

HOW THE NFL IS ADVANCING PLAYER HEALTH AND SAFETY



The National Football League is committed to advancing progress in the diagnosis, prevention and treatment of sports-related injuries, enhancing medical protocols, improving how the game is taught and played, and protecting players' overall health, safety and wellbeing.

PLAYER HEALTH AND WELLNESS

The NFL is making changes on and off the field to protect the health and safety of every player.

PREVENTING THE SPREAD OF INFECTIOUS DISEASE

Before the COVID-19 pandemic in 2020, the NFL was working with epidemiologists and infectious disease experts to prevent the spread of infection in the NFL team environment and to prepare for potential viral outbreaks. For the past two NFL seasons, the NFL, with the National Football League Players Association (NFLPA), have worked with medical experts and clinicians to develop COVID-related player safety protocols and were able to complete the 2020 and 2021 seasons on schedule. In addition, the NFL has worked closely with the NFLPA and club medical staffs to educate and encourage players to be fully vaccinated against COVID-19, resulting in a nearly 95% vaccination rate for NFL players and nearly 100% for personnel. More information on the NFL's COVID-19 protocols can be found [here](#).

- » **Contributing to COVID-19 Medical Science:** Since the start of the COVID-19 pandemic, the NFL has been working in collaboration with the Centers for Disease Control and local public health officials to ensure the safety of NFL players, personnel and fans, and to share our learnings navigating the COVID-19 environment that can be applicable to the rest of society. In November 2021, the CDC published a [case study](#) featuring the NFL's vaccination education efforts as a success story and model for society. In January 2021, the CDC featured the NFL's mitigation, testing, and contact tracing measures in their [Morbidity and Mortality Weekly Report](#), detailing how the league used data to evolve the definition of close contacts and put in place protective measures such as masking to successfully carry out the 2020 season.

NFL MEDICAL COMMITTEES

The NFL is advised by many of the world's preeminent experts in medicine and science. NFL medical committees frequently review player health and injury data and recommend policies, programs and protocols for the League. An overarching Health and Safety Committee—including chairs of the General Medical Committee, the Head, Neck and Spine Committee and the Musculoskeletal Committee—oversees committee efforts and facilitates collaboration among subject matter experts, team physicians and athletic trainers. The NFL also works closely with the NFLPA and its medical advisors on player health and safety issues.

CARING FOR PLAYERS ON GAME DAY

On average, there are 30 healthcare providers at a stadium on game day to provide immediate care to players, including:

- » **Unaffiliated Neurotrauma Consultant:** Three credentialed neurotrauma consultants, who are unaffiliated with either team, staff the sidelines, monitor the broadcast of the game, and work with the team medical staffs to identify, screen for and diagnose concussions.
- » **Visiting Team Medical Liaisons:** 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.
- » **Booth ATC Spotters and the Medical Timeout:** For all NFL games, two certified athletic trainers – retained by the league and unaffiliated with any NFL teams – observe the game from a booth above the field and monitor the broadcast to identify potential injuries, especially concussions and other head and neck injuries. The booth ATC spotter has the authority to call a medical timeout to permit the medical evaluation of a player who may have suffered a concussion or head injury.

NFL CONCUSSION PROTOCOL

NFL medical professionals follow the NFL Concussion Protocol when identifying, diagnosing and treating player concussions. The Concussion Protocol, developed in 2011, is reviewed and revised each year to ensure that care reflects the most up-to-date medical information.

To ensure consistent implementation of the protocol, the NFL and NFLPA developed an enforcement policy, which includes a process to investigate clubs that fail to follow the protocol and determine appropriate discipline – including fines and possible forfeiture of draft picks.

NFL RETURN-TO-PARTICIPATION PROTOCOL

The NFL and NFLPA 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. After a player goes through the process and is cleared for full participation by his club physician, he must also be cleared by an Independent Neurological Consultant, who is jointly approved by the NFL and NFLPA and who is not affiliated with any NFL club. Until a player is cleared by this independent physician, he may not return to contact practice or play in an NFL game.

MEDICAL RESEARCH

The NFL supports preeminent experts and institutions in their research on the diagnosis, treatment and prevention of sports-related injuries and other issues affecting NFL players' health, safety and wellbeing.

