2009 (Q3)	537	111	4.83	100%	0	0 *	8 *
2009 (Q4)	635	127	5.00	100%	1	1.6 *	9 *
2010 (Q1)	724	117	6.18	100%	0	0 *	6 *
2010 (Q2)	451	92	4.90	100%	0	0 *	4 *
2010 (Q3)	626	103	6.07	100%	0	0 *	2 *
2010 (Q4)	621	114	5.44	100%	0	0 *	3 *

* p<0.05

Conclusion

•Our data shows that implementation of care bundles can significantly and sustainably reduce and eliminate CRBSI on the ICU in a real life setting.
•100% compliance with the bundle over a sustained period seems to be necessary to eliminate CRBSI completely.
•The use of CIS enables us to display real-time compliance data, which reinforces this message.
•Interestingly, a significant drop in CRBSI rate coincided with the introduction of new CVCs and since the application of the pre-prepared CVC insertion packs we have not experienced any infections.

Appropriate blood transfusion on the ICU: An audit of current practice in a District General Hospital

A P Hadfield, J Naughton, T Szakmany

Anaesthetics, Critical Care and Theatres, Royal Glamorgan Hospital, Llantrisant, UK

Introduction

Liberal blood transfusion strategy has been attributed to worse outcome and increased cost on the intensive care unit[1].

Potential risks of transfusion include ABO incompatibility, transfusion reactions, transfusion transmitted infections, transfusion associated circulatory overload, transfusion related acute lung injury, transfusion associated immunomodulation and an increased incidence of hospital acquired infections.

A UK National guideline advocates tolerating low haemoglobin (Hb) levels in ICU patients[2]

Many centers are yet to adopt a restrictive transfusion policy as recommended by many publications and guidelines[3]

When is blood transfusion appropriate?

(AAGBI, 2008)

A strong indication for transfusion is a haemoglobin concentration <7 g/dl

Transfusion will become essential when the haemoglobin concentration decreases to 5 g/dl

A haemoglobin concentration of 8-10 g/dl is a safe level even for those patients with significant cardiorespiratory disease

Background of audit

The Royal Glamorgan Hospital is a busy District General Hospital with large numbers of major vascular and general surgical patients.

These patients often pass through the ICU/HDU during their stay, and a considerable number receive blood transfusions

It has been recently noticed that a seemingly significant number of patients are receiving blood transfusions above the threshold stated in the AAGBI guidelines, without evidence of significant bleeding.

An audit of transfusion practice was therefore proposed to evaluate our use of blood transfusions, improve staff education and awareness, and reduce potential harm to patients by over-transfusion.

Methods

Retrospective analysis of all patient data stored between January and December 2010 in our Clinical Information System (Carevue, Phillips) against published AAGBI transfusion guidelines

Transfusion was deemed appropriate if:

–Recent or ongoing blood loss > 1500mls

–Hb < 8g/dL

Patients age, sex, APACHE II score, length of stay (LOS), surgical status, ICU and hospital outcome were recorded.

Pre-transfusion Hb level and number of units of blood was recorded for every transfusion episode

Statistical analysis performed with Chi-squared and Mann-Whitney U test. Data presented as median and inter-quartile range.

Results

323 patients were transfused in 580 transfusion episodes

1319 units of blood

~ £264,000 cost

299 surgical vs 180 medical patient transfusion episodes

There was no significant difference between age, sex, APACHE II, LOS and outcome between the appropriate and inappropriate group.
Significantly more surgical (125/299) than medical (71/180) patients were transfused inappropriately during the observed transfusion episodes (p=0.031).
Surgical patients had significantly lower APACHE II scores and significantly higher pre-transfusion Hb levels.
When analyzed the single transfusion episodes (when blood transfusion was given only once during the ICU stay) we found that in 75 episodes using 156 units of blood the transfusion was inappropriate.

Is it appropriate?

