



Using Your Head: A Different Approach to Tackling The NFL's Concussion Epidemic

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ABSTRACT

Football is currently facing a “concussion epidemic” with no fix-all solution in sight. “You got your bell rung, that’s all!” “Shake out the cobwebs!” Coaches and medical experts alike have commonly made comments like these on football fields across the country. While the intent of such “encouragement” is usually to challenge young athletes to toughen up and learn to persevere through adversity—to become better versions of themselves—what these comments really portray is a dark story of our society’s misunderstanding about, and mishandling of, brain injuries and their associated health consequences.

There is no better example of this mishandling than the NFL’s past management of the concussion epidemic. After recent advances in neurological knowledge have revealed the devastating short and long-term consequences of concussions, the NFL now finds itself scrambling to mitigate the threat being posed to what makes the NFL, and football in general, so popular—the gladiator-esque nature of the game. High concussion rates threaten to shrink the NFL’s talent pool, erode public support, decrease viewership

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(and consequently advertising and TV revenue), and expose the NFL to significant employment-related legal liability.

While some of the NFL's responses to date hold promise for helping to mitigate the concussion epidemic, they are nonetheless inadequate because a fix-all is unlikely to be developed soon, if ever. As such, this article argues the NFL should commit, through their collective bargaining agreement, to developing (1) genetic screening techniques that will inform players if they are acutely susceptible to substandard concussion recovery outcomes and long-term effects; (2) diagnostic tests that enable objective confirmation of concussion occurrence and recovery (or lack thereof); and (3) pre-mortem testing for concussion-related neurological diseases such as chronic traumatic encephalopathy (CTE).

A genuine commitment to these initiatives will not only accelerate the innovation of concussion epidemic-mitigating technologies, but also ensure the NFL is providing its players with the necessary information for them to properly "assume the risk" of playing football.

INTRODUCTION

Football is currently facing a "concussion epidemic" with no fix-all solution in sight. "You got your bell rung, that's all!" "Shake out the cobwebs!" Coaches¹ and medical experts² alike have commonly made comments like these on football fields across the country. While the intent of such "encouragement" is usually to challenge athletes to learn to persevere through adversity, what these comments really portray is a dark story of our

¹ See, e.g., Erick Fernandez, *This is the Horrifying Way People Talked About Concussions in 1988*, HUFFINGTON POST (Oct. 14, 2015), https://www.huffingtonpost.com/entry/jim-mcmahon-concussions-1988_us_561d57ebe4b028dd7ea56770 [<http://perma.cc/UVB7-F9GU>] (discussing Coach Mike Ditka's response to questions about his QB's concussion by noting the QB "had to clear up the cobwebs. He had spots in front of his eyes for a while, but he was fine after that . . . [he will] practice full speed . . . and play Sunday . . . He'll be fine . . . that question shouldn't be asked again.").

² NFL team physician Elliot Pellman once noted veteran players can "'unscramble their brains a little faster' than rookies . . . 'because they're not afraid after being dinged.'" Ben McGrath, *Does Football Have A Future?*, NEW YORKER (Jan. 31, 2011), <https://www.newyorker.com/magazine/2011/01/31/does-football-have-a-future> [<http://perma.cc/4SRA-8N3K>]. Pellman served for more than two decades as chairman of the NFL's Mild Traumatic Brain Injury Committee, during which time the Committee stated returning to play after sustaining a concussion "does not involve significant risk of a second injury either in the same game or during the season." Peter Keating, *Doctor Yes*, ESPN (Nov. 6, 2006), <http://www.espn.com/espnmag/story?id=3644940> [<https://perma.cc/JU9F-LX3J>].

society's misunderstanding about, and mishandling of, brain injuries and associated health consequences. There is no better example of this understanding than the National Football League's (NFL's)³ handling of the "concussion epidemic."

Recent advances in neurology reveal the devastating consequences of concussions.⁴ The NFL, the world's most financially successful sports league,⁵ now finds itself scrambling to mitigate the threat being posed to what makes the NFL, and football in general, so popular—the violent, gladiator-esque nature of the game. High neural trauma rates and knowledge of the associated negative health consequences threaten to shrink the NFL's talent pool, erode public support, decrease viewership (and consequently advertising and TV revenue), and expose the NFL to significant employment-related legal liability. The NFL's efforts to address this threat have, to date, yielded marginal reductions in concussion occurrence⁶—a statistic that should be qualified by the subjective nature of current concussion diagnostic testing.⁷

Acknowledging there is no easy fix to the concussion epidemic, the NFL should focus on promoting the development of a better understanding of neural trauma, how to prevent it, diagnose it, treat it, mitigate its long-term consequences, and how to counsel players about these issues. To do this effectively, the NFL must turn to the very thing that is threatening the league's, and the sport's, existence—neuroscience, in particular genetic research.

With that goal in mind, this paper proposes two provisions be included in the 2020 collective bargaining agreement (CBA).⁸ These provisions create genetic testing programs aimed at providing players with better information regarding concussion occurrence, their relative predisposition to substandard post-concussion recovery, and whether they are suffering from CTE. Such employer-sponsored medical testing, especially of a genetic na-

³ The term "NFL," is used to refer to the NFL as an entity and to the 32 NFL teams' ownership collectively.

⁴ See generally Section I.

⁵ See *infra* note 58 and accompanying text.

⁶ See 2016 *Injury Data*, NFL.COM, Jan. 26, 2017, tbl.1., <https://www.playsmartplaysafe.com/newsroom/reports/2016-injury-data/> [<http://perma.cc/YU8W-AYEH>].

⁷ See Raquel C. Gardner & Kristine Yaffe, *Epidemiology of Mild Traumatic Brain Injury and Neurodegenerative Disease*, 66 *MOLECULAR & CELLULAR NEUROSCIENCE* 75, 76 (2015).

