Trajectories
Aim For Excellence

Trajectories is a quarterly publication highlighting Missouri hospital initiatives to improve the health of their communities, as well as the experience and effectiveness of the care provided to their patients.

Combating patient infection is a goal of every hospital. Health care-associated infection is one of the most preventable causes of mortality in the U.S.[i] To reduce HAIs, reduction programs have focused on high value infection-mitigation targets, including catheters, central lines and surgical sites, among others. One reason for hospital success in reducing infections is the increased use of evidence-based practice protocols.

A growing number of infections are present upon admission. As a result, hospitals are increasingly adopting programs to identify and mitigate community-acquired infections. These infections can present an entirely different set of challenges, especially in the case of sepsis — a systemwide infection that can quickly lead to organ failure and death. Researchers have found that sepsis is commonly diagnosed in the emergency department setting.

Successfully reducing infections — HAIs and those present upon admission — requires a much broader focus.

It is abundantly clear that not all patients or pathogens are equal. Patients with complex medical conditions or those from vulnerable populations — the immunocompromised, elderly, very young, impoverished or malnourished — often require more than efficacious cleaning and hygiene practices to prevent HAIs.[ii, iii] Moreover, a growing number of "super bugs" — infections resistant to standard antibiotics — have left caregivers with limited options in infection management.

New research, clinical guidance and regulatory requirements are emerging to address the growing infection control challenge. In combination, they provide a framework for patient protection, increased population health improvement through health literacy and awareness, and protection of the antibiotic tools available to fight infection.

Patient Safety Week 2017

March 12-18 is National Patient Safety Week. Hospitals and health care organizations are encouraged to use the week to increase public and clinical awareness of patient safety, including infection control and management activities. While a week is dedicated to highlight awareness of patient safety, every day is patient safety day.[xxvi]

MHA
MISSOURI HOSPITAL ASSOCIATION

Infection Control Policy, Regulatory and Evidence–Based Practice Updates

Improvements in infection control practices are driving rates down, while at the same time the lessons of these efforts are leading to changes in clinical practice and policy. Practitioners should be aware of several concurrent updates, including changes to sepsis guidelines and sepsis core measures, proposed changes to the Centers for Medicare & Medicaid Services' Conditions of Participation that include infection prevention, and new antibiotic stewardship guidelines designed to prevent secondary infections, such as *Clostridium difficile.* In addition, lessons learned from disease outbreaks are providing a new understanding of strategies to protect patients and the workforce.

Sepsis Definition And Process Measure Changes

The "Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3)" was published by the *Journal of the American Medical Association* in 2016. Researchers noted the limitations of previous definitions which included an excessive focus on inflammation, the misleading model that sepsis follows a continuum through severe sepsis to shock, and inadequate specificity and sensitivity of the systemic inflammatory response syndrome criteria. The task force concluded that the term severe sepsis was redundant, and recommended "sepsis" as a diagnosis with "septic shock" as a subset of sepsis, noting profound circulatory, cellular and metabolic abnormalities associated with a greater risk of mortality than with sepsis alone.[iv] Essentially, the task

force validated that while the term "severe sepsis" should no longer be used, the recognition and treatment are essentially unchanged. Further, they included a stronger suggestion that clinicians include invasive hemodynamic monitoring to provide more patient-centric response and management. These recommendations are based on multiple observational studies showing that any delay in antibiotic administration is associated with an increased risk of death. In January 2017, the fourth revision of the "Surviving Sepsis Guidelines" was published reflecting these updates.[v]

At this time, CMS has not changed the sepsis process measures as a result of recent studies from *JAMA* and the Surviving Sepsis Campaign. The studies validate that sepsis, severe sepsis and septic shock recognition and treatment are essentially unchanged and that the prognosis can be more accurately predicted by using the Sepsis-Related Organ Failure Assessment (qSOFA) — a rapid triage assessment tool for early sepsis recognition. The presence of two qSOFA criteria is a predictor of both increased mortality and ICU stays of more than three days, in non-ICU patients. The new sepsis definitions recommend using a change in baseline of the total qSOFA score of two or more points to represent organ dysfunction. ICD-10 codes have not changed.