	Transfusion episodes	Pre-transfusion Hb (g/dL)	Units of blood (n)
Appropriate	**351 (65%)**	**7.4 (7.0-7.8)**	**928**
Inappropriate	**200 (35%)**	**8.5 (8.2-8.8)**	**391**

Conclusions

~34% of blood transfusions were deemed inappropriate when compared to the AAGBI guidelines.
Surgical patients seem to receive blood at significantly higher pre-transfusion Hb levels without any signs of bleeding. This highlights an educational and interface issue on our unit.
Based on our results, even the most conservative estimate shows that 13% of the blood transfused on our unit is inappropriate and wastage of precious resources.
Further education is warranted for the critical care and surgical residents about appropriate blood transfusion.
Our plan is to introduce a decision support tool for transfusion using our electronic CIS to raise awareness and reduce inappropriate use of red blood cells

References

1.) Hebert PC et al. NEJM 1999;340:409-417.

2.) Blood Transfusion and the anaesthetist: Red Cell transfusion 2 AAGBI, 2008

3.) Corwin HL, Gettinger A, Pearl RG, et al.: The CRIT Study; Crit Care Med 2004, 32:39–52.

KSB HOSPITAL is...
KATHERINE SHAW BETHEA HOSPITAL

Increasing CHF Patient Education through Advisory Alerts

Philips EPIS Users Group Meeting, November 17-19, 2010

Challenge

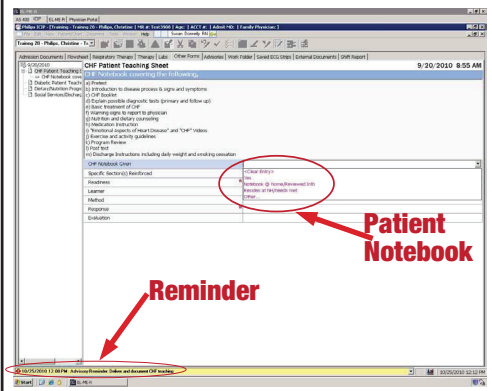
An appropriate standard of care in a hospital setting is providing education to all patients diagnosed with Congestive Heart Failure (CHF) and ensuring each patient receive that education during their admission. Patients without CHF education do not know how to determine which symptoms require seeking medical attention and have more episodes than patients who have received education. Although patient education has always been supported and encouraged by nursing staff, documentation has not been consistent.

Prior to instituting ICIP:

- Charts were audited daily for CHF diagnoses
- A heart sticker was placed on the Kardex reminding nurses to provide CHF teaching
- Printed reminders for CHF teaching were attached to patient charts

Auditors had limited time to manually check charts and nurses overlooked reminders due to their work load and therefore reminders came off and/or were lost, leading to less patient CHF education.

Solution



A custom advisory was created in ICIP that triggered any admission having CHF. A new form was developed entitled "CHF Patient Teaching Sheet" which is used to document CHF education. This electronic form mimics the notebook given to the patient addressing specific issues related to CHF. Documentation includes the patients readiness and motivation to learn after the teaching is complete.

The custom advisory triggers every 8 hours at 0400, 1200 and 2000 which allows staff enough time to provide education before the end of their shift. It continues to trigger until staff documents the CHF notebook given and topics taught.

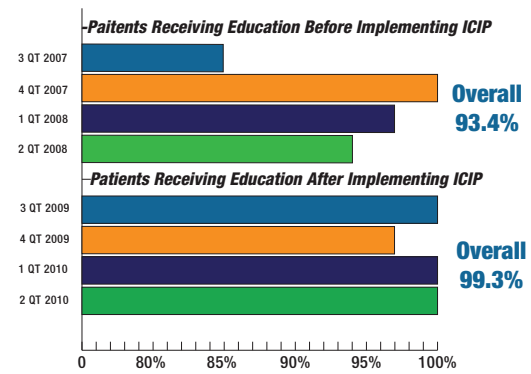
Results

Patients receiving CHF education have:

- A higher rate of compliance with their treatment regime
- Recognize their symptoms
- Seek medical attention earlier when these symptoms occur
- Family members of the patient also learn to recognize CHF symptoms and the medical process

This education results in:

- Ability to meet required CMS specifications for CHF admissions
- Possible decrease in readmission rates for CHF reasons