- » **NFL Scientific Advisory Board:** In 2016, the NFL allotted \$40 million for medical research primarily dedicated to neuroscience. The NFL assembled a Scientific Advisory Board (SAB)—chaired by Peter Chiarelli, U.S. Army General (Retired)—comprising leading independent researchers, experts, doctors, scientists and clinicians to identify and support research proposals on the diagnosis, treatment and natural history of concussion and associated comorbid conditions.
- » In 2018, the SAB granted \$35 million in total funding to five projects for research being conducted by investigative teams related to the diagnosis, treatment, and natural history of concussion (mild traumatic brain injury) and associated comorbid conditions.
- » In July 2021, the SAB announced a four-year, \$4 million award to a team of medical researchers led by the University of Wisconsin who are investigating the prevention and treatment of hamstring injuries in elite football players.
- » The remaining \$1 million in SAB funding was awarded to two teams of medical researchers at the University of California San Diego and University of Regina through a request for proposals process for studies investigating the effects of cannabis and CBD on the pain management of elite athletes.

ADDITIONAL RESEARCH

The NFL has also allotted more than \$30 million to support brain injury research conducted by the Foundation for the National Institutes of Health (FNIH), Department of Defense, and Department of Veterans Affairs.

MENTAL HEALTH AND WELLNESS

In collaboration with the NFLPA, the NFL is building a positive culture around mental health by providing players and the NFL family with resources and tools to succeed, on and off the field, over the course of their lives.

JOINT BEHAVIORAL HEALTH AGREEMENT

The Comprehensive Mental Health and Wellness Committee, which develops mental health and wellness programs and resources for players and the wider NFL family, requires each club to retain a Behavioral Health Team Clinician to support players' emotional and mental health and wellbeing.

MENTAL HEALTH RESOURCES

The league provides mental wellness benefits and resources to current and former players, including:

- » **NFL Total Wellness**, which provides wellness resources to all members of the NFL family, including education at every stage of a player's career.
- » **The NFL Player Care Foundation**, which staffs licensed clinical social workers who provide expert consultation and help facilitate specialized treatment services for former players.



- » **NFL Life Line**, a free, confidential, and independently operated resource that connects current and former players with trained counselors who can help individuals work through personal or emotional crises 24 hours a day, seven days a week, 365 days a year.

PAIN MANAGEMENT

The NFL-NFLPA Pain Management Committee educates players and personnel on best clinical practices in pain management, awards grant funding for research to advance understanding of alternative treatments, and sets standards for club policies regarding pain management and the use of prescription medications by NFL players.

The Pain Management Committee also focuses on finding alternatives to opioids for pain management. The Committee conducts informational forums on the state of cannabidiol science and manufacturing, and awarded \$1 million in research funding in February 2022 to two teams of medical researchers at the University of California San Diego and University of Regina to study the effects of cannabis and CBD on the performance and pain management of elite athletes.

EQUIPMENT, DATA AND INNOVATION

The NFL is championing new developments in engineering, biomechanics and material science to better protect against injuries. The league collaborates with the NFLPA and the world's foremost engineers and scientists as advisors.

LEVERAGING DATA

Data is at the heart of the NFL's decisions about player health and safety.

- » **Injury Data:** Throughout the year, comprehensive NFL player injury data is compiled and analyzed by IQVIA, an independent, third-party company that provides results to the league, the NFLPA and medical and football committees. The NFL then shares this data publicly each year. Guided by the experts at IQVIA, NFL medical committee members identify trends in how, where and when injuries happen, and assess how protocols and rules changes affect player safety. Notably, the 2021 season saw the lowest number of concussions in regular season games for the period of 2015 to 2021. The league has sustained a 25 percent reduction in concussions for each of the past four seasons (2018-2021).
- » **Electronic Medical Records:** Every club's medical staff has access to its players' complete medical records via the Electronic Medical Record (EMR) system. Players can access their records at any time using a secure online portal, which remains active after the player retires. The EMR system helps the league make data-driven decisions on rules changes and permissible techniques used in play.
- » **Comprehensive Video Review:** Each season, biomechanical engineers complete a comprehensive video review of all reported concussions sustained in NFL games. The league shares the data with helmet manufacturers, designers, innovators, entrepreneurs, universities and others to stimulate new designs for protective equipment.

