

Antibiotic Stewardship
The Smoldering Outbreak of the “Nightmare Bacteria”
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Being an Infection Preventionist for over a decade I have worked in various facilities controlling outbreaks including Norovirus, Group A Strep, Flu, Legionella and Scabies. These outbreaks created an immediate sense of alarm to gain control over the situation. Both administrative and front line staff strove to eradicate the pathogen whether it was caused by a virus, bacteria, or an insect. All employees understood the problem and diligently worked together to eradicate it. For example, just mention that there is a scabies outbreak in your hospital or nursing home and watch how many of your co-workers start scratching and adhere to proper Standard and Transmission Based Precautions. No one ever has to be reminded to wear PPE.

The common denominator in these types of outbreaks – a sense of urgency. Outbreaks not only happen in a single facility but can impact large geographical areas – the entire USA, or the world as a whole. Examples of recent National and International outbreaks were the 2009 H1N1 influenza pandemic, West Africa Ebola, and the recent Zika crisis. In all of these circumstances forces were mobilized, resources invested, and repeated media attention was focused to raise awareness and control the outbreaks.

But this article is about Antimicrobial Resistance. Antimicrobial Resistance represents years of inappropriate and unnecessary prescribing patterns that have culminated in our patients being colonized with multi-drug resistant bacteria. Without minimizing the dangers of MRSA or VRE, Carbapenem-Resistant Enterobacteria (CRE) are much more dangerous. Carbapenems are our “end of the line” antibiotics for some of our most common bacteria responsible for sepsis such as *E. coli*, *Pseudomonas*, and *Klebsiella*. *E. coli* is the most common bacteria we see in our culture results. The reason why we now have this incredibly concerning situation is because we did not heed the lessons of MRSA and VRE: we failed to stop abusing antibiotics and failed to implement antibiotic stewardship.

Carbapenem Resistant Pathogens can swap genetic material between different strains of bacteria. One of these genes is the Mobilized Colistin Resistance (*mcr-1*) gene. According to the CDC, “Plasmids carrying resistant *mcr* genes can make other bacteria become resistant to colistin, including the

“nightmare bacteria” carbapenem-resistant Enterobacter (CRE).” (1) This gene has been reported to be spreading around the world. In essence the gene has the capacity to avoid the effects of colistin, an antibiotic of ultimate last resort, and share its ability with other strains of bacteria. These bacteria have the capability of passing genetic resistance by a mechanism known as “bacterial conjugation” which is the transfer of genetic material between different species of bacteria; (e.g. between Enterobacter and Klebsiella). Klebsiella resistance to carbapenems is sometimes due to a gene called KPC. This gene has now been shared with other Gram negative bacteria as well, which spreads carbapenem resistance. KPC bacteria have become resistant to almost, and in some cases, all antibiotics. Attempting to further explain the specific microbiological dynamics of CRE / KPC development would complicate and elongate this article. So, let me just repeat; Carbapenem Resistant Klebsiella are bacteria that have become resistant to almost, and in some cases, all antibiotics.

If that doesn’t scare you, it should! Why? Because empirical data from various infection preventionists shows that there is a growing prevalence of CRE Klebsiella pneumonia in Southern Nevada.

Although there are occasional media stories about these “Nightmare Bacteria” (2) the articles are few and far between and, unfortunately, we do not yet have the resolve to address antimicrobial resistance. The lackadaisical attitude that we, as nurses, have about the smoldering outbreak of CRE and KPC is more than concerning, it is frightening. The danger when an outbreak slowly festers is that we may have an awareness that something is happening, that something is wrong, but the true dimensions of the problem remains hidden until the smolder bursts into flames.

Many nurses, doctors, CNA, and other direct care staff have an apathetic attitude about CRE / KPC and often break transmission based contact precaution protocols . . . Why? One reason may be that they believe they are “special” and falsely think they are immune to catching or transmitting the pathogen. Another, there are no immediate consequences related to the breach of precautions. What if the transgressor broke out with skin rashes and itching a few weeks after contact? – Guaranteed

those entering the room would be putting PPE on as if they were going into a hazmat zone.

If the CRE / KPC “smoldering outbreak” that we are experiencing was a scabies outbreak everyone caring for the person diagnosed with scabies would use proper precautions. A scabies outbreak would not be allowed to spread from one facility to another and it would be quickly controlled. But there is a difference between scabies, norovirus, or any other type of outbreak. The CRE / KPC outbreak that is creeping into our hospitals, nursing homes and our community already has numerous facilities that are infested and there is a reservoir of diagnosed and undiagnosed carriers of these pathogens. It is up to you to promote appropriate antibiotic use, take personal responsibility, and prevent cross-

contamination by ensuring that you adhere to all Standard and Transmission Based Precautions.

It is up to you to ensure that all of your fellow co-workers whether they are a physician, lab tech, respiratory therapist, or CNA - complies - and if they don't call them out and stop them from endangering your patients, you, and others.

Protect your patients, protect yourself, protect your co-workers and help stop this ever expanding outbreak of Nightmare Bacteria before it is too late.

Norman Wright is the Infection Preventionist at Kindred Sahara LTAC Hospital in Las Vegas and an active member of the Nevada Antimicrobial Stewardship Program.

1) <https://www.cdc.gov/drugresistance/trackingmcr1.html>

2) <https://www.reviewjournal.com/life/health/drug-resistant-nightmare-bacteria-pose-increasing-threat/>

Other Resources

<https://www.cdc.gov/hai/pdfs/cre/CREguidance-508.pdf>

<https://www.cdc.gov/vitalsigns/containingunusual-resistance/index.html>

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3075864/>

<https://www.ahrq.gov/professionals/qualitypatient-safety/patient-safety-resources/resources/cretoolkit/cretoolkit1.html#1-1>

<http://aac.asm.org/content/59/3/1656.long>