MCR-1 “SUPERBUG” Found In US For First Time

A Chinese team first described the MCR-1 gene last November, after finding it in pigs, pork, and humans. Since then scientists in several countries have found the gene, sometimes alongside other resistance genes, after examining their sample collections. The gene can be transferred to other organisms, compounding the concern. Bacteria carrying the very worrisome MCR-1 resistance gene—which makes the last-line antibiotic colistin useless against them, have been found in human and animal samples for the first time in the United States.

In May 2016, a clinical sample from a urinary tract infection was collected from a 49 year old women in a military treatment facility in Pennsylvania was found to have contained *Escherichia coli* harboring the MCR-1 gene and an *E coli* isolate from a pig intestine that also contained the colistin-resistance gene. Susceptibility testing revealed the pathogen to be extended-spectrum beta-lactamase (ESBL)—producing *E coli*, which are typically resistant to several common antibiotics like penicillin and cephalosporins. Real-time polymerase chain reaction revealed the presence of the MCR-1 gene, signifying extreme drug resistance. In total, the bacterium contained 15 antibiotic-resistance genes on two plasmids (small DNA strands), one of them a novel IncF plasmid. Colistin is one of the last efficacious antibiotics for the treatment of highly resistant bacteria. The emergence of a transferable gene that confers resistance to this vital antibiotic is extremely disturbing," said lead author Patrick McGann, PhD, of WRAIR, in a Walter Reed news release. "The discovery of this gene in the U.S. is equally concerning, and continued surveillance to identify reservoirs of this gene within the military healthcare community and beyond is critical to prevent its spread. Continued surveillance to determine the true frequency for this gene in the USA is critical," he added.

The USDA used a modified technique for detecting MCR-1, "employing a targeted and extremely sensitive method to examine whole bacterial populations found in intestinal samples from food-producing animals," according to the post. So far the swine intestine sample was the only 1 of 949 samples screened that tested positive for MCR-1. In addition, U.S. Department of Health & Human Services (HHS), Centers for Disease Control and Prevention (CDC) and the Food and Drug Administration have used whole-genome sequencing to search for MCR-1 in *Salmonella*, *E coli* and *Klebsiella* isolates obtained from people and retail meats. As of April, more than 44,000 *Salmonella* and 9,000 *E coli* and *Shigella* isolates have tested negative for MCR-1, HHS noted. "Although the findings suggest that mcr-1 mediated colistin resistance might be rare, HHS and USDA remind consumers that cooking all meat, poultry and fish to its proper internal temperature kills bacteria, viruses and other foodborne pathogens, whether or not they are antibiotic-resistant," HHS states.

Source: Center for Infectious Disease Research and Policy (CIDRAP) - Academic Health Center, University of Minnesota, Minneapolis, MN; U.S. Department of Health & Human Services (HHS).

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New App Helps Doctors Minimize Patients' Resistance To Antibiotics

In response to the concern around over-prescribing medication, Spectrum MD is an app designed to help doctors optimize patient outcomes while minimizing antimicrobial resistance. The app concept was created by two medical residents, Dr. Elizabeth Parfitt and Dr. Paul Campsall, who worked with a software development group and collaborated with a multidisciplinary team from the University of Calgary and Alberta Health Services (AHS). Designed with the busy physician in mind, the app is quick and easy for doctors to use. Health-care professionals input select patient information directly into the app and receive treatment recommendations specific to that patient. In addition, because guidelines and microbial prevalence differs among cities and provinces, the app can be customized to include stats for specific locations to incorporate local sensitivity patterns. Currently, customizable microbial profiles are available for hospitals throughout Calgary and the Providence Health Care group of hospitals in Vancouver.

“Information has been available to prescribing physicians on the Internet but Spectrum MD is trying to put clinical practice guidelines and complex decision support in the doctor’s pocket. As busy physicians, time is limited to access information — the more efficient we can make that access, the better said, Dr. Dan Zuege, app collaborator and clinical professor in the departments of critical care medicine and medicine.