Conclusion

The CHF custom advisory:

- Ensures patients receive CHF education at KSB Hospital
- Improves compliance with CMS project requirements at KSB Hospital
- Supports our philosophy to provide patient education
- Impoved staff compliance with documentation of teaching

Lessons Learned

- Patients may not wish to follow instructions for CHF even if educated
- Discharge instruction forms need to address CHF teaching
- Implement EMR discharge instructions addressing CHF symptoms requiring medical attention
- Staff document dissemination of CHF notebook meets advisory requirements

However, the patient's readiness to learn section was often omitted on the ICIP teaching sheet. To correct this, the custom ICIP "CHF Patient Teaching Sheet" requires completing the readiness and learning motivation sections.

- Use of ICIP advisory system improves the hospital's compliance with CMS projects documentation and requirements

KSB Hospital Profile:

77 ICIP Beds
Activation Dates:
ICU - September 17, 2008
Med/Surg - April 22, 2009
PEDS - September 30, 2009
Outpt. & Endoscopy - October 14, 2009
Respiratory with all units

Project Team
Susan Donnelly, RN, BSN Nursing Data & Documentation Coordinator (System Admin) ● Teresa Gibson, RN, BSN, MBA Director of Clinical Information Services ● A.T. Appenheimer, MD (Medical Director) ● Dave Ginn, BS Director of Information Systems ● Sue Rowe, RN, MSN Nurse Resource Coordinator ● Mary Ann Stone, RN, CMS Project Coordinator

St. Joseph's Healthcare Hamilton

Leading and Transforming Care using Technology through Implementation of Clinical Advisories in the Intellivue Clinical Information Portfolio

Marg Maclennan RN (ICIP Systems Administrator, Clinical Informatics), Lily Waugh (Nurse Manager ICU/CCRT), Mark Soth, MD (Medical Director ICU), Joanne Takaoka RN, Julie Garnham -Takaoka RN, Angela Greiter RN, Shawn Quait RN, May Griffiths-Turner (ICP), Elaine Wilson (Application Analyst), Jacqueline Lata (Nurse Manager Clinical Informatics), Jackie Barrett (Director of Clinical Programs), Deborah Cook MD, Dan Perri MD
St. Joseph's Healthcare Hamilton, Ontario CANADA

Philips EPIS Users Group Meeting
November 17 - 19, 2010

BACKGROUND:

St. Joseph's Healthcare Hamilton (SJHH) is a regional, tertiary referral and premier academic research health science centre. SJHH is member of the St. Joseph's Health System, one of the largest corporations in Canada devoted to healthcare. The SJHH site has over 650 beds, staff of 4000+, 12 Medical Stepdown beds, 6 Surgical Stepdown beds, and 15 ICU beds (15 ICIP beds). Patient safety is an identified priority at SJHH. As a leader in research, and patient safety and best practice implementation, the ICU has implemented safety bundles which are aligned with the SJHH organization and *Safer Healthcare Now!* Canada patient safety initiatives.

CHALLENGE:

Several strategies have been shown to decrease central line associated blood stream infection (CLA-BSI) and ventilator associated pneumonia (VAP) rates. However, compliance can be challenging. According to the evidence, reliable and timely care for high-risk and critically ill clients can be achieved

GOALS:

- To determine if a real time standardized approach to nurse acknowledgement of Intellivue Clinical Information Portfolio (ICIP) advisories are associated with compliance
- To determine if implementation and compliance to safety advisory alerts in ICIP can impact patient safety outcomes and decrease CLA-BSI and VAP rates
- To determine if a standardized approach to education can positively impact patient safety and best practice outcomes

METHODS:

