THROUGH ITS PLAY SMART. PLAY SAFE. INITIATIVE, THE NATIONAL FOOTBALL LEAGUE IS WORKING TO DRIVE PROGRESS IN THE PREVENTION, DIAGNOSIS AND TREATMENT OF INJURIES, ENHANCE MEDICAL PROTOCOLS AND FURTHER IMPROVE THE WAY THE GAME IS TAUGHT AND PLAYED BY ALL WHO LOVE IT.

PROTECTING PLAYERS
The NFL is committed to continuing to work with the NFL Players Association, NFL Physicians Society and Professional Football Athletic Trainers Society, as well as the numerous experts on the NFL's medical committees, to identify and recommend changes on and off the field to help protect the health and safety of every player.

» Leveraging Data: The NFL’s Injury Surveillance System has been designed and is administered by QuintilesIMS, a third-party company providing epidemiological analysis of NFL injury data. The data and QuintilesIMS’ epidemiological analysis is reviewed by the league and NFL Players Association and made available to independent medical experts, clubs, players, coaches and the NFL Competition Committee to guide them in making changes to the rules of the game and how practices are conducted.

» Rules on the Field: Since 2002, the league has made 42 rules changes intended to eliminate dangerous tactics and reduce the risk of injuries, especially to the head and neck. To highlight just a few:
  - In 2009, the NFL prohibited a defender from using his helmet, forearm or shoulder to make contact with the head or neck area of a “defenseless” receiver.
  - In 2010, the NFL expanded that rule to protect all “defenseless players” from contact to the head by an opponent’s helmet, forearm or shoulder. The rule was expanded again in 2012 to include certain defensive players.
  - In 2011, the NFL moved the restraining line for the kicking team from the 30- to the 35-yard line to reduce the risk of injury on kickoffs. Further, in 2016, the NFL moved the spot of the next snap after a touchback resulting from a kickoff from the 20- to the 25-yard line.
  - In 2013, the league prohibited a runner or tackler from initiating contact against an opponent with the top or crown of the helmet.
  - In 2016, the NFL expanded the horse collar rule to include when a defender grabs the jersey at the name plate or above and pulls a runner toward the ground.

» The Team Behind the Team: On average, there are 29 healthcare providers at a stadium on game day to give immediate care to players. In conjunction with the NFLPA, the league has added unaffiliated medical personnel and adopted new technology to assist in the identification and review of injuries, with a specific focus on concussions.
  - Unaffiliated Neurotrauma Consultant (UNC): The NFL Head, Neck and Spine Committee and the NFL Players Association have selected and credentialed neurotrauma consultants, who are unaffiliated with either team, to staff the sidelines of every NFL game and to assist the team physicians with identifying and diagnosing concussions.
- **Visiting Team Medical Liaisons (VTML):** When traveling across state lines, every visiting team is required to retain a local board-certified and locally licensed emergency physician, who is typically affiliated with the trauma center nearest the NFL stadium. The VTML works with the visiting team to provide medical care for its players while they are traveling.

- **Booth ATC Spotters and the Medical Timeout:** For all preseason, regular season and postseason games, two certified athletic trainers—retained by the league and unaffiliated with any NFL teams—are stationed in a booth overseeing the field to observe the game and monitor the broadcast feed to identify potential player injuries, with an emphasis on concussions and other head and neck injuries. In what was the first rule of its kind in professional sports, the Booth ATC Spotter has the authority to stop the game by calling a medical timeout to permit the medical evaluation of a player who the Spotter believes may have suffered a concussion or head injury, yet appears likely to remain in the game without an evaluation from the team's medical staff. This medical timeout does not count against either team. Game officials also have the authority to send a player off the field for medical evaluation.

  » **Video Monitors:** Medical staff from each team and the UNCs have access to sideline video monitors. As a result, medical staff can review the mechanism of an injury as part of their examination of the player on the sideline to focus their examination and guide their diagnosis. The sideline video and communications equipment permits both teams’ medical staffs to communicate with the Booth ATC Spotters.

  » **Electronic Medical Records:** Every club’s medical staff has instant access to their players’ complete medical records via the Electronic Medical Record (EMR) system. Players can access their records at any time via a secure online portal, which remains active after the player retires. The EMR system has greatly enhanced the NFL’s Injury Surveillance System, allowing the league to make data-based changes in rules and permissible techniques used in play in an effort to make the game safer.