World Health Organization shows interest in app
To date, the app is being used in all of Calgary’s adult hospitals and will be available soon in pediatrics. A utilization study is currently being completed in the adult critical care units. In addition, the World Health Organization has shown interest in potentially adapting the app to benefit member state countries where resources are limited. The free app is currently only available for iPhones, and is available through the AppStore.

Source: U Today, June 2016

ANA And APIC Tackle Infection Control with New Website

American Nurses Association (ANA) and Association for Professionals in Infection Control and Epidemiology (APIC) launched the ANA/APIC Resource Center, a website that aims to close the information gaps among health care professionals in emergency preparedness. The site consolidates resources, allowing health care professionals quick and ready access to infection prevention strategies and evidence-based practices. Gaps in training, education and information-sharing are barriers in effectively decreasing health care-associated infections, which according to the Centers for Disease Control and Prevention (CDC), claim up to 75,000 lives annually. Check out the Resource Center at, http://www.nursingworld.org/ANA-APIC

ANA - American Nursing Association is the premier organization representing the interests of the nation’s 3.6 million registered nurses. ANA advances the nursing profession by fostering a high standard of nursing practice, promoting a safe and ethical work environment, bolstering the health and wellness of nurses, and advocating on health care issues that affect nurses and the public.

APIC - Association for Preventionist in Infection Control and Epidemiology is the leading professional association for Infection Preventionist (IP) with more than 15,000 members. APIC’s mission is to create a safer world through the prevention of infection, achieved by better care to promote better health at a lower cost.

Source: Nursing World, June 2016
Diagnosis Problems Blamed for 30-fold Overuse of MRSA Drugs

Current clinical guidelines for identifying methicillin-resistant *Staphylococcus aureus* (MRSA) at hospital admission are resulting in 30 times more patients with pneumonia being treated with anti-MRSA drugs than theoretically necessary because clinicians have no better options than empiric anti-MRSA therapy for many patients with community acquired pneumonia (CAP).

The multicenter, prospective surveillance study led by Wesley H. Self, MD, MPH, associate professor of emergency medicine, Vanderbilt University Medical Center, Nashville, Tennessee, showed a MRSA prevalence of 0.7% in adults hospitalized for CAP but treatment of 29.8%, nearly one third of patients with CAP, with the anti-MRSA antibiotics vancomycin or linezolid. Dr. Self continues. “Although the identification of risk factors and development of clinical prediction models for MRSA CAP have generated great interest recently, our results suggest it is unlikely that a clinical prediction model could be developed that accurately identifies MRSA CAP at hospital admission due to the nonspecificity of common MRSA features (influenza coinfection, multilobar infiltrates) and uncommon occurrence of more specific features (massive hemoptysis, cavitary pneumonia).” This has resulted in widespread overuse of anti-MRSA therapy because clinicians have no quick and reliable way to differentiate between non-MRSA CAP and potentially fatal MRSA. Rapid test for *S aureus* is needed to reduce overuse of anti-MRSA Drugs.

The study population of 2259 patients underwent at least one diagnostic test for both bacteria and viruses. The analysis showed that 1.6% of patients had CAP caused by *S aureus*, including 0.7% with MRSA and 1.0% with methicillin-susceptible *S aureus* (MSSA). The researchers examined prevalence of MRSA CAP by age group (18-49, 50-64, 65-79, and ≥80 years) and it was less than 1% in each age group.

Dr. Self conclude, "While MRSA CAP patients generally had high severity of illness, clinical and epidemiologic characteristics overlapped substantially with non-S. aureus CAP, particularly pneumococcal CAP, making it difficult to distinguish between etiologic types of pneumonia clinically. Low prevalence of MRSA combined with a lack of highly distinctive clinical features make accurate targeting of empirical anti-MRSA antibiotics very difficult. Development of diagnostic tests capable of rapidly and accurately identifying *S. aureus* could greatly improve the current approach to CAP management and reduce overuse of anti-MRSA antibiotics."