⁸ John Breech, *NFLPA Director Says Strike or Lockout Will 'Almost Certainly' Hit NFL in Near Future*, CBS SPORTS (Aug. 17, 2017), <https://www.cbssports.com/nfl/news/nflpa-director-says-strike-or-lockout-will-almost-certainly-hit-nfl-in-near-future/> [<http://perma.cc/JU9Z-YJ6R>].

ture, is perceived to be prohibited by federal anti-discrimination and privacy-focused laws.⁹ Most relevant of these laws for purposes of this paper is the Genetic Information Nondiscrimination Act (GINA), which prohibits employers from requesting, accessing, or utilizing genetic information.¹⁰

But, existing exceptions to these laws (the “Wellness Program Exception”¹¹ and the “Genetic Monitoring Exception”¹²) may allow such testing. Applicable federal laws and the aforementioned exceptions are analyzed in Sections IV and V of this paper.

The proposed CBA provisions will create an employee¹³ wellness program (“NFL Wellness Program”), in which an independent medical committee will conduct *voluntary* genetic testing and associated genetic counseling services related to a player’s predisposition to substandard post-concussion neurological recovery and outcomes. They will also set the foundation for two *voluntary* genetic monitoring programs, which will enable NFL team doctors to (1) utilize blood-based diagnostic tests to objectively determine if a player has a concussion, and if so, when it is safe for him to return to play,¹⁴ and (2) allow for periodic pre-mortem CTE diagnostic testing.¹⁵ Even if some of these tests are not FDA-approved at the time the next NFL CBA is negotiated, experts believe these technologies will be viable soon thereafter.¹⁶

⁹ Relevant laws discussed in Section IV include the Patient Protection and Affordable Care Act (ACA), 42 U.S.C. § 18001 et seq. (2010); American with Disabilities Act (ADA), 42 U.S.C. § 12101 et seq.; and the Genetic Information Nondiscrimination Act (GINA), 42 U.S.C. § 2000(ff) et seq. (2008).

¹⁰ 42 U.S.C. § 2000(ff) et seq. (2008).

¹¹ See 42 U.S.C. § 2000ff-1(b)(2)(A) (2008).

¹² *Id.* § 2000ff-1(b)(5).

¹³ As explained in Section IV.A, while the question of whether the NFL is considered an employer of its players is undecided, the proposed CBA provisions assume the NFL, NFLPA, and all 32 NFL teams must adhere to federal employment-related laws in crafting the testing programs outlined in this paper.

¹⁴ A review of recent research on blood-based diagnostic concussion tests is beyond the scope of this paper. For such a review, see Betsy J. Grey & Gary E. Marchant, *Biomarkers, Concussions, and the Duty of Care*, 2015 MICH. ST. L. REV. 1911, 1930–38 (2015).

¹⁵ For a review of the recent research on pre-mortem CTE diagnostic testing, see Jonathan D. Cherry et al., *CCL11 Is Increased in the CNS in Chronic Traumatic Encephalopathy but Not in Alzheimer’s Disease*, 12 PLOS ONE e0185541, 1 (2017) (finding the biomarker CCL11 may be a novel target for diagnosing CTE pre-mortem).

¹⁶ See Patrick Hruby, *The Future of Detecting Brain Damage in Football*, THE ATLANTIC (Sept. 21, 2017), <https://www.theatlantic.com/health/archive/2017/09/football-brain-injury-chronic-traumatic-encephalopathy/540459/> [http://perma.cc/X8F6-LFD9]. At least one in-vitro blood-based biomarker test is already viable, having been approved for marketing authorization by the FDA in mid-February

Setting the legal framework for these testing programs in the CBA would ensure (1) the programs are governed and permitted by federal labor and employment laws; (2) stable and sufficient funding to carry out the proposed testing; and (3) implementation of statutorily-compliant confidentiality and reporting procedures for the information gathered during testing. If the testing programs are implemented in accordance with the considerations discussed in Section IV and V, they are likely to fit within the existing exceptions to applicable federal statutes.¹⁷

I. CONCUSSIONS AND CHRONIC TRAUMATIC ENCEPHALOPATHY— WHAT ARE THEY?

To better understand the topics to be covered, a brief overview of what concussions and CTE are, how they occur, and the damage and symptoms they cause is useful.

A. *Mild Traumatic Brain Injuries—AKA “Concussions”*

While “concussion” is often used to describe traumatic brain injuries (“TBI”) resulting in a cluster of post-injury symptoms including headache, dizziness, and blurred vision,¹⁸ the more accurate term is “mild¹⁹ traumatic brain injury” (“mTBI”).²⁰ mTBIs occur when an external force acts upon

2018. *FDA Grants Marketing Authorization to Banyan Biomarkers for the First Diagnostic Blood Test for Traumatic Brain Injury*, BUSINESSWIRE.COM (Feb. 14, 2018), <https://www.businesswire.com/news/home/20180214006251/en/FDA-Grants-Marketing-Authorization-Banyan-Biomarkers-Diagnostic> [http://perma.cc/AR6L-SLHX].

¹⁷ Proposals of the kind put forth here have not been suggested despite the significant resources being devoted to head trauma issues by large entities. See, e.g., NCAA, *DoD Launch Concussion Study*, NCAA (May 29, 2014, 9:41 AM), <http://www.ncaa.org/about/resources/media-center/news/ncaa-dod-launch-concussion-study> [http://perma.cc/QV8N-6RPK] (outlining a concussion study co-sponsored by the NCAA and U.S. Department of Defense).

¹⁸ David Sharp & Peter Jenkins, *Concussion is Confusing Us All*, 15 PRAC. NEUROLOGY 172, 172 (2015).