How should hospitals and providers address the changes? The Surviving Sepsis Campaign recommends the following three-step approach.

Step 1: Screening and Management of Infection

Use screening to identify infection. Hospitals should continue to use signs and symptoms of infection to

promote the early identification of patients with suspected or confirmed infection, and obtain blood and other cultures as indicated, and simultaneously obtain laboratory results to evaluate the patient for infection-related organ dysfunction. Administration of medically indicated antibiotics should follow within one hour.

Step 2: Screening for Organ Dysfunction and Management of Sepsis (formerly called Severe Sepsis)[vi]

Patients with sepsis should still be identified by the same organ dysfunction criteria (including lactate level greater than 2 mmol/L). The qSOFA tool is recommended. Evidence indicates that the presence of two out of three qSOFA elements (altered mental status, respiratory rate greater than or equal to 22 breaths per minute and systolic blood pressure less than or equal to 100 mm Hg) in patients who have screened positive for infection may be used as a secondary screen to identify patients at risk for clinical deterioration. These three qSOFA elements were determined through analysis of a data-driven model to predict deterioration. Practitioners should strongly consider closely monitoring these at-risk patients.

Step 3: Identification and Management of Initial Hypotension

In patients who have infection and hypotension, or a lactate level greater than or equal to 4 mmol/L, 30 mL/kg, crystalloid should be given with reassessment of volume responsiveness or ongoing tissue perfusion.

CMS CoP Proposed Changes[vii]

CMS published proposed updates to the inpatient conditions of participation in June 2016. The proposed updates for *§ 482.42 Infection Prevention and Control and Antibiotic Stewardship Programs, Infection Control and Reporting Requirements*, are an attempt to improve care and reduce health care-associated infections. The changes to CMS' CoP include the following.

■ Require that a hospital's infection prevention and control and antibiotic stewardship programs be active and hospitalwide for the surveillance, prevention and control of HAIs and other infectious diseases, and for the optimization of antibiotic use through stewardship.

■ Require that a program demonstrate adherence to nationally recognized infection prevention and control guidelines for reducing the transmission of infections, as well as best practices for improving antibiotic use, and for reducing the development and transmission of HAIs and antibiotic-resistant organisms.

■ Document "surveillance" to include infection detection, data collection, analysis, monitoring and evaluation of preventive interventions, such as through the widely accepted CDC National Healthcare Safety Network.

■ Require identification of infection preventionist with credentials and ongoing education. Require hospital leadership to have input in selecting this individual.

■ Broaden the scope of the hospitals' prevention and control programs.

■ Develop and manage an infection prevention and control program that "reflects the scope and complexity of the hospital services provided."

Antibiotic Stewardship

Antibiotic stewardship programs seek balance in antimicrobial use — maximizing clinical outcomes while minimizing the growth in antibiotic resistance. Simultaneously, stewardship programs can reduce health care costs without adversely affecting quality of care. Striking this balance is critical to the larger population health issue of antibiotic resistant "super bugs."

ASPs align well with the Triple Aim — better health, better care and lower costs. Antibiotic resistance in the U.S. costs an estimated $20 billion a year in excess health care costs, $35 million in other societal costs and more than 8 million additional hospital days.[viii]

The population health repercussions of widespread, untargeted use of antimicrobials is concerning considering the lack of new antibiotic discoveries of any significance in the last 30 years. The World Health Organization now sites antibiotic resistance as a "major threat to public health globally."[ix] Not since the time of the discovery of penicillin has the world seen such broad and effective medications to treat infections. However, even the powerhouse penicillin was not immune to developing resistance issues; within 10 years of penicillin's discovery in 1928, *group A streptococci* and *pneumococci* already had developed modes of resistance.

The magnitude of the problem cannot be overstated. The speed with which new resistant pathogens are emerging and the decline in new antibiotic research and development is ominous. A recent presidential call-to-action,

legislative action and funding to promote optimized use and control of antibiotics in the U.S., are a good sign.