  » **Electronic Tablets:** The NFL requires clubs to use electronic tablets with specially designed applications for injury diagnosis. The X2 Biosystems’ Integrated Concussion Evaluation (ICE) app, which includes a step-by-step checklist for assessing players suspected of head injury, as well as all players’ concussion baseline tests and historical data, is now an established component of in-game concussion diagnosis and care.

  » **Emergency Action Plans:** Every club is required to design an Emergency Action Plan to follow in instances of severe trauma. These plans are reviewed by the NFL and NFLPA and must be approved by third-party experts prior to the start of each season. This plan, which the club is required to practice prior to the start of the season, also requires the home team to designate a Level One Trauma Center and to retain two certified crews of paramedics and advanced life support ambulances.

  » **Concussion Protocol:** The NFL and NFLPA, in conjunction with their medical advisory committees, implemented the NFL Game Day Concussion Protocol in 2011 to guide the diagnosis and management of concussions. The parties consistently review the Concussion Protocol and make necessary changes to ensure players receive care that reflects the most up-to-date medical consensus. In July 2016, the NFL and NFLPA announced a new policy to enforce the Concussion Protocol by which they investigate possible incidents and determine appropriate discipline, including club fines and possible forfeiture of draft picks, should a member of its medical staff or other employee fail to follow the Protocol.

  » **Return-to-Participation Protocol:** The NFL and NFLPA have established a five-step process that every NFL player diagnosed with a concussion must follow before being cleared to fully practice or participate in an NFL game. This process, developed from internationally accepted guidelines, ensures that every player in the NFL receives consistent treatment. After a player has progressed through the five-step process, and is cleared for full participation by his club physician, he must be seen and separately cleared by an Independent Neurological Consultant (INC), jointly approved by the NFL and NFLPA, who is not affiliated with any NFL club. Until cleared by this independent physician, a player may not return to contact practice or play in an NFL game.

  » **Health and Safety Education:** The NFL and NFLPA, with their medical advisors and committees, developed a standard preseason health and safety presentation that is shown by every team to every player at the start of training camp. The presentation was developed by subject matter experts and includes information on exertional heat stroke, concussion diagnosis and management, mental health, infection control, substance abuse and performance-enhancing substances.
» **Protective Equipment and Field Surface Safety:**

- The NFL and NFLPA assembled a team of engineers, biomechanical experts and material scientists to test football helmet performance in a laboratory environment. Performance testing was conducted in 2015 and again in 2016, and the results were shared with players, athletic trainers and equipment managers to help players make informed decisions about the helmets they choose. Posters summarizing the results are in all club locker rooms.

- The NFL requires players to wear thigh and knee pads during games to better protect them from leg injuries. As with helmets and shoulder pads, players not wearing the mandatory protective equipment are not permitted onto the playing field and may be fined.

- The Musculoskeletal Committee, which analyzes biomechanical research and injury data, works with shoemakers and engineers to test turf shoes worn by NFL players to ensure they are appropriate for NFL surfaces. The committee shares the results of its tests and identifies those shoes that perform poorly on the test by publishing a poster that hangs in all 32 NFL club locker rooms.

- In 2016, the NFL and NFLPA established the Field Surface Safety & Performance Committee to perform research and advise on injury prevention, improve testing methods and adopt tools and techniques to evaluate field surface performance and playability. It also oversees the NFL stadium inspection program, which includes testing of NFL playing surfaces by engineers retained by the NFL, under observation by NFLPA experts.

» **Limits on Practices:** The 2011 collective bargaining agreement between the NFL and the NFLPA eliminated two a day practices in training camp and contact practices were significantly reduced. The CBA limits NFL teams to only 14 days of full-contact football practice during the 17-week season.

**ADVANCED TECHNOLOGY**

The NFL is committed to championing new developments in engineering, biomechanics, advanced sensors and material science that mitigate forces and better protect against injuries in contact sports and recreational sports and for the military. In order to advance this effort, the league is collaborating with the NFLPA and bringing in the world’s foremost biomechanical engineers and material scientists as advisors.

» **The Engineering Roadmap:** The NFL allocated $60 million from the *Play Smart. Play Safe.* initiative toward the Engineering Roadmap, a dedicated and comprehensive plan to create incentives for helmet companies, manufacturers, small businesses, entrepreneurs, universities and others from around the world to develop new and improved helmets and protective equipment over the next three to five years.