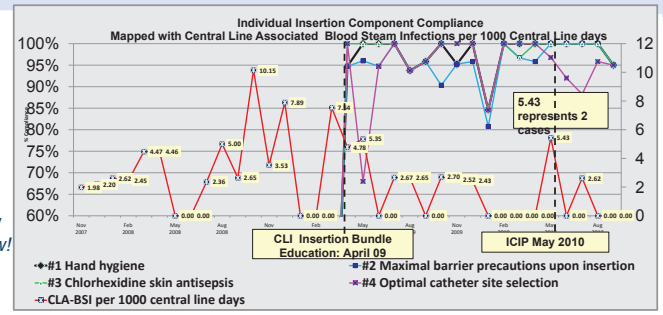
Within 15 minutes of a central venous line insertion, and through direct assistance and observation, a 4 component paper based checklist was completed by the bedside nurses (April 2009)

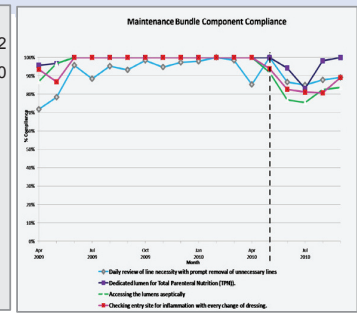
1. hand hygiene
2. maximal barrier precautions
3. chlorhexidine skin antisepsis
4. subclavian site selection unless contraindicated

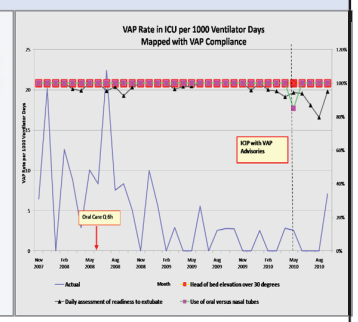
Compliance for each of these components was reviewed by nursing informatics on a paper case report form initially with transition to the electronic medical record and ICIP reporting after the first year (ICIP Activation May 5,2010)

Central venous line insertion, maintenance and VAP prevention compliance cues were built into ICIP along with clinical advisories

A standardized approach to education of safety bundles and checklist completion with 1:1 RN led education and Physician led medical learner simulator training (SIM)







The CLA-BSI rate was tracked by the hospital infection control practitioner for 17-months pre-intervention (before) and for 18 months after the intervention started (post). (November 2007-September 2010)

ICIP reporting was used to determine compliance after May 2010

Online audits with direct staff feedback using Sharepoint

Infection Rates and process improvements were tracked monthly with mandatory reporting to the Ontario Ministry of Health

Post implementation survey completed by staff

RESULTS:

The CLA -BSI and VAP patient safety bundles built into ICIP are aligned with *Safer Healthcare Now! Canada*

ICIP has been live in ICU since May 2010

Customized electronic charting rows and clinical advisories cue nursing staff to complete compliance checklists that are associated with moderate compliance and a moderate decrease in CLA-BSI

Staff feedback includes appreciation of the quarterly graphic reports displaying the decrease in CLA-BSI and VAP rates

Nurses are empowered to speak up and halt the procedure whenever a breach in bundle protocol is observed

Use of an online chart audit form and website allows for standardized chart review and direct staff feedback

Evaluation and follow up results will be available following further analysis

OBSERVATIONS:

Nurse led best practice initiatives empower nurses to advocate on behalf of patient safety

A standardized approach in the electronic documentation system with ICIP advisories cue and remind nurses to document the care they have provided, and can provide real time improvement in patient safety bundle compliance

Implementation and compliance of patient safety ICIP advisory alerts, monitoring compliance and process feedback can positively impact CLA-BSI and VAP outcomes

A standardized approach to nurse and physician led education can improve timely care for high-risk and critically ill clients in ICU. It is recognized that SIM education assisted in bundle compliance

CONCLUSIONS:

A 5 month post implementation survey was completed November 2010
Early results indicate: staff find the clinical advisories beneficial, they have readily adapted to ICIP, and they find ICIP a pleasure to use

LESSONS LEARNED:

Several factors contributed to successful ICIP implementation including:

1. Visionary leadership – established steering group and team meetings
2. Senior Executive team support
3. RN Clinical Informatics leadership with an interprofessional team approach to configuration and team education – RN, RT, MD, IT, IPAC, Dietitian, Pharmacist
4. ICU team leadership
5. Dedicated ICU resources
6. Physician collaboration and engagement throughout the process
7. Process for ongoing support, feedback, and communication