The international call-to-action against antimicrobial resistance includes prevention and management of HAI — since without an infection, no antibiotic is necessary.[x] The CDC's Get Smart Campaign provides consumer-friendly resources that providers can use to engage patients in understanding practice changes related to antibiotic stewardship.[xi]

C. diff infections from overuse of antibiotics — unnecessary prescription, over-prescription or mis-prescription — are a driver of ASP efforts. However, there is a growing list of other multidrug-resistant organisms. New studies are linking reduced use of the antimicrobial classes of fluoroquinolones and cephalosporins, particularly third generation, to lower *C. diff* rates. An observational study from England noted an 80 percent decrease in *C. diff* infections by limited use of these two classes of antibiotics.[xii]

In Missouri, Senate Bill 579 requires hospitals, excluding mental health facilities and ambulatory surgery centers, to have ASPs based on national guidelines in place by August 28. In addition, once regulations concerning Stage 3 of the Medicare and Medicaid Electronic Health Records Incentive Programs, promulgated by CMS that enable the electronic interface for such reporting, are effective, hospitals will be required by law to report to NHSN's antimicrobial use or resistance module. The bill, currently in the rule-writing phase at the Missouri Department of Health and Senior Services, is regarded as the most proactive and advanced state policy in the U.S. Many state and national organizations are monitoring its effect on health outcomes.[xiii]

MHA Sepsis Immersion Project Yields Results

To combat the high costs and the increasing prevalence of sepsis, MHA developed, introduced and led the first cohort of a statewide Sepsis Immersion Project pilot program from October 2015 through October 2016. Participating hospitals focused on early recognition and intervention of sepsis primarily in the ED because a large majority of septic patients present to the ED. The project goal was to decrease the time lapse between sepsis recognition and treatment initiation to decrease morbidity and mortality rates. MHA's sepsis immersion project interventions included the following.

- increase education on early recognition of sepsis within EMS and the ED
- increase performance of early intervention and treatment of sepsis by EMS and ED staff
- plan for implementation of an evidence-based sepsis care pathway bundle
- offer tools/prompts to assist care teams in adhering to sepsis bundles
- determine methods and mechanisms to audit bundle compliance

