Sifting facts from fiction when it comes to the risks of playing football on synthetic turf.

By Mike Austin

The NBC News report came out in October 2014. More than five minutes of air time was dedicated to the idea that crumb-rubber infill, the kind used in today's synthetic turf fields being installed across the country at colleges and high schools, could be causing cancer in athletes.

The connection being made between the rubber infill and cancer is from Amy Griffith, the associate head coach of women's soccer at the University of Washington. Two of her goalkeepers were diagnosed with non-Hodgkin's lymphoma, and after that coincidence, she found 38 more soccer players around the country with similar diagnoses.

The NBC News report shows many pictures of these athletes, now clearly battling the disease and fighting for their health. It's heartbreaking to see the images and get a glimpse of how they are suffering.

But, at the same time, the news report doesn't and cannot make any scientific connection between the crumb rubber and the cancer diagnoses. A direct quote from the reporter in the piece says, "A list is not scientific proof. There is no research directly linking crumb-rubber exposure to cancer."

In fact, there have been many independent, scientific studies showing *the opposite* — there is no link between crumb-rubber exposure and cancer, and that the surface is safe for athletes with no risk.

Once an idea – especially one such as young athletes suffering from cancer – is floated by the national media, it spreads. Now, football coaches are being peppered with questions from parents, and city and school administrators about this topic.

In addition to on-field Xs and Os and off-field issues, now coaches are expected to be scientists when it comes to the surface upon which the team is playing. It's an impossible position, especially when considering the emotional pull of the topic.

Add in rumors persisting that synthetic fields contribute more to players' lower-body injuries, and that it's not safe due to heat concerns during summer practices (both untrue), and dispelling turf myths has become a part of many coaches' daily interactions.

Your best bet is to deal in scientific research and what has been shown through years of study from federal and state governments, as well as independent third parties, when it comes to all three topics.

Myth: *Crumb-Rubber Exposure Can Lead To Cancer*

Fact: *No Research Study Supports This Claim*

The Synthetic Turf Council (STF), the group tasked with having "the industry's voice" and one that works to educate, advocate, market and recruit members to further the synthetic-turf cause, has more than 50 technical studies and reports on hand pertaining to toxicities from inhalation, ingestion and dermal contact, as well as cancer. Every scientific study has come to the same conclusion: there is no elevated health risk to athletes playing on surfaces using crumb rubber infill.

"We have 51 studies done in the last 20 years validating that there is no human health risk from crumb rubber infill," says Rick Doyle, STF president. "This is a very emotional issue but the allegations simply are not based on science. We've dedicated a great deal of resources to this topic and have shown there is no connection."

One of the most compelling reports on this topic comes from the State of Connecticut Department of Health, which in January 2015, released a statement summarizing its findings from a 2010-11 study of five artificial turf fields in the state.

The study was a joint project with the Connecticut Department of Energy and the University of Connecticut

Health Center. It also was peer-reviewed by the Connecticut Academy of Science and Engineering.

"Our study did not find a large amount of vapor or particle release from the fields confirming prior reports from Europe and the U.S. We put these exposures into a public health context by performing a risk assessment. Our risk assessment did not find elevated cancer risk," the report reads.

The report continues: "Our risk assessment did cover carcinogens that are known to be in recycled tires and the crumb rubber to cushion fields. Once again, we found there to be very little exposure of any substances, carcinogenic or not, in the vapors and dust that these fields generate under active use, summer conditions. The fact that we sampled five fields (four outdoor and one indoor) of different ages and compositions suggests that the results can be generalized to other fields, a conclusion supported by the fact that results were similar to what was found in California, USEPA and European studies."

Beyond recent government studies, Lower Canada College (LLC), a private school (K-12) in Montreal, Quebec, released its independent-lab-test findings in November 2014.

School officials say they investigated the safety of synthetic turf with crumb rubber infill when first considering this type of field. But, "in the wake of recent unfounded media speculation regarding the safety of this material and the concerns raised by parents as a result of that speculation, we decided to fund our own laboratory analysis using a toxicology test that simulates the ingestion of the crumb rubber, and benchmarks the results against tough European standards for heavy metals in toys.

"The report clearly shows that the results were negligible compared to the standards," reported Christopher Shannon, headmaster at LLC.

The turf companies also have been active in proving their product is safe for athletes of all ages.

Act Global, an international turf company based out of Austin, Texas, recently worked with third-party organic chemist Dr. R. William Tilford and three independent testing laboratories in New York, France and Texas on more research, which concluded there to be no chemicals present at levels of concern.

Dr. Tilford's paper analyzed the four carcinogens mentioned by the NBC News report (arsenic, benzene, cadmium and nickel) as well as 83 substances including trace metals, volatile organic compounds and semi-volatiles/PAHs.

The findings read: "Analysis concludes that no substances were measured at a higher concentration than what may be found in background typical air, soil and surrounding environments, and many substances were completely undetected. Standardized, modern and objective test protocols were utilized per U.S. Environmental Protection Agency (EPA) and European Union toy safety standards."

Darren Gill of FieldTurf, one of the major players in the turf industry, says while the news reports may seem alarming, the research conducted during the last two decades already has answered this new line of questioning.