Source: Janis C. Kelly - Medscape Medical News, June 2016

Visual Triggers Increase Hand Hygiene Compliance

The infection control team at Henry Ford Health System in Detroit, Michigan, used images of bacterial growth to provoke feelings of disgust and motivate hospital staff to comply with hand hygiene guidelines. The team developed a book of images containing bacterial cultures of differing types and levels of contamination. They tested the images on hospital units that had low hand hygiene compliance rates. The team visited those units 10 times in a period of two months, sampled workers’ hands for bacteria, and then showed pictures of cultures similar to the contamination on their hands. Compliance increased between 11 and 46 percentage points in units that were non-compliant. By connecting the images of microbial contamination with the contamination on their own skin, hospital staff wanted to wash their hands after looking at the book’s pictures. Using examples changed behavior and improve hand hygiene compliance rates. According to Center for Disease Control and Prevention, more than 700,000 healthcare-associated infections occur in U.S. acute care hospital every year. Hand-hygiene helps reduce the spread of infection. Despite the evidence, Healthcare Professionals practice hand hygiene less than half of the time.

Source: APIC Daily Newspaper of the APIC 2016 Annual Conference
Antibiotics: Reserve for Patients With Clinical Signs of STD

Many patients who present to the emergency department with a suspected sexually transmitted disease (STD) are treated with antibiotics, even though their cultures are ultimately negative for bacterial infection. Such unnecessary treatment with antibiotics is not only associated with unnecessary cost and complications from antibiotic use but may also contribute to antibiotic resistance. Karen Jones, MPH, BSN, RN, from St. John Hospital & Medical Center, Detroit, Michigan described clinical predictors of STDs and suggested clinicians focus on those predictors to avoid unnecessary antibiotic prescribing in patients without true disease.

She reviewed data from 1103 patients who presented to the emergency department and had genital cultures. Of these patients, 39.9% (n = 440) received treatment for *Neisseria gonorrhea* (GC) and *Chlamydia trachomatis* (CT), and 60.1% (n = 663) were untreated. Cultures revealed, however, that only 13.6% (n = 150) of all patients were positive for GC and/or CT. Of the 440 patients who received antibiotics, 76.6% (n = 337) did not test positive for GC or CT. Conversely, 7.1% of patients not treated with antibiotics tested positive for GC and/or CT. Jones then reviewed the patient charts to determine whether any clinical signs were associated with a positive diagnosis of GC and/or CT. In the case of female patients, cervicitis and cervical motion tenderness were associated with positive GC/CT (25.0% and 27.3%, respectively; \( P < .001 \)). For male patients, penile discharge and urethritis were associated with positive GC/CT (60.3% and 57.5%, respectively; \( P < .001 \)).

Laura Buford, RN, BSN, CIC, from Lakeway Regional Medical Center in Texas, who is a former emergency department nurse, complimented the study and weighed in on the complexity of the problem. She explained to Medscape Medical News that Hospital Consumer Assessment of Healthcare Providers and Systems survey scores contribute to the pressure on clinicians to prescribe antibiotics to satisfy patients and maintain high scores. "The patient satisfaction part of it is huge," she emphasized, adding, "Definitely governmental influence is part of the problem." If patients pressure physicians for antibiotics, then patients are part of the problem as well. "It definitely comes down to patient education," explained Buford. She added that APIC has made an effort to educate patients so that they understand that antibiotics do not fix everything. The APIC infographic also introduces patients to the concept of antibiotic resistance and its risks for sicker patients, as well as relatively healthy patients.

Source: Medscape Infectious Diseases - Lara C. Pullen, PhD, June 2016
CDC and CMS Recognize The Need To Assess Infection Prevention Efforts Spanning Hospitals and Nursing Homes

As the role of nursing homes grows, so too does the need for infection prevention in post-acute healthcare. Over 3 million Americans receive care in U.S. nursing homes each year, according to the Centers for Medicare & Medicaid Services (CMS). The agency estimates that:

- Between 1 to 3 million serious infections occur every year in these facilities.
- Common infections include urinary tract, diarrheal diseases, antibiotic-resistant staphylococcal infections and other multi-drug-resistant organisms.
- Infections are a major cause of hospitalization and death; as many as 380,000 people die from infections in nursing homes each year.