The pilot project included implementation of evidence-based sepsis treatment bundles from the Society of Critical Care Medicine's Surviving Sepsis Campaign. The 12 hospitals in the pilot achieved promising results, with more than 72 percent of the project tasks being implemented across the cohort. One of the largest barriers was ordering a lactate level within three hours of admission and again within six hours. MHA provided specific education,
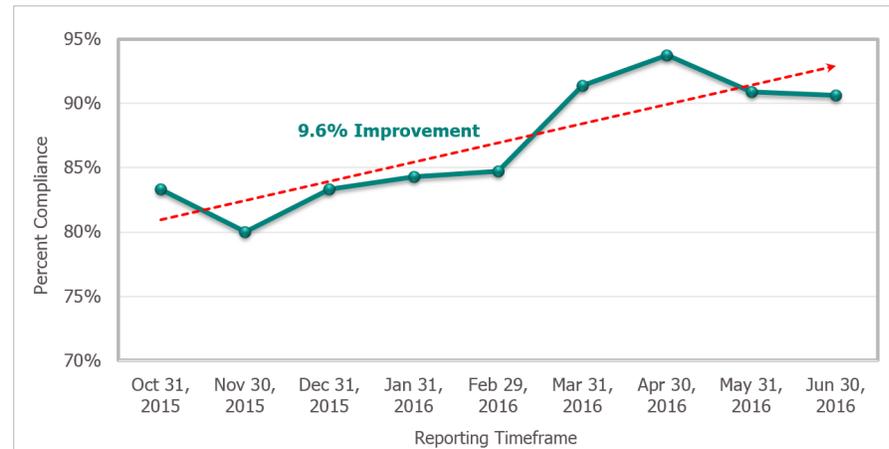
Figure 1: Sepsis Patients Who Received Initial Lactate Level Within Three Hours of Severe Sepsis Presentation
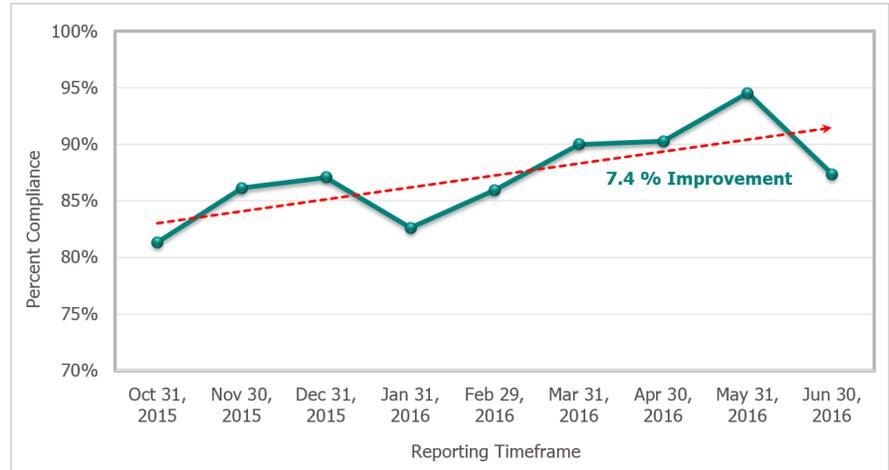
**Figure 2: Sepsis Patients Who Received Repeat Lactate Level Within Six Hours**
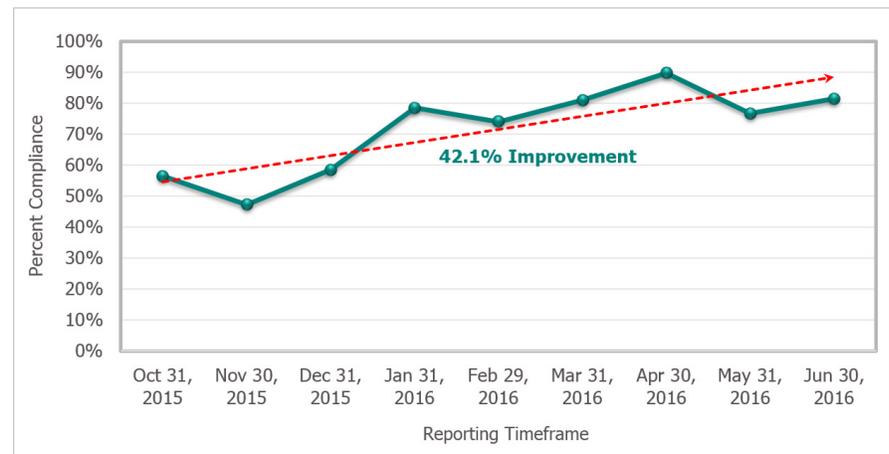
Figure 3: Sepsis Patients Who Received IV Fluids Per Protocol Within Three Hours of Severe Sepsis Presentation

evidence-based literature reviews and subject matter expert engagement to underscore the importance of this bundle component. The results include improvement throughout the cohort (Figures 1 and 2). Rapid intervention based on diagnostics also improved, particularly in administration of IV fluids and intensive monitoring (Figures 3 and 4).

In addition, the 63 Missouri hospitals in the HEN 2.0 reduced their overall sepsis rate by 35 percent between October 2015 and May 2016. This sharp reduction indicates the intense focus on rapid identification and treatment of sepsis to prevent morbidity and mortality.