"Volumes of research and testing from academics, federal and state governments like New York, California, Massachusetts and Connecticut, and school systems have examined everything called into question about synthetic turf. The conclusions suggest synthetic turf poses no health risks," Gill says. "We have encouraged the rigorous work from third parties that has taken place over decades to confirm there are no significant negative health effects connected to synthetic turf. Synthetic turf is, and has always been, safe."

Myth: *Turf Fields Lead To More Lower-Body Injuries*

Fact: *No Differences In Injury Rate Have Been Found Between Turf And Grass*

A common misconception is that as a turf field ages, and years of use from a variety of athletes take its toll on them, athletes are more susceptible to knee and ankle injuries versus if they were playing on grass.

Dr. Michael Meyers, PhD, FACSM, who is an associate professor in the Department of Sport Science and Physical Education at Idaho State University (Pocatello, Idaho), as well as an adjunct faculty member at Montana State University (Bozeman, Mont.), has been studying this topic for more than a decade.

In 2010, he released his findings of a research study that evaluated 24 universities over three competitive seasons for injury incidence, type of injury, environmental factors, and more.

In total, 465 collegiate games were evaluated for game-related football injuries on FieldTurf or natural grass during these three seasons. With 230 of 465 games played on FieldTurf, 1,050 injuries were documented. With 235 games played on grass, 1,203 injuries were documented.

The report also concluded that, "Multivariate analyses also indicated significantly less trauma on FieldTurf when comparing injury time loss, injury situation, grade of injury, injuries under various field conditions and temperature. No significant differences in head, knee or shoulder trauma were observed between the playing surfaces."

Meyers also warns that general studies grouping all "turf" together should be taken with a grain of salt. He says he's read studies showing turf in an unfavorable light, but those studies are placing all brands, all surfaces and all padding together.

"You can't group together Yugos and Mercedes and make an assumption about turf," Meyers says. "Grass tends to be more uniform, but depending on the type of turf and who produces it, it can vary widely."

As further evidence of there being no difference in injuries when comparing turf to grass, John Baize of ActGlobal and Doyle of the Synthetic Turf Council pointed to detailed findings from FIFA released in a 2006 published report.

An independent group hired by FIFA compared the injury risk for elite soccer players competing on artificial turf and natural grass. The study utilized 290 players from 10 elite European clubs that had installed third-generation artificial surfaces in 2003-04, and 202 players from the Swedish Premier League acting as a control group.

The study found that there was no difference in overall incidence or severity of injuries during training and match play between grass and artificial turf surfaces. There was a slight uptick in the incidence of ankle sprains on turf vs. grass, but the report notes, "this result should be interpreted with caution as the number of ankle sprains was low."

Doyle added that the grass fields monitored were "well maintained" and "not a typical grass field" most players would utilize.

Baize adds that turf companies have ways to test their surfaces and compare them to the best grass fields.

"We now have methods to test synthetic turf surfaces and benchmark the performance against the top natural grass stadiums. The natural grass benchmarks can include parameters (primarily developed by FIFA) for low-impact force reduction, vertical deformation (foot

stability), rotational resistance (traction), slip resistance and deceleration," Baize remarks. "These tests impact the lower extremities such as ankles, knees and Achilles tendons.

"FIFA has gathered volumes of data and demonstrates that when a synthetic turf surface is built and tested according to these natural grass benchmarks, the injury data, especially for lower extremities, are the same."

Myth: *Turf Fields Potentially Lead To Greater Episodes Of Heat Exhaustion During Pre-Season Practices*

Fact: *Turf Does Run Slightly Hotter In Direct Sunlight And At The Surface, But As You Move Closer To A Player's Torso, The Difference Is Negligible*

Milone & MacBroom, an engineering, landscape architecture and environmental science firm based in Connecticut, performed an independent study of three recently installed synthetic fields in 2007-08.

The findings of the study showed air temperature at a distance of 2 feet above the synthetic turf surface ranged from 1-5 degrees greater than the observed ambient air temperature in comparison to natural grass, which had a range of 3 degrees lower to 1 degree greater than the ambient air temperature.

At 5 feet above the surface, the air-temperature differences between the two surfaces became even more minuscule. Five feet above the surface also is closer to a player's chest and head, rather than at 2 feet.

Also, it was noted turf fields cooled rapidly when sunlight was interrupted or blocked by clouds. The report also noted that, "significant cooling was also noted if water was applied to the synthetic fibers in quantities as low as 1 ounce per square foot."

In Meyers' study, "Incidence, Mechanisms, and Severity of Game-Related College Football Injuries on FieldTurf versus Natural Grass — A Three-Year Prospective Study," double the amount of heat-related illnesses occurred on natural grass compared with FieldTurf.

What it comes down to is how coaches manage players in the heat, rather than the surface upon which they are playing. Synthetic-field installs also are occurring in conjunction with larger projects, meaning typically stadium lights are part of the construction. So, coaches would have the option of practicing out of the direct sunlight of the day.

"When it's sunny and hot, you have to manage play on that surface just like if you are playing on grass and it's raining," adds Doyle.

Doyle adds that the STC website (SyntheticTurfCouncil.org) provides recommendations for managing players in the heat, which are based off the NCAA and National Athletic Trainers Association guidelines. He also recommends covering synthetic turf sideline areas when it's sunny, have players stand in the shade when possible and install misting stations near the sidelines.

Participating in any sport can be a dangerous endeavor at times, but the research shows that doing so on synthetic turf fields does not increase the level of danger.