¹⁹ Using the term “mild” is misleading, as mTBIs can, and do, cause significant damage to the brain. See Ellen R. Bennett, Karin Reuter-Rice & Daniel T. Laskowitz, *Genetic Influence in Traumatic Brain Injury*, in TRANSLATIONAL RES. IN TRAUMATIC BRAIN INJ. 179, 180 (Daniel Laskowitz & Gerald Grant eds., 2016).

²⁰ See Kimberly G. Harmon et al., *American Medical Society for Sports Medicine Position Statement: Concussion in Sport*, 47 BRIT. J. SPORTS MED. 15, 16–17 (2013).

the body and causes brain trauma, resulting in brain dysfunction.²¹ To better understand how an mTBI occurs, and why helmet technology cannot eradicate the concussion epidemic anytime soon (if ever),²² a summary of the biomechanics involved in TBIs is useful.

The human brain is encased in a protective skull and is cushioned by spinal fluid.²³ Nerve cells, known as neurons, communicate between different regions of the brain.²⁴ Integral to this communication are axons, thread-like structures that run across the brain²⁵ and utilize nerve impulses to allow neurons to “talk” with other neurons.²⁶ When an external mechanical force acts upon the brain, the brain’s layers slide across one another,²⁷ damaging axons through stretching and tearing.²⁸ This damage can cause nerve impulses to transmit less effectively, or to cease transmission altogether.²⁹ The damage also leads to cognitive deficits including fatigue, impaired short-term memory, and difficult with concentration.³⁰

Such jarring forces can cause structural (e.g., axonal) damage and chemical changes to the brain.³¹ These changes can be even more significant when the external force is strong enough to cause the affected individual’s brain to slam into his/her skull.³²

Think of the head as an egg—the brain being the delicate yolk, the cerebrospinal fluid being the whites, and the skull being the shell. Shaking of the egg is the external mechanical force, which causes rapid acceleration

²¹ *Diseases and Conditions: Traumatic Brain Injury*, MAYO CLINIC, <https://www.mayoclinic.org/diseases-conditions/traumatic-brain-injury/symptoms-causes/syc-20378557> [<http://perma.cc/A7AY-KVPS>].

²² Erik E. Swartz et al., *Early Results of a Helmetless-Tackling Intervention to Decrease Head Impacts in Football Players*, 50 J. ATHL. TRAINING 1219, 1221 (2015).

²³ Grey & Marchant, *supra* note 14, at 1921.

²⁴ *Neurons (Nerve Cells)*, PUBMED HEALTH, <https://www.ncbi.nlm.nih.gov/pubmedhealth/PMHT0024269/> [<http://perma.cc/CX2A-GJCU>].

²⁵ See MICHAEL S. GAZZANIGA, RICHARD B. IVRY & GEORGE R. MANGUN, *COGNITIVE NEUROSCIENCE: THE BIOLOGY OF THE MIND* 24–28, 64–66 (2d ed. 2002).

²⁶ See *id.* at 60.

²⁷ OWEN D. JONES, JEFFREY D. SCHALL & FRANCIS X. SHEN, *LAW AND NEUROSCIENCE* 323 (2014).

²⁸ Douglas H. Smith & David F. Meaney, *Axonal Damage in Traumatic Brain Injury*, 6 NEUROSCIENTIST 483, 484–87 (2000).

²⁹ *Id.*

³⁰ See Fumihiko Yasuno et al., *Decision-Making Deficit of a Patient with Axonal Damage After Traumatic Brain Injury*, 84 BRAIN & COGNITION 63, 63–64 (2014).

³¹ Thomas W. McAllister, *Neurobiological Consequences of Traumatic Brain Injury*, 13 DIALOGUES CLINICAL NEUROSCIENCE, 287, 291 (2011); see also Smith & Meaney, *supra* note 28, at 484–87.

³² Smith & Meaney, *supra* note 28, at 484–87.

of the yolk. If the egg (a head) is shaken hard enough, the yolk (the brain) will move through the cerebrospinal fluid enough to hit the inside of the egg shell (the skull). If this happens, the brain not only sustains trauma from hitting the inside of the skull, but also from the sheering forces applied during sudden displacement—acceleration and deceleration. This illustrates why helmets alone will not solve the concussion epidemic. For while improved helmet technology softens the blow to a player’s head, thereby reducing the brain’s acceleration, helmets cannot reduce the acceleration enough to prevent TBIs.³³

It is important to recognize that our ability to understand the scope of football’s mTBI issue is limited by our lack of reliable, objective measures to diagnose mTBI.³⁴ Reliance on clinical diagnoses based in large part upon self-reported symptoms³⁵ leads to diagnosis error and lack of accurate mTBI occurrence data.³⁶ The data we have is further skewed by self-reporting problems rooted in football’s gladiator culture.³⁷ Even with the underreporting of the number and severity of concussions, current statistics demonstrate a serious mTBI issue.

The Centers for Disease Control and Prevention estimated that in 2013, the U.S. population suffered 2.8 million TBIs, for an annual incidence rate of one TBI for every 113 people.³⁸ By comparison, there were about 2,880 players in the NFL,³⁹ and 71 diagnosed concussions⁴⁰ during the NFL’s *one-month* contact period of preseason, for a concussion rate of one TBI for every 39 players. During the five-month NFL regular season, there were

³³ Swartz et al., *supra* note 22.

³⁴ See Gardner & Yaffe, *Epidemiology of Mild Traumatic Brain Injury and Neurodegenerative Disease*, *supra* note 7, at 76–77.

³⁵ *Id.*

³⁶ Erik Greb, *Can A Diagnosis of Concussion be Objective?*, 24 NEUROLOGY REVS. 39, 39–40 (2016) (“A diagnosis of concussion is based on clinical observation and testing, and it therefore is susceptible to error.”).