Figure 4: Sepsis Patients Meeting Criteria With a CVP Monitoring System in Place
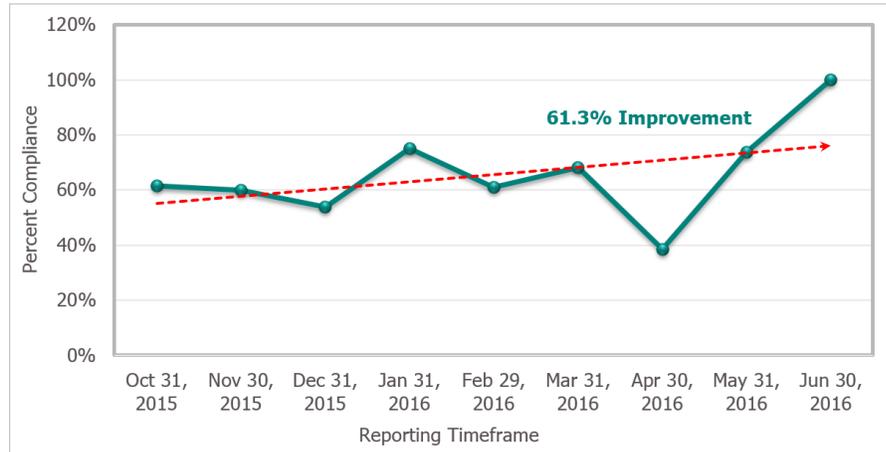
Figures 1-4 Source: Missouri Hospital Association Immersion Pilot Project cohort data by end date, October 2015-June 2016

Delivering Better Care: The Case at Cass

Cass Regional Medical Center is committed to reducing infection. The medical center has had only one hospital-acquired *C. diff* incidence in seven years and a catheter-associated urinary tract infection rate of almost zero. They attribute their success to strict adherence to isolation and hand hygiene practices, avoiding the use of indwelling catheters and quick removal if indicated, and protocols designed to maximize sterile technique and care of invasive lines.
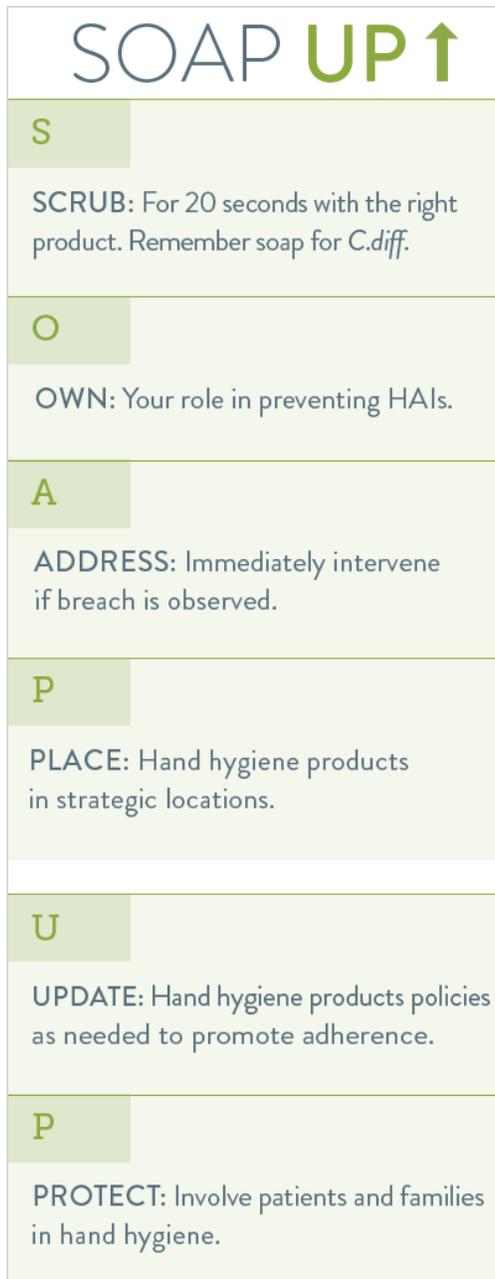
The commitment to infection prevention is strong throughout the organization. The hospital's medical director facilitates conversations on infection prevention and attends regular hospital committee meetings to reinforce evidence-based practices. Environmental services staff support the effort as well through attention to patient care and public areas.

