The MRSA Panic: More Work To Be Done By Science Education?

I. Germs: They Can Be Good For You!

In its 12 November 2007 issue, Newsweek (pg 24) posted a note in “Letters” titled “Can Germs Be Good for You?” It was written by physician Brad Piatt, M.D., Moraga, California and addressed the overly protective but well-meaning parents of kids relative to the MRSA wars. It noted how parents were demanding schools to provide sterile playgrounds, antibiotic wipe use and more in order to eradicate the existence of MRSA. The more important piece of this letter was the statement that early childhood exposure to germs, in fact, can provide immunity. The attempt to eliminate natural flora from skin and gut, serves to only foster the development of allergies and autoimmune disease.

Where has science education failed? How can so many well-meaning parents be so misinformed about creating the sterile bubble for their children? How can they be so devoid of knowledge about the role of bacteria and other microbes in the ecosystem? Hopefully, basic biology and life science in primary and secondary schools certainly should have addressed the MRSA-type of issues and the need for exposure to good bacteria. Maybe these parents never got a chance to read H.G. Wells – War of the Worlds?

Bottom-line is – Yes – many germs or flora are not only good but also necessary for us. What is really interesting is these same well-meaning parents promote probiotics like Kefir and yogurt for their children’s health. How do you figure?

II. The History of MRSA

Methicillin-resistant Staphylococcus aureus (MRSA) is a major cause of hospital-acquired infections. These infections have now stepped outside of the hospital environment into the community in places like daycare centers and schools. Current MRSA clones are becoming increasingly difficult to treat because of emerging resistance to all current classes of antibiotics.

The history of MRSA is rather brief dates back to approximately 1959 when Methicillin was first introduced to treat infections caused by penicillin-resistant Staphylococcus aureus. As early as 1961, the United Kingdom reported S. aureus isolates had acquired resistance to methicillin. Known as MRSA, the bacteria were soon discovered in other European countries, Japan, Australia, and the United States.

The methicillin clones not only are immune to methicillin but also more common antibiotics such as amoxicillin, oxacillin and penicillin. Patients with weakened immune systems were the original targets of MRSA in hospitals and healthcare facilities. More recently, MRSA infections acquired by persons having a medical procedure outpatient or people with skin infections from pimples, boils or even scratches by cat claws are known as CA-MRSA infections or community-associated MRSA.

Normally, staph bacteria (including MRSA) are located on the skin or in the nose of about one-third of the population. People with skin bacteria of this type are identified as “colonized.” They are however not infected with MRSA but are carriers who can pass it on to another person.

III. Who Is At Risk and What Are The Symptoms?

There are several main risk factors for community-associated MRSA, especially relative to school aged children. These risk factors include:

1. Primary School Children – Children tend to be susceptible to infection because their immune systems are not fully developed or they have not had the necessary exposure to bacteria.
2. School Contact Sports – School activities such as contact sports expose students to the bacteria via cuts and abrasions from skin-to-skin contact.

3. Sharing Of Athletic Equipment – Students tend to share equipment such as uniforms and don’t use appropriate hygiene in keeping them clean.

4. Weakened Immune System – With confidentiality laws, teachers often do not know if their students are immune compromised; e.g., AIDS, Hepatitis, etc. People with weakened immune systems are likely to have difficulty fighting off MRSA-type infections.

5. Working in Unsanitary Conditions – Gym classes and sports activities today do not require appropriate hygiene practices such as clean uniforms, showers, etc. These kinds of unsanitary conditions can lead to a MRSA playground!

Science teachers, like all teachers, come in contact with many students, including the possible one-third who are colonizers and also those with active infections. The following symptoms would be a signal to the teacher for a medical consult with the school health care provider:

1. Small red bumps looking like boils, pimples or spider bites in an open skin scratch or cut.
2. The red bumps over a short period of time become deep, painful abscesses with the formation of pus.

The bacteria can burrow deep into the body, causing life-threatening infections in other organs.

IV. Advice on Prevention In School

The Centers for Disease Control and Prevention (CDC) recommend the following advice for prevention strategies:

Practice good hygiene:

1. Keep hands clean by washing thoroughly with soap and water or using an alcohol-based hand sanitizer. This is especially applicable prior to and after eating.
2. Keep cuts and scrapes clean and covered with a bandage until healed.
3. Avoid contact with other people’s wounds or bandages.
4. Avoid sharing personal items such as towels or razors.

If you or a student has MRSA, the following protocols are advised by the CDC

You can prevent spreading staph or MRSA skin infections to others by following these steps:

1. **Cover your wound.** Keep wounds that are draining or have pus covered with clean, dry bandages. Follow your healthcare provider’s instructions on proper care of the wound. Pus from infected wounds can contain staph and MRSA, so keeping the infection covered will help prevent the spread to others. Bandages or tape can be discarded with the regular trash.

2. **Clean your hands.** You and others in close contact should wash their hands frequently with soap and warm water or use an alcohol-based hand sanitizer, especially after changing the bandage or touching the infected wound.

3. **Do not share personal items.** Avoid sharing personal items such as towels, washcloths, razors, clothing, or uniforms that may have had contact with the infected wound or bandage. Wash sheets, towels, and clothes that become soiled with water and laundry detergent. Drying clothes in a hot dryer, rather than air-drying, also helps kill bacteria in clothes.

4. **Talk to your doctor.** Tell any healthcare providers who treat you that you have or had a staph or MRSA skin infection. Teachers need to be proactive and police their classroom. If students are found with exposed open wounds or pustules, they should be sent to the school’s health care provider for attention.

V. Are MRSA Type Infections Treatable?

First of all, more people died of MRSA in 2005 than AIDS according to statistics. Is it dangerous – absolutely! However, according to medical records and research, most of those victims were immune compromised with a disorder such as AIDS. The point is, average students in the classroom are not at high risk.
The other news is that most MRSA infections can still be treated successfully with antibiotics. Like all antibiotic usage, the full dose should be taken and good hygiene practiced! Treatment may involve draining of the abscess or boil by a healthcare provider.

VI. Science Lessons to Be Learned!

The causes contributing to bacteria mutations, clones and survival via antibiotic resistance unfortunately are the result of human activity! The leading three causes include:

1. Unnecessary use and overuse of antibiotics - Years of excessive and unnecessary antibiotic use such as prescriptions for colds, flu and viral infections.
2. Use of Antibiotic in Food and Water – For many years, the food industry has used antibiotics for cattle, chickens and pigs in the United States. These antibiotics ultimately find their way into municipal water supply systems via groundwater runoff. Interestingly enough, routine feeding of antibiotics to animals has been banned in the European Union and other countries.
3. Germ Mutation – With the use of antibiotics, some bacteria survive the dose and become resistant. They learn to resist additional antibiotics very quickly, due to a high mutation rate.

VII. Final Word

MRSA is serious but can easily be addressed simply using the old standby – wash hands with soap and water. Equally important for the science teacher is getting the correct word out in the public arena. Most bacteria are not harmful and, in fact, are beneficial or even essential. The overkill syndrome is only doing two things –

1. Helping to foster drug resistant bacteria cloning.
2. Making drug manufacturers and the home cleaning product industry richer!

Be part of the solution and work with students and parents by fostering good science.

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