³⁷ COMMITTEE ON SPORTS-RELATED CONCUSSIONS IN YOUTH, INST. OF MED. & NAT’L RESEARCH COUNCIL, SPORTS-RELATED CONCUSSION IN YOUTH 289–90 (Robert Graham et al. eds., 2014). (“Consequently, concussed athletes may not seek medical advice, leading to artificially low reported concussions rates.”). See Ashley A. LaRoche et al., *Sport-Related Concussion Reporting and State Legislative Effects*, 26 CLIN. J. SPORT MED. 33 (2016).

³⁸ *TBI: Get the Facts*, CTR. FOR DISEASE CONTROL & PREVENTION, https://www.cdc.gov/traumaticbraininjury/get_the_facts.html [http://perma.cc/3KUC-CUEC].

³⁹ Wade Davis II, *A Numbers Game: Making an NFL Roster*, HUFFINGTON POST (Oct. 28, 2014), https://www.huffingtonpost.com/wade-davis-jr/a-numbers-game-making-an-nfl-roster_b_5731630.html [http://perma.cc/9DQY-J8JE].

⁴⁰ 2016 *Injury Data*, *supra* note 6, at tbl.1.

about 1,969 and 173 diagnosed concussions⁴¹—an incidence rate of one concussion for every 11 players. Youth, high school, and collegiate players also experience high concussion rates.⁴²

B. *Chronic Traumatic Encephalopathy (CTE)*

CTE has been the most publicized degenerative disease associated with repetitive brain trauma.⁴³ The disease is characterized by an abnormal build-up of tau protein in the brain.⁴⁴ Excess tau, traditionally associated with Alzheimer's disease, acts as a plaque that decreases the brain's functionality.⁴⁵ CTE symptoms include: suicidal tendencies, impaired judgment, memory loss, impulse control issues, aggression, Parkinsonism, depression, and progressively worsening dementia.⁴⁶ The disease's wide range of age-of-onset and latency periods,⁴⁷ coupled with the fact it can only currently be diagnosed post-mortem, make it extremely difficult to study and treat.⁴⁸

What is most worrisome is the seemingly-low threshold of head injury severity necessary to cause CTE.⁴⁹ While it is already well-established that mTBIs are associated with CTE, a growing body of scientific evidence indicates that repetitive sub-concussive impacts, which leave the affected individual asymptomatic, may also lead to the development of CTE.⁵⁰ The implications of this are startling: even great concussion prevention, diagno-

⁴¹ 2016 *Injury Data*, *supra* note 6, at tbl.1.

⁴² Thomas Dompier et al., *Incidence of Concussion During Practice and Games in Youth, High School, and Collegiate American Football Players*, 169 JAMA PEDIATRICS 659, 661–65 (2015).

⁴³ See *Frequently Asked Questions About CTE*, BOSTON UNIVERSITY: CTE CENTER, www.bu.edu/cte/about/frequently-asked-questions/ [http://perma.cc/U7YP-AAZA] (on file with the Harvard Law School Library).

⁴⁴ *Id.*

⁴⁵ *Id.*

⁴⁶ *Id.*

⁴⁷ *Id.*

⁴⁸ Ann C. McKee et al., *The First NINDS/NIBIB Consensus Meeting to Define Neuropathological Criteria for the Diagnosis of Chronic Traumatic Encephalopathy*, 131 ACTA NEUROPATHOLOGICA 75 (2016) [hereinafter McKee et al., *The First NINDS/NIBIB Consensus Meeting*].

⁴⁹ *CTE Resources*, CONCUSSION LEGACY FOUND., <https://concussionfoundation.org/CTE-resources/subconcussive-impacts>, [http://perma.cc/M7HJ-CGSA].

⁵⁰ See, e.g., Chad A. Tagge et al., *Concussion, Microvascular Injury, and Early Tauopathy in Young Athletes After Impact Head Injury and an Impact Concussion Mouse Model*, 141 BRAIN 422, 424 (2018); see also Christine M. Baugh et al., *Chronic Traumatic Encephalopathy: Neurodegeneration Following Repetitive Concussive and Subconcussive Brain Trauma*, 6 BRAIN IMAGING & BEHAV. 244, 245 (2012).

sis, and recovery protocols would not solve the cumulative effects of sub-concussive hits on CTE development.

In 2002, Dr. Bennet Omalu first discovered CTE in an NFL player.⁵¹ Shortly thereafter he found it in multiple retired players.⁵² But the discovery was largely ignored by the NFL⁵³ and general public.⁵⁴ However, the push towards recognition of the mTBI-CTE link has grown stronger in recent years.⁵⁵ In March 2016, only after U.S. House Committee hearings on head trauma in the NFL, high-profile suicides by ex-NFL players later found to have had CTE, increasing media pressure, and mounting scientific evidence, did a senior NFL executive acknowledge a link between repetitive head trauma and CTE for the first time.⁵⁶

II. THE NFL'S CURRENT MARKET POSITION

Despite the bad publicity the NFL has received for its response to head trauma issues, it nonetheless has maintained remarkable popularity⁵⁷ and has become increasingly financially successful.⁵⁸ Like other competitive enterprises, the NFL's financial outlook is in large part dependent on product

⁵¹ Dr. Omalu, a forensic pathologist, discovered CTE in former NFL player Mike Webster's brain during an autopsy after Webster had committed suicide. *NFL Concussion Fast Facts*, CNN (Aug. 26, 2018), <http://www.cnn.com/2013/08/30/us/nfl-concussions-fast-facts/index.html> [<http://perma.cc/8YRM-MV8H>].

⁵² See McGrath, *supra* note 2.

⁵³ See Sean Gregory, *Concussion Expert: Over 90% of NFL Players Have Brain Disease*, TIME (Dec. 22, 2015), time.com/4158140/concussion-film-bennet-omalu-cte-nfl/ [<http://perma.cc/9PRZ-BBTA>].