"The single most effective activity which supports our infection control programs and processes is emphasis on hand hygiene, which is regularly monitored and reviewed through monthly reporting," said Twila Buckner, Chief Nursing Officer at Cass Regional. "Having handwashing and hand sanitation options accessible to staff and patients is one way we have set up the environment of care for safe results."

The infection control nurse or their designee reviews culture results daily, allowing for prompt intervention. All staff are regularly instructed on isolation terms and techniques, and the infection control nurse is available for consult at all times.

As a critical access hospital, the majority of patients at Cass Regional Medical Center stay three days or less, decreasing the opportunities for hospital-acquired infections. And, a relationship with local long-term care facilities allows for notification within 48 hours of discharge if a patient develops an infection.

Figure 5: UP Campaign

SOAP UP ↑

S

SCRUB: For 20 seconds with the right product. Remember soap for *C.diff.*

O

OWN: Your role in preventing HAIs.

A

ADDRESS: Immediately intervene if breach is observed.

P

PLACE: Hand hygiene products in strategic locations.

U

UPDATE: Hand hygiene products policies as needed to promote adherence.

P

PROTECT: Involve patients and families in hand hygiene.

Source: HRET HIIN National UP Campaign

The Missouri Hospital Association has taken several approaches to offer structure and guidance for members based on relevant infection prevention changes, including the following.

- Launch of an Antibiotic Stewardship Program Immersion Project in November 2016.

- Participation in the Hospital Improvement and Innovation Network, aligning with, and providing access to, national resources, including the UP Campaign (Figure 5).[xiv]

- Membership to the Vizient™ PSO to potentiate learning and improvement through event analysis and data collection.

- Launch of the STRIVE project cohort in November 2016 focused on reducing four types of HAIs; 14 Missouri hospitals are participating in the project.

- Launch of a redesigned Infection Preventionist Orientation Program in April 2017 with subsequent follow-up support to encourage role retention and sustainability.

- Collaboration with state and national partners to enhance offerings, reduce redundant programming and leverage resources.

- Support and preparation toward anticipated NHSN AUR module reporting, including developing knowledge and resources toward the IT infrastructure and architecture required to facilitate data reporting.

Infection Prevention in Outbreak Management

Risk management is essential to patient and workforce protection. Clinical quality improvement leaders use risk management strategies to improve the delivery of care, manage patients, assess patient and facility vulnerabilities, and reduce HAIs. Simple strategies, such as hand hygiene and individual treatment protocols, including positively pressured rooms for immunocompromised patients, are essential to infection control. Although these activities are considered routine by many infection control professionals, they also are applicable to new and emerging infectious diseases.

In 2014, as the Ebola virus disease spread through Western Africa, the CDC developed protocols for health care providers to screen travelers, monitor patients under investigation and protect the health care workforce with personal protective equipment — items including gloves, face masks/shields, occlusive gowns and respiratory protective devices. To

Infection Prevention Increases Through the UP Campaign

MHA's Hospital Improvement and Innovation Network is promoting the "UP Campaign." The idea takes all clinical topics included in the HIIN and pares them down to a three-part strategy for front-line health care workers to implement for every patient — Get Up, Wake Up and Soap Up. The campaign focuses on efforts to get patients up, ensure they are adequately awake and alert, and perform infection prevention practices. When hospital staff use the UP Campaign steps, they can effectively reduce every harm topic addressed in the HIIN.

protect staff and patients, hospitals immediately implemented entry-point assessment questions and trained staff on PPE to demonstrate competence. Workforce protection best practices were developed, including a sequential, step-by-step list for donning and doffing PPE, monitored by a trained third-party observer. This hands-on approach ensured consistent, strict use and removal of the appropriate PPE, ultimately safeguarding the health care worker and preventing spread of the deadly infection.