» **HeadHealthTECH Symposium:** In November 2016, the NFL and Football Research, Inc. (FRI) hosted a first-of-its-kind educational conference in which world-class biomechanical and biomedical engineering experts educated hundreds of innovators—from inventors to equipment manufacturers to engineering students—on the latest knowledge regarding the causes of concussion in professional football, including the best tools available for assessing and optimizing the design and manufacture of protective equipment. As part of the Engineering Roadmap, the NFL and/or FRI will host periodic symposia or other educational efforts to allow experts to share the most up-to-date biomechanical and biomedical information.

» **HeadHealthTECH Challenges:** The NFL and FRI created the HeadHealthTECH Challenges, a series of innovation challenges intended to deepen understanding of and advance solutions in the areas of head protection, materials science and head kinematics, among others. The TECH Challenges are structured to stimulate research and innovation, as well as encourage connections with mentors and/or venture capitalists, with a goal of spurring developments in engineering, biomechanics, advanced sensors and material science. The TECH Challenges are operated and managed by Duke University’s Clinical and Translational Science Institute.

» **Head Health Initiative:** In 2013, GE and the NFL teamed up to launch the Head Health Initiative, a four-year, $60 million collaboration to accelerate diagnosis and improve treatment for traumatic brain injury. The initiative includes the following:

- A four-year, $40 million research and development program to develop next-generation brain imaging technologies that take a whole-brain approach to improving the diagnosis and treatment of patients with mild traumatic brain injury. The initiative has fostered the development of several novel technologies.
An open innovation challenge fund to invest up to $20 million in grants to scientists, academics, experts and entrepreneurs worldwide across three innovation challenges aimed at spurring advancements to better understand, diagnose and protect against traumatic brain injury. Under Armour and the National Institute of Standards and Technology (NIST) are also supporting this effort.

More than 1,000 applicants submitted ideas through the challenge's three parts, resulting in innovations in equipment and technology:

- New diagnostic tools—such as blood tests, biomarkers and MRI technologies—to aid in the detection of traumatic brain injury
- Helmet and turf technologies designed to absorb impact
- Rate-dependent tethers that attach to a player’s helmet and torso designed to provide high-force resistance during collisions
- Advanced materials to better absorb or mitigate force from helmets, pads and other sports and consumer products

**1st and Future:** In February 2017, the NFL teamed up with Texas Medical Center (TMC) to host the second annual Super Bowl start-up pitch competition. The 2017 competition highlighted innovations to advance sports technology and athlete safety in three categories: communicating with the athlete, training the athlete and materials to protect the athlete.

**MEDICAL RESEARCH**

The NFL is committed to investing in and collaborating with preeminent experts and institutions to advance progress in the prevention, diagnosis and treatment of head injuries.

**A New Commitment:** More than $40 million in funding has been allotted in the Play Smart. Play Safe initiative for medical research over the next five years, primarily dedicated to neuroscience. The NFL has assembled a Scientific Advisory Board comprising leading independent experts, doctors, scientists and clinicians to develop and lead a clear process to identify and support compelling proposals for scientific research.

**Foundation for the National Institutes of Health (FNIH):** In September 2012, the NFL announced a $30 million unrestricted grant to the Foundation for the National Institutes of Health to advance medical research on brain injuries, especially among athletes and veterans. This marked the single-largest donation to any organization in the league’s history. The initial round of awards (totaling approximately $14 million) included:

- $12 million for pathology studies through the Sports and Health Research Program (SHRP): two $6 million cooperative agreements dedicated to defining the long-term changes that occur in the brain after a head injury or multiple concussions.
  - The Boston University School of Medicine and U.S. Department of Veterans Affairs received $6 million for a study on CTE and post-traumatic neurodegeneration.
  - Mount Sinai Hospital and the University of Washington received $6 million for a study the neuropathology of CTE and Delayed Effects of TBI.
- The grant also funded six pilot projects totaling more than $2 million, to provide support for the early stages of sports-related concussion projects.