⁵⁴ McGrath, *supra* note 2. ("The earliest cases of C.T.E. had been medical news, not national news.").

⁵⁵ Ann C. McKee et al., *supra* note 48, at 83–84.

⁵⁶ See *NFL Concussion Fast Facts*, *supra* note 51.

⁵⁷ Adam Kilgore & Scott Clement, *Poll: Nine in 10 Sports Fans Say NFL Brain Injuries Are a Problem, but 74 Percent Are Still Football Fans*, WASH. POST (Sept. 6, 2017), https://www.washingtonpost.com/sports/poll-nfl-remains-as-popular-as-ever-despite-head-injuries-other-concerns/2017/09/06/238bef8a-9265-11e7-8754-d478688d23b4_story.html?utm_term=.875d92098999 [<http://perma.cc/9S5A-2WCU>].

⁵⁸ In 2015, the NFL generated ~\$13 billion in revenue, ~ \$3.5 billion more than its closest competitor. Steven Kutz, *NFL Took in \$13 Billion in Revenue Last Season — See How It Stacks Up Against Other Pro Sports Leagues*, MARKETWATCH (July 2, 2016), <http://www.marketwatch.com/story/the-nfl-made-13-billion-last-season-see-how-it-stacks-up-against-other-leagues-2016-07-01> [<http://perma.cc/GB72-3CAV>]. Unsurprisingly, NFL teams are, on average, the most profitable and highest valued sports teams. See Kurt Badenhausen, *Full List: The World's 50 Most Valuable Sports Teams 2017*, FORBES (July 12, 2017), <https://www.forbes.com/sites/kurtbaden>

quality and public perception. The product, in-game entertainment, is dependent on on-field talent. This talent consists of some of the world's best athletes performing awe-inspiring acts of strength, speed, and agility. If concussions and CTE concerns are not resolved, the NFL's talent pool is at risk of dilution as top athletes may choose sports with less risk of head trauma, thereby negatively affecting the NFL's product and creating a risk of declining viewership and advertising revenues. Prominent football broadcasters,⁵⁹ NFL coaches, and former NFL players⁶⁰ have begun to speak out about how football's brain trauma issue threatens the league's existence and how they would not (or will not) let their own children play.

Several NFL players retired early over concussion and CTE concerns.⁶¹ Commentators believe early retirements will only increase as players develop a better understanding of the science behind these neurological afflictions.⁶² These worries may have already started to affect participation, as high school football participation declined for the second year in a row in 2017, despite a growing number of high school sports participants overall and schools offering varsity-level football.⁶³

hausen/2017/07/12/full-list-the-worlds-50-most-valuable-sports-teams-2017/#15e5c7794a05 [http://perma.cc/UW42-JCJS].

⁵⁹ See, e.g., Mark W. Sanchez, *ESPN Football Voice Quits Over the Sport's Brain Toll*, N.Y. POST (Aug. 30, 2017), <http://nypost.com/2017/08/30/espn-football-voice-quits-over-the-sports-brain-toll/> [http://perma.cc/3LG8-PHHP] (discussing Broadcaster Ed Cunningham resignation as an ESPN football anchor because he could "no longer be in [football's] cheerleader's spot" since he "[doesn't] think the game is safe for the brain."); Tom Schad, *Bob Costas on the Future of Football: 'This Game Destroys People's Brains'*, USA TODAY (Nov. 8, 2017), <https://www.usatoday.com/story/sports/nfl/2017/11/08/bob-costas-future-football-nfl-this-game-destroys-peoples-brains/842904001/> [https://perma.cc/6ZR9-A7AL].

⁶⁰ Fernandez, *supra* note 1 (reporting that Mike Ditka stated that he would not want his son to play football because he think the "risk is worse than the reward.").

⁶¹ See, e.g., Justin Block, *We Shouldn't Be Surprised When NFL Players Retire Any-more*, HUFFINGTON POST (Apr. 8, 2016), https://www.huffingtonpost.com/entry/dbrickashaw-ferguson-nfl-early-retirement-no-surprise_us_5707c4d5e4b0c4e26a2273fa [http://perma.cc/WL4S-MXS4] (claiming that former NFL players D'Brickashaw Ferguson, Chris Borland, Rashean Mathis, Adrian Coxson, and Anthony Davis have all retired early than expected due to concussion concerns).

⁶² *Why More NFL Players Will Retire Early Like Calvin Johnson*, FOX SPORTS (Mar. 14, 2016), <http://www.foxsports.com/nfl/story/nfl-cte-link-brain-disease-calvin-johnson-bj-raji-retirement-early-young-leaving-game-031416> [http://perma.cc/27HN-DSYQ].

⁶³ Eric Sondheimer, *11-Man High School Football Participation Declines by More Than 25,000 Nationally*, L.A. TIMES (Aug. 7, 2017), <http://www.latimes.com/sports/highschool/varsity-times/la-sp-high-school-sports-updates-11-man-high-school-football-1502127207-htmlstory.html> [http://perma.cc/ZL9Z-LBVZ].

The decline may be due to parental concern for head injuries. Specifically, several polls indicate that parents have expressed hesitation in letting their children play football.⁶⁴ The California legislature has proposed a bill banning contact football before high school.⁶⁵ These concerns may eventually affect the supply and quality of football players for the NCAA and NFL.