These facts – and the recent U.S. experience with Ebola – have highlighted the importance of infection prevention programs in protecting both healthcare personnel and patients, notes CMS. “Translating lessons learned from the Ebola outbreak, including the importance of core infection prevention practices, to every setting where individuals receive healthcare is a significant opportunity to increase the safety of U.S. healthcare facilities,” it states. With funding from the Centers for Disease Control and Prevention (CDC), CMS has begun a three-year pilot project to meet identified joint priorities related to assessing the continuum of infection prevention efforts between hospitals and nursing homes, in order to prevent transmission of infections in both settings.

CMS plans to use a national contractor to perform educational pilot surveys designed to assess the continuum of infection prevention efforts spanning hospitals and nursing homes. While no citations will be issued, if an immediate Jeopardy deficiency is noted, a referral to the CMS Regional Office will be made, according to the agency.

“The surveys will provide nursing homes and hospitals with guidance on improving infection prevention within their catchment area,” CMS states. “Starting in fiscal year 2016, a pilot nursing home surveyor infection control worksheet (ICWS) and pilot survey process, in collaboration with CDC, will better assess compliance with long-term care facility infection control requirements that CMS published in 2015 in a Notice of Proposed Rule-Making. To the extent that such requirements are published in final form, we believe that these educational surveys will help the nursing homes become more prepared and help CMS and the CDC develop training materials for both nursing homes and surveyors.” In 2017, CMS anticipates the educational surveys will be conducted in both hospitals and nursing homes.

Once the survey findings have been determined, a team of infection prevention professionals will use that to develop an action plan for improvement, as well as organize on-site technical assistance. When necessary, there will be follow-up visits for technical assistance, and the long-term impact may be measured using CDC’s National Healthcare Safety Network data, says CMS, adding that its long-term goal is “improved surveyor infection control tools and survey processes to optimize infection control.”

CMS expects to communicate regularly with the CDC and state survey agencies throughout the three-year pilot. The ten pilot surveys will be conducted in fiscal year 2016 in nursing homes, followed by surveys in both nursing homes and hospitals in FY 2017 and 2018. The project outcomes include “new surveyor infection control tools and survey processes that can be used to optimize assessment of new infection control regulations,” the agency states. “Through this effort, issues related to the spread of HAIs between facilities in a local community will also be addressed,” the CMS states. “After the survey findings are determined, a team of infection control professionals will use those survey findings to develop an action plan for improvement and to organize on-site technical assistance.”
10 Elements to Consider When Conducting an Infection Risk Assessment

Often when developing an infection risk assessment, healthcare leaders understand what the outcomes should be but have no idea where to begin. Before setting any goals or objectives, leaders must create a structure from which to work. An infection risk assessment considers potential hazards and prioritizes them to better guide goal-setting and strategy development. While the subpar practices may seem obvious pitfalls to avoid, IPC protocol is not always adequately enforced. That is why the Accreditation Association for Ambulatory Health Care (AAAHC) recently added a requirement for written risk assessments documenting how facilities are prioritizing patient safety. The new standard underscores why healthcare organizations must have an infection risk assessment in writing that can be updated annually. A formal risk assessment:

- Provides a basis for infection surveillance, prevention and control activities
- Identifies at-risk populations/procedures in your facility
- Assists in focusing surveillance efforts toward targeted goals
- Aids in meeting regulatory and other requirements

There is a plethora of factors that may impact IPC success. An infection risk assessment must consider a variety of elements before establishing IPC protocol, goals and objectives. Here’s what to look for:

1. **Geography/Topography/Weather** - Natural disasters can disrupt IPC efforts by creating emergency situations. When resources are limited and personnel is stretched thin, healthcare facilities may find higher rates of infection than under normal circumstances, and should therefore plan accordingly.

