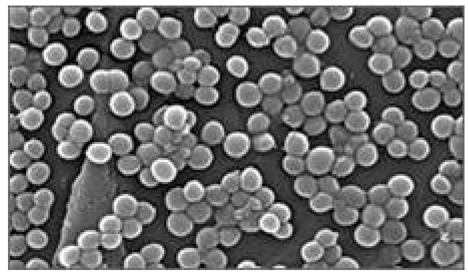
Upon further review, the data collected from 20 synthetic fields by Penn State University actually demonstrates the existence of bacteria, fungi and other microorganisms in synthetic turf systems. These findings fall in line with the two decades of medical research conducted by renowned sources like the New England Journal of Medicine, Clinical Infectious Disease Center and the Journal of Clinical Microbiology that confirm the presence of bacteria on inanimate objects including the bacteria - MRSA

On August 29th Penn State University published a study authored by A. McNitt, an associate professor of soil science entitled "A Survey of Microbial Populations in Infilled Synthetic Turf Systems." According to the press release, the *"study debunks the staph scare in synthetic turf"* and *"infill systems are not a hospitable environment for microbial activity."* **In reality, the study data only supports that bacteria are alive and well in synthetic turf systems.**

Upon review of the study data by a Ph.D in biochemistry and an award winning microbiologist/ antimicrobial expert, it is clear that despite the PR claims, this study confirms the existence of a wide array of microbial life including bacteria and fungi on the substrates of the tested synthetic turf systems.



The New England Journal of Medicine, Clinical Infectious Disease Center, and a long list of clinical hospital studies have long supported the fact that the MRSA bacteria can survive on and be transferred by inanimate objects in the environment from towels, to garments, athletic equipment and polyethylene (a plastic used in synthetic turf fibers). The Journal of Clinical Microbiology in 2000, studied MRSA's ability to survive on a variety of substrates ranging from cotton to polyethylene plastic and found that in clinical study, ***"Staphylococcal viability was longest on… polyethylene plastic (22 to >90 days)."***

The data in the Penn State study captures further evidence that bacteria exist in even the smallest samples of infill material and synthetic fibers of infilled synthetic turf systems. The following addresses the sample size and findings from the study.

Minimal Sampling Size – Large Bacteria Count
A typical 80,000 sq. ft. football field has between 280,000 lbs (rubber) and 800,000 lbs (sand/rubber) of infill material and over 33 billion synthetic grass fibers. In the Materials & Methods section of the Penn State study it cites that 20 fields were evaluated with two 1-inch fibers of synthetic grass and .075 grams of infill material from each.

The study attempts to draw conclusions about which type of bacteria do or do not exist based on a sample of 0.00000000058% of the infill on the field and 2 of 33 billion fibers. This is hardly representative. In fact, **a 1% infill sample would have required the analysis of 3,628,720 grams (8,000 lbs) of sand/crumb rubber per field and 330,000,000 fibers per field, not 2.**

With a sample so insignificant, to declare that MRSA cannot grow on these fields is an improbable conclusion. This method would be the equivalent of determining that *no sharks live in the ocean* because you looked underwater once and saw fish… but no sharks.

The Actual Findings
In the Penn State survey, the author established an objective to "determine the microbial population of several infilled synthetic turf systems" and his findings support the healthy existence of microbial activity in synthetic turf systems and sports surfaces.

1. Of the 40 samples taken, the average bacterial count was 14,580 Colony Forming Units (CFU) per .075 grams of infill. (Penn State - Table 1)

1. *"Microbial colonies isolated from field samples generally included both fungi and bacteria. Some fields had predominantly one organism type while other fields contained a wide variety of organisms."* (Penn State -Results, p. 2)
2. Reviewing the results in Table 1, the highest bacterial count was on a sand/rubber infill field - 80,000 CFUs (19L).

2. **He also found that the greater the field use, the greater the microbial activity.**

1. *"One factor that may influence total microbial populations of infill surfaces is use. Of the 11 fields with at least one sub-sample having greater than 1x104 CFU/g crumb rubber, one of those fields had been heavily used within 7 days of sampling and two fields had been used within 24 hours of sampling."* (Penn State -Discussion, p. 1)
2. The study was conducted June 15– June 30 of 2006 when school was out of session and football season was months away. One can imagine how the bacterial CFU count would change in peak season and peak use times.

3. Microbial colonies including staph were found on sports surfaces

1. *"Including a mixture of fungi and bacteria…S. aureus was identified from several samples including towels, blocking pads, weight equipment, and the stretching table."* (Penn State - Results, p.3)
2. The study lacks specificity of what substrates composed the equipment tested, however weight equipment, blocking pads and stretching tables often contain plastic and rubber surfaces- no different than the substrates that compose synthetic turf fields. If staph can survive on plastic equipment, why can't it be one of the bacteria on turf?

The Theory of "Natural Antimicrobials"
In the press release the author suggests that turf is naturally antimicrobial. There is significant evidence to the contrary, in some case the evidence is in the study itself.

1. The zinc and sulfur leached from the crumb rubber are not sufficient antimicrobials

    a. In Table 1 of the study it shows two all rubber infilled fields with bacteria CFUs greater than 30,000 per gram of infill (1L, 4L). Whatever the antimicrobial property of zinc and sulfur, it is certainly not sufficient antimicrobial protection for one gram of all rubber infill let alone 280,000 lbs in a field.

2. The study asserts that the *"surface temperatures of infill surfaces outdoors often exceed the temperature range of S. aureus"* implying that temperature is an antimicrobial strategy. (Penn State – Results, p. 1)
    a. This logic implies that on hot sunny days (field temp greater than 112° F) the field is protected, but in the evenings, mornings or seasons of fall/winter/spring when the field may not exceed 112° F, the MRSA is free to populate.
    b. The field temperatures of an indoor field would have no reason to exceed 112° F thereby rendering indoor facilities unprotected year round, according to McNitt's hypothesis.
    C. In the study, "Survival of Salmonella typhirmurium and Staphylococcus aureus in eggs cooked by different methods" it was found that *"it took 12 minutes of boiling to destroy Staph aureus" (Poultry Science, July 1983)*

3. Finally, there is the implication that weather outdoors will wash the bacteria away.
    A. This too is contrary to expert opinions. According to Clare Edelmayer, the infection control coordinator at Doylestown Hospital. *"Bacteria can remain on a synthetic surface for as long as three hours — about the average length of a football game —Rain wouldn't be enough to get rid of the bacteria either, only if, Edelmayer said,* ***'it rained with disinfectant.'"*** (Philly Burbs, 4/30/06

Real Antimicrobial Protection
Synthetic turf playing fields have many advantages over the natural grass they often replace. Though there are no effective natural disinfecting strategies of sun, rain or rubber, there are proven, long-lasting ways to control the growth of bacteria, mold, fungi and algae on a field 24/7. With the proper antimicrobial protection in place, players, communities and teams can have the ultimate playing surface with peace-of-mind.

Award winning antimicrobial expert, William C. H. White provided a critique on the scientific methodology used in the Penn State Study.