St. Joseph's Healthcare Hamilton is one of Canada's Top 100 Employers for 2010 (www.stjoes.ca)

Use of a Custom Advisory To Improve Regulatory Compliance on Methicillin Resistance Staph Aureus Surveillance Testing

Alcina Fonseca, Manager IMC/CSICU, Maryann Fischer, Manager ICU, Laurie Nagle, Manager CCU,
Katherine Peck, System Administrator

The Valley Hospital, Ridgewood, New Jersey

Philips EPIS Users Group Meeting • November 17 - 19, 2010

CHALLENGE

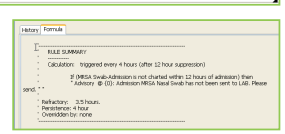
In 2007, the New Jersey Department of Health and Senior Services (NJSA 26: 2H-1)mandated surveillance testing for Methicillin Resistant Staph Aurea (MRSA). Critical care units were required to obtain a nasal swab within the first 24 hours of admission and at transfer. Obtaining the swab sample on admission was often problematic due to the criticality of the patient's condition and required frequent reminders from others to ensure that the specimens were sent.

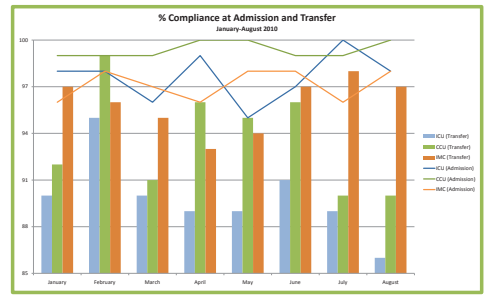
SOLUTION

With the implementation of the Intellivue Clinical Information Portfolio at The Valley Hospital in November 2009, a custom advisory was created. This advisory would automatically alert the RN if the MRSA swab was not sent to the laboratory. If the swab was not sent after 12 hours in the unit, the advisory would be displayed on the chalkboard and in the message bar areas of the flowsheet. This message would continue to re-appear every 4 hours until the sample was sent.

Example of Admission MRSA nasal swab advisory and Rule Summary

9/29/2010 12:00 AM	Advisory @ 12:01 AM: Admission MRSA Nasal Swab has not been sent to LAB. Please send.
9/28/2010 8:00 PM	Advisory @ 8:01 PM: Admission MRSA Nasal Swab has not been sent to LAB. Please send.





RESULTS

The graph shown above demonstrates that there are bettter outcomes with the custom advisory in place as compared with no advisory at the time of transfer. The line graph reflects the admission results and the bar graph displays the results at the time of transfer. Data is collected and compiled by the Infection Control Department using admission information from the hospital information system and microbiology results. Percent compliance is measured by the total number of patients with correctly processed samples (numerator) compared to the total number of admissions or transfers (denominator). Overall, during the eight months studied each unit demonstrated improvement during the admission process:

ICU 7.7%

CCU 5.8%

IMC 1.2%

CONCLUSION

Although simple in concept, the implementation of this custom advisory has been successful in achieving better compliance with the New Jersey Department of Health regulation. The advisory eliminates the need for additional staff interventions and the "nag factor" to make sure the samples are sent. This allows for additional time to be spent with patients and families. At the present time we are discussing the feasibility of an advisory at the time of transfer.

LESSONS LEARNED

Prior to implementation as staff were being trained, more emphasis should have been placed on the entire advisory process. Priority was placed on staff competency with the flowsheet, forms and daily documentation requirements. Some additional retraining was required to reinforce the importance and processing of all the advisories (custom and clinical).

The Valley Hospital (www.valleyhealth.com) is a 451 bed not-for-profit hospital.
The Valley Hospital contains 48 ICIP beds.
ICIP Activation: November 17, 2009

Valley Health System

Bring Value to Life

Showcase ***your*** success.
Visit http://philips.cvent.com/SuccessStories to learn more and upload ***your*** story.

Printed in the Netherlands
45229 628 6981 * JUN 2012