**Concussion Symposium at University of Pittsburgh Medical Center (UPMC):** In October 2015, UPMC held a first-of-its-kind two-day symposium, funded by a grant from the NFL Foundation, that brought together leading concussion clinicians and researchers from around the country to propose guidelines for treating concussions and consider areas for further research. As a result of their discussions, the experts published a Statement of Agreement in the journal Neurosurgery designed to propose and share nationally the participants’ agreement on the best practices, protocols and active therapies for treating concussions.
» **International Professional Sports Concussion Research Think Tank**: The league hosted its second international think tank on concussions in October 2015, convening representatives of the world’s major sports leagues and concussion experts to share best practices and protocols and collaborate on ways to advance progress, such as a new study on the potential long-term effects of concussions in sports. The think tank events resulted in several new projects:

- The NFL partnered with the Canadian Football League (CFL) to study the King-Devick test, which measures a player’s eye movements, as a method for diagnosing concussion with professional and college football players.
- Researchers from the Medical College of Wisconsin and the University of North Carolina announced a new study that will explore whether players with concussions benefit from rest or a more active approach to rehabilitation.
- The NFL announced a partnership with the International Concussion and Head Injury Research Foundation (ICHIRF) to fund research into the potential long-term effects and risk factors associated with concussion in high-impact sports, including horse racing.

**SHARING PROGRESS**
The NFL is committed to sharing what it is learning across all levels of football—and to other sports and society at-large.

» **Heads Up Football**: In April 2013, USA Football—with support from the NFL—launched the Heads Up Football program. This educational outreach program, supported by a $45 million grant from the NFL Foundation, strives to improve player safety for youth and high school players by training and certifying coaches on safety fundamentals; teaching proper tackling techniques; appointing Player Safety Coaches for every youth league to enforce safety protocols; ensuring proper equipment fitting; and teaching coaches, parents and players how to recognize and respond to injuries, including concussions. In February 2015, USA Football released new youth tackle football practice guidelines, which have been endorsed by leading medical organizations. These include clear definitions of contact and time limits on full player-to-player contact.

» **Increasing Access to Athletic Trainers**: Nearly two thirds of high schools lack a full-time athletic trainer (AT) and almost 30 percent of high schools do not have any athletic trainer at all. In 2014, the NFL Foundation established a matching grant program designed to help NFL teams increase access to ATs in their communities. To date, 22 NFL clubs have used this grant to support local schools and leagues. In October 2016, the NFL Foundation, in collaboration with Gatorade, the National Athletic Trainers’ Association (NATA), the Korey Stringer Institute (KSI) and the Professional Football Athletic Trainers Society (PFATS), launched a pilot program in four states to provide funding to public high schools with football programs that have limited or no access to an AT. Grants, each in the amount of $35,000, will be awarded over a three-year period to fund an athletic training program.

» **Raising Awareness about Concussions**: A poster and related player fact sheet were developed, in partnership with the CDC and others, to educate NFL players about the symptoms and possible consequences of concussions and advise them to report any related symptoms they may experience. A similar poster, endorsed by 16 national governing bodies for sport, was developed for young athletes and made available through the CDC to display in youth team locker rooms, gymnasiums and schools nationwide.

» **Helmet Replacement Program**: In 2012, the NFL partnered with the U.S. Consumer Protection Safety Commission and a number of other organizations to launch a helmet replacement program for youth football leagues in underserved communities. In conjunction with USA Football, the NFL continues to offer grants to provide helmets and other protective equipment for eligible youth and high school leagues.

» **Youth Concussion Laws**: In 2010, the NFL began advocating for youth sports concussion laws in every state. These laws are modeled after Washington’s Lystedt Law, which includes three components: 1) concussion education for parents, coaches and players; 2) immediate removal from play of an athlete who has sustained a concussion; and 3) clearance by a licensed medical professional before a young athlete may return to play or practice. These laws have now been adopted in all 50 states, as well as the District of Columbia.
NFL PLAY 60: NFL PLAY 60 aims to promote the importance of a healthy lifestyle among today’s youth by encouraging at least 60 minutes of physical activity every day. Since 2007, the league has committed more than $325 million to grants, health and fitness programming for youth, and media time for public service announcements. The NFL and its clubs have supported programs in over 73,000 schools nationwide—giving more than 38 million children the chance to boost their activity levels. Research conducted by The Cooper Institute through its NFL PLAY 60 FitnessGram® Project revealed annual improvements in aerobic capacity and body mass index for students participating in NFL PLAY 60 programming when compared to schools not utilizing NFL PLAY 60 programs.

NFL FLAG: Flag football is a great way for boys and girls of all ages to learn the fundamentals of the game. In 2016, more than 375,000 participants played in NFL FLAG leagues in all 50 states. Additionally, the NFL FLAG-In-Schools program, which includes an in-school PE curriculum, reaches more than four million students. In 2016, the NFL Foundation worked with the Women’s Sports Foundation to distribute 200 NFL FLAG In-Schools kits to organizations throughout the country that serve girls.

For more information about the NFL’s health and safety efforts, please visit www.playsmartplaysafe.com.