2. **Population** - When assessing for risk, be sure to take into account the demographics of patients, their socioeconomic situation, their age and other factors that directly or indirectly impact health.

3. **Communications** - One element often overlooked when developing IPC protocol is a facility’s communication strategy – which applies to both internal and external efforts. Leaders should evaluate how messages are communicated within a facility, among staff, or between entities in a health system. Within the community, a healthcare facility should have a comprehensive plan for how to work with third parties such as emergency management teams, health departments, medical societies, professional groups and emergency medical services.

4. **Employees** - Gauge how employees are managed and provide services to patients. Managers should develop strict hand hygiene requirements and monitor for compliance, as well as assess how well sharps injuries protocol is being followed to avoid unnecessary risks. Proactively work to keep their staff healthy by developing a sick policy that keeps employees away from patients when they have certain illnesses. This policy should include expectations for proper immunizations, as well as a TB control program.

5. **Environment** - Healthcare facilities must look at the working environment to ensure there is adequate space and resources to clean, disinfect and sterilize all instruments, scopes and furnishings.

6. **Cleaning, Disinfection, Sterilization** - Health leaders should evaluate if these practices are following AAMI, AORN and CDC guidelines. Facilities can develop procedures to monitor the use of all disposables, sterilizers and high-level disinfectants, as well as steps to take for a failed sterilizer or HLD test. In addition, a schedule and log should be created for preventive maintenance on all equipment to ensure maximum efficiency.

7. **Risks for Infections** - There are a handful of major risks for infection any healthcare facility should be mitigating: • Surgical and other device-related infections • Diarrheal diseases (e.g. C. difficile) • Post-procedure pneumonia • Respiratory diseases (flu, colds) • Significant organisms (MRSA, VRE, ESBLs, CRE). Many of these risks may remain prevalent in your facility without you realizing.

8. **Procedures** - What types of procedures are being performed at your facility? Risks can vary greatly by type of procedure, and the safety of the patient can be affected differently after each service provided. Mitigating these unique risks goes beyond establishing protocol during the actual procedure. Employees should consider the behaviors and environmental factors affecting the health of the patient population in the community. Understanding the background of each patient is as vital as informing them of the risks to avoid and healthy behaviors to follow to remain safe post-procedure.

9. **Emergency Management** - When planning for an emergency, anticipate a variety of scenarios that could occur both internally or externally. Then determine what staff training, supplies and equipment must be prepared to sustain operations when disaster strikes. Infection Prevention can be adversely affected if there is no water, ventilation is compromised or there is physical damage to the facility.

10. **Education and Competency Evaluation** - There should be annual or biannual training opportunities and competency testing for all employees and licensed independent practitioners to ensure the facility is functioning at top performance. Each staff member must demonstrate his or her ability to perform assigned duties routinely as well as whenever tasks, procedures or products change. Patients should also be educated on infection risks and best practices to reduce threats.
How Do You Assess The Risks?
Documenting all your facility’s infection control risks will help you set priorities and goals based on relative risk. Rate each risk of the 10 risks on the following criteria using a severity scale of 0-3:

- WHO is at risk for infection or adverse event?
- What LEVEL of risk is present?
- What is the IMPACT on care, treatment or services?
- How PREPARED for this is the organization?

Add up the scores and create a list of priorities placing risks with the highest number at the top and work your way down.

Now that you know your menacing risks, develop goals and measurable objectives to combat those threats and improve IPC success. A goal is a broad statement indicating the change you want to make. Goals are not measurable as they stand, but rather identify an overarching issue. For example, goals may include:

- Improving hand hygiene
- Initiating disaster preparedness kits
- Reducing the risk of surgical site infections

A measurable objective specifies quantifiable results over a specific period of time. It defines the who, what, when, where and how of your strategy. The measurable objectives that fall under the umbrella of each goal can then become part of one or more staff management objectives for the following year.