- » **Mouthguard Sensors to Measure On-Field Head Impacts:** In 2019, the NFL introduced a novel program in which NFL players wore mouthguards retrofitted with high-tech sensors designed to collect kinematic data, including impact speed, direction, force, location and severity. In 2021, this program was expanded to the collegiate level at four universities: The University of Alabama, The University of North Carolina at Chapel Hill, The University of Washington, and University of Wisconsin. Insights gleaned from the data collected help inform the NFL's approach to injury reduction and decrease head impacts overall.
- » **Taking Data to the Next Level:** In 2019, the NFL partnered with Amazon Web Services to transform player health and safety using cloud computing, machine learning and artificial intelligence. The NFL and AWS are developing tools to generate better insights into injuries, specifically the impact of game rules, equipment, and rehabilitation and recovery strategies. One of the partnership's primary goals is building the capacity to predict injuries before they occur.
 - The NFL and AWS are currently building the Digital Athlete, a virtual representation of an NFL player using actual NFL games and data that can run infinite in-game scenarios to understand the impact on player health and safety.
 - In 2022, the NFL and AWS awarded \$100,000 to the winners of its artificial intelligence competition, which challenged data scientists to teach computers to automatically detect players involved in head impacts from NFL game footage. The groundbreaking new computer vision models further strengthen the already-robust data and insights at the heart of the NFL's effort to understand and reduce head injuries.

USING DATA TO DRIVE RULES CHANGES

The NFL improves player safety by taking a data-driven approach to eliminating potentially dangerous tactics and reducing the risk of injuries. Over the past decade, these include changes that protect "defenseless" players and penalize dangerous techniques and other plays, such as "leaper" block attempts on field goal and extra point plays and using the helmet as part of a bull rush.

SEASON STRUCTURE

Under the 2020 Collective Bargaining Agreement, the NFL and NFLPA agreed to a new season structure, moving from 16 regular season and four preseason games to 17 regular season and three preseason games. The new season structure allows more time for player acclimation and for clubs to practice proper tackling techniques to reduce the risk of injury. These adjustments to the training camp schedule aim to better prepare players for the start of the preseason and regular season.

THE ENGINEERING ROADMAP

In 2016, the NFL allocated \$60 million toward the Engineering Roadmap, a comprehensive effort managed by Football Research, Inc. (FRI) to better understand the biomechanics of head injuries in professional football and incentivize helmet manufacturers, small businesses, entrepreneurs, universities and others to create more effective protective equipment through innovation challenges.



- » **HeadHealthTECH Challenges:** For five years, HeadHealthTECH Challenges have attracted innovative grant proposals from institutions, individuals and corporations interested in designing the next generation of protective equipment. The Challenges are operated and managed by Duke University's Clinical and Translational Science Institute, which provides constructive feedback for all applicants. Thus far, the NFL and FRI have awarded grants totaling nearly \$3 million to help advance the development of 17 new technologies.
- » **The NFL Helmet Challenge:** In 2019, the league launched the NFL Helmet Challenge to stimulate the development of a new helmet that outperforms all helmet models currently worn by NFL players. In 2020, the NFL and FRI awarded \$1.37 million to help four teams create their helmet prototypes to be submitted as part of the challenge. The challenge culminated in 2021 with the award of \$1.55 million in grant funding to three teams - Impressio, Kollide, and Xenith - to advance their innovative designs and technologies and to help get their projects on the field as soon as possible. NFL Helmet Challenge submissions achieved up to a 13% improvement above the top-performing helmet currently worn in the NFL, based on the laboratory testing the NFL and NFLPA use to test and rank helmets each year.
- » **1st and Future:** From 2016 to 2021, the NFL hosted a start-up competition at the Super Bowl to drive innovation in athlete safety and performance. Innovators and entrepreneurs share technologies to improve player health and safety, including protective equipment, medical devices, sensors and training devices. 1st and Future includes an Analytics Competition that enables data scientists to analyze NFL game data and propose new ideas for reducing injuries.

EQUIPMENT TESTING AND EVALUATION

The NFL and NFLPA work together to evaluate the performance of protective equipment and to ensure players are informed about the latest advances in equipment technology when making decisions about their helmets, cleats and other equipment.

This includes helmet laboratory testing in collaboration with the NFLPA, cleat evaluations conducted by the NFL Musculoskeletal Committee, and playing field assessments by the Field Surface Safety & Performance Committee.

SHARING PROGRESS

The NFL is committed to sharing its progress in health and safety across all levels of football, with other sports around the world and for the benefit of society at large. This includes publishing peer-reviewed research, convening leaders in sports medicine for important conversations, sharing data and crowdsourcing new ideas.