Concern for head injuries is supported by a growing body of medical literature.⁶⁶ Despite small sample sizes, self-selection, and other aspects of these studies that are likely to skew results, such studies are nonetheless damning.⁶⁷ Dr. Omalu has estimated that over 90 percent of NFL players have some degree of CTE,⁶⁸ and that “90 to 100% of all [NFL players] will have some residual problem from their exposure to thousands of blows to the head.”⁶⁹

⁶⁴ See Annie Linskey, *Half of Americans Don't Want Their Sons Playing Football, Poll Shows*, BLOOMBERG (Dec. 10, 2014), <https://www.bloomberg.com/news/articles/2014-12-10/bloomberg-politics-poll-half-of-americans-dont-want-their-sons-playing-football> [https://perma.cc/58ZH-J2JT]; see also Eliana Dockterman, *Parents Deeply Concerned About Injuries in Youth Sports, Survey Finds*, TIME (Oct. 13, 2014), <http://time.com/3502999/youth-sports-injuries-concussion/> [https://perma.cc/58ZH-J2JT].

⁶⁵ Khadrice Rollins, *New California Bill Would Ban Tackle Football Before High School*, SPORTS ILLUSTRATED (Feb. 8, 2018), <https://www.si.com/high-school/2018/02/08/california-bill-ban-tackle-football-high-school> [https://perma.cc/VTR9-HTSA]. Such a bill is likely to gain increasing support. Press Release, Robert Morris Univ., *RMU Poll Shows Growing Support for Banning Youth Football* (Dec. 18, 2014), <http://www.rmu.edu/News.aspx?id=816> (a poll showing 49.4 percent of responding parents support a ban on children playing contact football before high school).

⁶⁶ See, e.g., Jesse Mez et al., *Clinicopathological Evaluation of Chronic Traumatic Encephalopathy in Players of American Football*, 318 JAMA 360, 362 (2017) (A study finding that out of 202 football players (111 former NFL players), 177 were diagnosed with CTE, with 110 out of 111 former NFL players diagnosed with the disease).

⁶⁷ See, e.g., Victoria C. Merritt et al., *The Influence of the Apolipoprotein E (APOE) Gene on Subacute Post-Concussion Neurocognitive Performance in College Athletes*, 33 ARCHIVES CLINICAL NEUROPSYCHOLOGY 36, 36 (2017) (suggesting a relationship between the $\epsilon 4$ allele and post-mTBI (1) impairment, (2) neurocognitive performance variability, and (3) less efficient cognitive processing).

⁶⁸ *Concussion Expert: Over 90% of NFL Players Have Brain Disease*, *supra* note 53.

⁶⁹ *Id.*

III. THE NFL'S RESPONSE TO THE CONCUSSION EPIDEMIC, AND WHAT IT SHOULD DO

The NFL has tried to address the concussion epidemic by implementing new rules,⁷⁰ assessing penalties for players who hit other players in the head⁷¹ and for teams that fail to adhere to the NFL's concussion protocol,⁷² augmenting trainers' ability to intervene in games,⁷³ sponsoring safe tackling programs,⁷⁴ and reducing contact in practices.⁷⁵ The NFL has also sought out partnerships with organizations concerned with high mTBI rates,⁷⁶ and has invested millions of dollars in the development of protective

⁷⁰ Lorenzo Reyes, *NFL Reports Reduction in Concussions, New Measures to Protect Players*, USA TODAY (Aug. 6, 2015), <https://www.usatoday.com/story/sports/nfl/2015/08/05/concussions-reduced-rule-changes-defenseless-injured-players/31189031/> [<https://perma.cc/6MU4-2VBA>] [hereinafter Reyes, *NFL Reports New Measures*].

⁷¹ See, e.g., Ken Belson, *N.F.L. Fines Two Broncos for Head Hits to Panthers' Cam Newton*, N.Y. TIMES (Sept. 15, 2016), <https://www.nytimes.com/2016/09/16/sports/football/nfl-fines-two-broncos-for-head-hits-to-panthers-cam-newton.html> [<http://perma.cc/X39R-LWKE>] (reporting that, in 2016, Broncos linebacker Brandon Marshall was fined \$24,309 for hitting Panthers quarterback Cam Newton in the head).

⁷² See Ken Belson, *N.F.L. Introduces New Rules to Back Its Concussion Protocol*, N.Y. TIMES (July 25, 2016), https://www.nytimes.com/2016/07/26/sports/football/nfl-concussion-protocol-new-rules.html?_r=0, [<http://perma.cc/7Y6F-ADYC>] (penalties include fines in the hundreds of thousands of dollars, and the possibility of losing draft picks).

⁷³ In 2015, the NFL gave certain certified athletic trainers the authority to stop play with the touch of a button if they notice a player exhibiting notable signs of injury, including a concussion. Reyes, *NFL Reports New Measures*, *supra* note 70.

⁷⁴ Steve Fainaru & Mark Fainaru-Wada, *Questions About Heads Up Tackling*, ESPN (Jan. 13, 2014), http://www.espn.com/espn/otl/story/_id/10276129/popular-nfl-backed-heads-tackling-method-questioned-former-players [<http://perma.cc/6B45-33M7>].

⁷⁵ See NFL & NFL PLAYERS ASSOCIATION, *NFL COLLECTIVE BARGAINING AGREEMENT*, 140–41 (2011) [hereinafter NFL CBA].

⁷⁶ See, e.g., Press Release, NFL, *NFL Partners with CFL on Concussion Testing* (Oct. 5, 2015), <http://www.nfl.com/news/story/0ap3000000507064/article/nfl-partners-with-cfl-on-concussion-testing> [<http://perma.cc/N296-BUY9>] (reporting the NFL's 2013 partnership with General Electric and Under Armour to launch the Head Health Initiative—a four-year, \$60 million collaboration designed to improve the diagnosis and treatment of TBI).

equipment and more research on the effects of mTBI.⁷⁷ At best, these changes have yielded marginal reductions in mTBI occurrence.⁷⁸

Despite the NFL's monetary dedication to concussion-related initiatives, some commentators have criticized the NFL for purposely stymying neurological injury research.⁷⁹ Without more research to develop a comprehensive understanding of how the brain reacts to neural trauma, and why it reacts in the way it does, neurological injury will remain an epidemic. Innovation occurs less frequently than is socially optimal.⁸⁰ The main reasons for this are high research and development costs and the limited number of opportunities for innovation.⁸¹ The NFL needs to make a genuine commitment, both publicly and financially, to developing neural trauma-related knowledge, and implementing this knowledge once developed.⁸² While

⁷⁷ See, e.g., Ken Belson, *N.F.L. to Spend \$100 Million to Address Head Trauma*, N.Y. TIMES (Sept. 14, 2016), <https://www.nytimes.com/2016/09/15/sports/football/nfl-concussions-100-million-roger-goodell.html> [<https://perma.cc/DHP4-WYK7>] (outlining the NFL's pledge of \$30 million to the Foundation for the National Institutes of Health for concussion-related medical research, and its 2016 \$100 million pledge to fund mTBI and CTE-related research).