For example, a measurable objective may call for IV antibiotics to be administered within one hour of incision with a 95 percent threshold. The objective will be incorporated into the performance goals of affected employees, and will be monitored for progress and compliance by checking patient charts. You should evaluate how each goal and measurable objective not only addresses an infection risk but also promotes change in operations. Many healthcare organizations will use goal setting as a vehicle for employee bonuses. Bonuses are not awarded unless both personal and facility goals and objectives are met each year. Because each goal and objective will impact a variety of departments and employees, it is essential to conduct an infection risk assessment and identify goals in a collaborative manner. Each department will require different solutions and strategies to combat their unique risks and challenges. Therefore, input should be collected from all levels and teams to ensure nothing is overlooked and increase the chances of success.

The AAAHC has created an IPC program designed to help facilities build risk assessment goals and objectives together. Like-minded organizations come together at a preconference to Achieving Accreditation to share ideas and results to extract insights and best practices for future risk assessment exercises. Participants have developed a network of collaborative facilities across the country that provides information-sharing opportunities and a myriad of valuable IPC resources. The lessons learned from each risk assessment effort can help your facility, as well as facilities nationwide, improve their processes for the next assessment and strengthen their overall outcomes. When facilities work together and share what they learn, the industry as a whole benefits and we can remain focused on the ultimate goal: patient safety.

Source: ICT Infection Control Today, Marcia Patrick, MSN, RN, CIC is a Tacoma, Washington based consultant and surveyor for AAAHC
Isolating Asymptomatic \textit{C diff} Carriers May Reduce Incidence

In a Canadian study that produced stunning results against arguably the greatest infection threat to patient safety, researchers showed that detecting and isolating asymptomatic carriers of \textit{Clostridium difficile} prevented more than 60\% of subsequent infections in hospital patients. \textit{C difficile} infects approximately 450,000 people and plays a role in the death of about 29,000 individuals each year, as reported by Medscape Medical News. In addition, \textit{C difficile} rates rose by 4\% during 2013 and 2014, according to the Centers for Disease Control and Prevention. Current infection control recommendations focus on patients with symptomatic infections. However, asymptomatic carriers likely also play a role in spreading disease because they can contaminate the environment and caregivers’ hands.

To assess the effect of isolating asymptomatic carriers, the hospital screened patients at admission between November 2013 and March 2015 for the \textit{tcdB} gene through a rectal swab. The \textit{tcdB} gene is associated with carriers of heavier organism loads who are more likely to contaminate the skin or environment, write Alice Y. Guh, MD, MPH, and L. Clifford McDonald, MD, from the Division of Healthcare Quality Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia. Among the 7599 patients screened, 368 (4.8\%) were identified as \textit{C difficile} carriers.

The hospital placed identified carriers under infection controls similar to those for people with symptomatic \textit{C difficile} infections, but intended to have minimal effects on bed management. For example, health workers were not required to wear isolation gowns, and patients could share rooms with noncarriers, with the privacy curtains drawn. During the intervention, the incidence rate of \textit{C difficile} infections decreased by more than half, to 3.0 per 10,000 patient days compared with 6.9 per 10,000 patient days before the intervention, a statistically significant change. Acknowledging there is no commercial test approved by the governments of Canada or the United States to detect asymptomatic carriers, and they could not mask patients, caregivers, and investigators to the intervention.

"The results of this study are promising for reducing [\textit{C difficile} infections]," write Dr Guh and Dr McDonald in the editorial. They note however, that excluding patients admitted directly to wards might have allowed some asymptomatic carriers to go undetected. They also wondered whether any infections were transmitted from asymptomatic carriers to roommates.

Moreover, medical facilities might encounter obstacles in trying to isolate asymptomatic carriers, and only limited data are available to support what kind of testing would be most accurate. In addition, screening patients can be labor-intensive, and isolating asymptomatic carriers can cause anxiety and depression.

Source: Medscape, 2016; \textit{JAMA Intern Med}, Published online April 25, 2016
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