While the domestic threat of Ebola has declined, this training protocol has continued throughout organizations and national training providers in an effort to strengthen the nation's capability to treat highly infectious diseases. The West African EVD outbreak highlighted the lack of infection prevention and control expertise and infrastructure across entire health systems in many countries. Further, it underscored the consequence of such vacuums on health facility processes, and patient and health worker outcomes.[xv, xvi]

Lessons learned from the Ebola outbreak can help identify infection control practice gaps and offer opportunities to mitigate and contain other easily spread infections and blood-borne illness. One example is influenza — which encompasses multiple, rapidly evolving and mutating viral strains causing sudden onset illness. Influenza has led to epidemics and pandemics, particularly if the virus is rapidly mutating. The flu also is a good example to highlight the increased risk for identified vulnerable populations. People at higher risk of developing flu complications include:

- children younger than 5, especially those younger than 2

- adults older than 65

- residents of nursing homes and other long-term care facilities

- pregnant women and women up to two weeks postpartum

- people with weakened immune systems

- people who have chronic illnesses, such as asthma, heart disease, kidney disease and diabetes

- obese people who have a body mass index of 40 or higher[xvii]

Encouraging and providing easy access to the flu vaccination for those most vulnerable is one factor that contributes to decreased spread of infection. Novel influenza strains each flu season also pose significant threats to the health care delivery system. Prevention activities, for both patients and health care workers, to include proper hand hygiene, social distancing when symptomatic and vaccinations, are recommended to reduce the spread of influenza. To increase health care worker compliance with vaccinations, many hospitals have implemented policies outlining vaccination requirements for employment. In Missouri, 99 percent of hospitals have a policy that requires all hospital personnel to receive the flu vaccine unless certain criteria are met, with 91.3 percent of all health care personnel receiving the vaccination in the 2015-2016 flu season.[xviii, xix]

Public And Patient Engagement

Infection control is important within hospitals, but it starts in communities. Vulnerable populations may be at increased risk of community-acquired infections and HAIs. Additional research is necessary to determine the scope of influence that social determinants of health

can have on infection mitigation in the community and clinical setting — a relationship that has been demonstrated in hospital readmissions, chronic conditions and health care superutilizer behaviors.[xx, xxi, xxii] Using insight from these studies, a mix of strategic interventions can be identified to address and mitigate risks of infection for vulnerable populations.

- Specified interventions for patients known to be at risk, such as immunization protocols, case management and education that is culturally and literacy-level relevant

- Providing widespread community health education on infection prevention and optimal use of antibiotics

- Addressing sociodemographic and structural determinants of health to reduce disparity

Simple and Effective Strategies to Engage Patients in Infection Prevention

- provide hand sanitizer before meals and snacks

- avoid touching incisions and wounds

- demonstrate adequate handwashing

- talk through what you are doing and how it helps prevent infection

- discuss how they can best prevent infections once home

- teach the importance of nutrition for healing during meal tray passes; consider dietary consult for patients at risk or with known SDS issues.

- Engaging patients and families during health care experiences to understand and demonstrate ways to prevent infection

To achieve health improvements at the population level, the health care system must think beyond the walls of the hospital. Improved communication, collaboration and a widened scope of understanding the challenges patients face in their communities may help patients and providers improve patient outcomes while reducing unnecessary infection and antibiotic use.

Historically, patient engagement on clinical safety has fallen into five general categories: working with patients so that they are better able to manage their treatment regimen safely; getting patients to intervene directly when staff do not follow process, such as handwashing reminders; supporting patients to share information with and ask questions of clinicians — an intimidating or impossible task for some patients; inviting patients to provide feedback on care received; and directly involving patients in systemwide improvement strategies to improve safety.[xxiii, xxiv, xxv] These efforts, in addition to clinician attention to best practices in hand hygiene, correct use of PPE, and equipment cleaning and sterilization, can have a positive impact for patients and providers.

Conclusion

The scope of opportunities for effective infection control is expanding. Hospitals' efforts have shown that evidence-based approaches can reduce the incidence. However, the advent of antibiotic-resistant super bugs will require a redoubling of effort and new approaches to care and prevention.

Infection prevention influences all aspects of the Triple Aim of better health, better care and lower cost. New knowledge, changes in clinical practice and regulation, and patient and community engagement, can help reduce the incidence and harm caused by infection.

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