⁷⁸ See 2016 *Injury Data*, *supra* note 6, at tbl.1.

⁷⁹ See, e.g., Genna Reed, *How the NFL Sidelines Science—and Why It Matters*, UNION CONCERNED SCIENTISTS (Oct. 25, 2017), http://blog.ucsusa.org/genna-reed/how-the-nfl-sidelines-science-and-why-it-matters?_ga=2.128072908.1935828711.1513916524-80013690.1513916524 [<http://perma.cc/FF5S-JGW6>]; see also *N.F.L. to Spend \$100 Million to Address Head Trauma*, *supra* note 77 (criticizing the NFL's prevention of funds devoted to mTBI research from being spent on a long-term head trauma study because it involved critics of the NFL's mTBI efforts); see also Mark Fainaru-Wada & Steve Fainaru, *NFL Retakes Control of Brain Research as Touted Alliance Ends*, ESPN (Aug. 31, 2017), http://www.espn.com/espn/otl/story/_/id/20509977/nfl-takes-control-brain-research-100-million-donation-all-ending-partnerships-entities [<http://perma.cc/LC8V-SVAY>] (criticizing the NFL for only funding one CTE study since its 2016 \$100 million pledge to mTBI research—a study run by two doctors skeptical of the connection between mTBI and CTE).

⁸⁰ See Edwin Mansfield, *Microeconomics of Technological Innovation*, in TECHNOLOGY AND GLOBAL INDUSTRY 311 (Bruce R. Guile & Harvey Brooks eds., 1987); see also Charles I. Jones & John C. Williams, *Measuring the Social Return to R & D*, 113 Q. J. ECON. 1119 (1998); Jeffrey Bernstein & M. Ishaq Nadiri, *Interindustry R & D Spillovers, Rates of Return, and Production in High-Tech Industries*, 78 AM. ECON. REV. 429 (1988).

⁸¹ See Mansfield, *Microeconomics of Technological Innovation*, *supra* note 80; see also Jones & Williams, *Measuring the Social Return to R & D*, *supra* note 80; Bernstein & Nadiri, *Interindustry R & D Spillovers*, *supra* note 80.

⁸² While the NFL's R&D costs will be significant, the innovations that could be developed may help protect the NFL's revenue model and would have wide-ranging applications outside of football. Specifically, with regard to professional sports, the NFL's dominant market position could enable it to benefit more significantly from

such knowledge will not solve the “concussion epidemic,” it will improve the diagnosis and treatment of mTBI, and thereby help mitigate the associated negative long-term consequences.

A growing body of research suggests genetic variations influence diverse cellular responses to TBI, and can therefore be used to help predict and explain mTBI outcome variability.⁸³ Researchers are exploring several genetic-based technologies and processes to better prevent, predict, diagnose, and treat mTBIs.⁸⁴ Underlying these innovations is the knowledge that patients who sustain similar initial injuries experience variable outcomes.⁸⁵

Variability in genetics-related mTBI outcomes is linked to individual-specific gene variants, known as polymorphisms.⁸⁶ The most-studied gene that scientists believe influences TBI is the apolipoprotein E (“APOE”) gene.⁸⁷ APOE research originally focused on the gene’s relationship with Alzheimer’s disease.⁸⁸ However, recent studies have explored the impact of APOE allele variants on the brain’s response post-mTBI.⁸⁹ Researchers believe the ε3 allele (the most common form) promotes neural recovery, while the ε4 allele inhibits neural growth and repair.⁹⁰ The ε4 allele’s association with reduced antioxidant and biological activity indicates it is a risk factor

its innovative efforts. See Richard J. Gilbert & Steven C. Sunshine, *Incorporating Dynamic Efficiency Concerns in Merger Analysis: The Use of Innovation Markets*, 63 ANTI-TRUST L.J. 569, 576–77 (1995).

⁸³ Thomas W. McAllister, *Genetic Factors in Traumatic Brain Injury*, 128 HANDBOOK CLINICAL NEUROLOGY 723, 723 (2015). Many researchers acknowledge that TBI recovery is polygenic, involving the interaction of several genes and neural pathways. See, e.g., Bennett, Reuter-Rice & Laskowitz, *supra* note 19, at 180. Scientists have also urged consideration of the role of epigenetic mechanisms. Mika Gustafsson et al., *Modules, Networks and Systems Medicine for Understanding Disease and Aiding Diagnosis*, 6 GENOME MED. 1, 9 (2014).

⁸⁴ Research on how to diagnose and track the progression of CTE in living individuals is being conducted. For more on these efforts, see Cherry et al., *supra* note 15.

⁸⁵ See Bennett, Reuter-Rice & Laskowitz, *supra* note 19, at 180; see also Jonathan C. Edwards & Jeffrey D. Bodle, *Causes and Consequences of Sports Concussion*, 42 J.L. MED. & ETHICS 128, 128 (2014).

⁸⁶ Bennett et al., *supra* note 19, at 180.

