

## Staph Infections Associated With Artificial Turf?

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As high school and college athletes prepare for a new football season, sports trainers and coaches are concerned about outbreaks of an antibiotic-resistant staph bacterium that some people have associated with synthetic turf fields. But a study by researchers in Penn State's College of Agricultural Sciences should help put those concerns to rest.

Conducted by the university's Center for Turfgrass Science, the study found no trace of *Staphylococcus aureus* bacterium in any of the 20 infilled synthetic turf fields tested in various locations in Pennsylvania.

"These infilled systems are not a hospitable environment for microbial activity," says study author Andy McNitt, associate professor of soil science. "They tend to be dry and exposed to outdoor temperatures, which fluctuate rapidly. Plus, the infill media itself (ground-up tires) contains zinc and sulfur, both of which are known to inhibit microbial growth. Considering the temperature range for growth of *S. aureus* is 7-48 degrees Celsius, we didn't expect to find this bacterium in fields exposed to sunlight, since the temperatures on these fields far exceed 48 degrees frequently."



*Staphylococcus aureus* is a common bacterium that often lives harmlessly on the skin or in the nose. When introduced into the body through a cut or medical incision, it can cause anything from minor skin lesions to life-threatening bloodstream infections, pneumonia or organ damage. A strain of the bacterium, MRSA (methicillin-resistant *staphylococcus aureus*), has developed resistance to the antibiotic -- synthetic penicillin -- typically used to treat it and is becoming a major concern for sports teams with synthetic turf fields. The strain has also become one of the most common causes of skin infections requiring emergency room treatment nationally.

"Currently, there are between 700 and 800 of these fields being installed annually in the country, and there's been quite a scare about turf and MRSA," McNitt says. "Some pro football players came down with it, and a Pennsylvania high school team has had 13 players sickened by it over the last two years. So this is an important finding."

McNitt says the center's study didn't differentiate between MRSA and the nonresistant strain

because "they are the same bacterium. It's just that some of the bacteria have developed resistance to antibiotics. We didn't differentiate, as we didn't find any staph -- resistant or otherwise -- in the synthetic turf."

The Penn State study also found low overall microbial populations in the synthetic turf systems. "The microbe population of natural turfgrass far exceeds anything we've found in the infill systems," McNitt says. "In fact, a number of the infill systems had zero living microbes in the sample at the time of testing."

Even though temperatures of indoor fields would not be expected to fluctuate nearly as much as outdoor fields, he says, the microbe population of the indoor fields tended to be lower than outdoor fields. "That was unexpected," he says. "We really expected to see higher microbe populations indoors and purposely tested the fields during periods of high use and humidity. While we are unsure as to why the indoor fields had lower microbe counts, it could be due to the almost complete lack of moisture."

The researchers did find *S. aureus* on other surfaces (blocking pads, weight equipment, stretching tables and used towels), as well as on the hands of five randomly tested passersby. The bottom line, McNitt says, is that while everyone should be concerned about the spread of bacteria and the cleanliness of equipment and other surfaces that players contact, infilled synthetic turf systems do not appear to be a breeding ground for microbes generally.

"Some other studies indicate that a player playing on synthetic turf may acquire more skin abrasions due to the abrasiveness of the surface," McNitt says. "Thus, they have more entry points for the staph, but they're not getting it from the field -- they're picking it up in the locker room or somewhere else. One study shows that players who shave their ankles prior to taping up, for instance, also have a greater incidence of staph because the shaving creates little nicks for infection to enter."

McNitt will present a keynote address on the study at The International Horticulture Society Conference on Turfgrass Science and Management for Sport Fields in Beijing, China, in June 2007. A preliminary report can be found at [PSU](#)