⁸⁷ See *id.* at 191–95. For a more comprehensive list of genes affecting TBI occurrence, severity, etc., see *id.*

⁸⁸ Baugh et al., *supra* note 50.

⁸⁹ See, e.g., *id.*

⁹⁰ See Jonathan T. Finnoff et al., *Biomarkers, Genetics, and Risk Factors for Concussion*, 3 PM&R 452, 454 (2011); see also Graham M. Teasdale et al., *Association of Apolipoprotein E Polymorphism with Outcome After Head Injury*, 350 LANCET 1069, 1070 (1997).

for neurodegenerative disorders.⁹¹ Several studies suggest $\epsilon 4$ carriers have an increased risk of suffering mTBIs,⁹² are more likely to have worse recovery post-mTBI,⁹³ and have an increased susceptibility to CTE⁹⁴ and Alzheimer's Disease.⁹⁵ Studies of several other genes have resulted in similar findings, including the: (1) APOE promoter allele G-219T;⁹⁶ (2) catechol-*O*-methyltransferase ("COMT") gene;⁹⁷ and (3) protein phosphatase 3 catalytic subunit gamma isozyme gene.⁹⁸ These studies are, however, limited by several factors.⁹⁹

⁹¹ See John K. Yue et al., *Apolipoprotein E Epsilon 4 (APOE- $\epsilon 4$) Genotype is Associated with Decreased 6-month Verbal Memory Performance After Mild Traumatic Brain Injury*, 7 BRAIN & BEHAV. e00791, 1, 2 (2017).

⁹² See, e.g., Cameron B. Jeter et al., *Biomarkers for the Diagnosis and Prognosis of Mild Traumatic Brain Injury/Concussion*, 30 J. NEUROTRAUMA 657, 666 (2013).

⁹³ See generally Victoria C. Merritt et al., *Apolipoprotein E (APOE) $\epsilon 4$ Allele is Associated with Increased Symptom Reporting Following Sports Concussion*, 22 J. INT'L NEUROPSYCHOLOGICAL SOC'Y 89, 89–93 (2016) (indicating $\epsilon 4$ allele carriers may be at a greater risk for experiencing poorer post-concussion outcomes); Merritt et al., *supra* note 67, at 36.

⁹⁴ Jesse Mez et al., *Chronic Traumatic Encephalopathy: Where Are We and Where Are We Going?*, 13 CURRENT NEUROLOGY NEUROSCIENCE REP. 407, 413 (2013).

⁹⁵ See Jiqing Cao et al., *ApoE4-associated Phospholipid Dysregulation Contributes to Development of Tau Hyper-phosphorylation After Traumatic Brain Injury*, 7 SCI. REP. 11372, 11372 (2017); see generally Richard Mayeux & Nicole Schupf, *Apolipoprotein E and Alzheimer's Disease: The Implications of Progress in Molecular Medicine*, 85 AM. J. PUB. HEALTH 1280 (1995).

⁹⁶ See, e.g., Ryan T. Tierney et al., *Apolipoprotein E Genotype and Concussion in College Athletes*, 20 CLINICAL J. SPORTS MED. 464, 466 (2010) (finding individuals with the rare T allele had over 8X the likelihood of suffering a mTBI as those with the normal G/G genotype).

⁹⁷ See, e.g., Robert Lipsky et al., *Association of COMT Val158Met Genotype with Executive Functioning Following Traumatic Brain Injury*, 17 J. NEUROPSYCHIATRY & CLINICAL NEUROSCIENCE 465, 468–69 (2005) (finding an association between the COMT gene and worse executive function and cognitive flexibility post-TBI).

⁹⁸ See, e.g., Yasue Horiuchi et al., *Support for Association of the PPP3CC Gene with Schizophrenia*, 12 MOLECULAR PSYCHIATRY 891, 891 (2007) (indicating the gene's malfunctioning may be implicated in CTE); see also James W. Bales et al., *Association Between the PPP3CC Gene, Coding for the Calcineurin Gamma Catalytic Subunit, and Severity of Traumatic Brain Injury in Humans*, 28 J. NEUROTRAUMA 1 (2011) (suggesting an individual having the A/G polymorphism indicates a susceptibility to TBI, as well as a worse recovery after TBI).

⁹⁹ Merritt et al., *supra* note 67, at 93.

IV. IMPLEMENTING GENETIC TESTING PROGRAMS IN THE NEXT NFL CBA—NAVIGATING A STATUTORY AND REGULATORY MAZE

A quick summary of the NFL's organizational structure is informative to better understand (1) the employer-employee relationships that exist among the NFL, NFL Players Association ("NFLPA"), and NFL players, and (2) why the CBA is the best vehicle for implementing the proposed genetic testing programs.

A. *Who Is the Employer?*

The NFL is an unincorporated association of thirty-two member teams.¹⁰⁰ Each team is a separate legal entity.¹⁰¹ Despite each team's legal independence, the NFL acts as the governing body for all teams, facilitating shared business and policy decision making.¹⁰²

As the NFL's CBA states, a player is the employee of his respective team.¹⁰³ During the CBA negotiating process, players are represented by their union, the NFLPA.¹⁰⁴ The NFLPA acts as the "bargaining unit"¹⁰⁵ for purposes of the National Labor Relations Act ("NLRA"), which governs, among other things, collective bargaining agreements.¹⁰⁶ In this capacity, the NFLPA is the "exclusive [representative] of all employees . . . for the purposes of collective bargaining in respect to rates of pay, wages, hours of

¹⁰⁰ See *Am. Needle, Inc. v. National Football League*, 560 U.S. 183, 187 (2010) ("[T]he NFL is an unincorporated association that now includes 32 separately owned professional football teams.").

¹⁰¹ See *Brady v. National Football League*, 640 F.3d 785, 787 (8th Cir. 2011) (per curiam) (where the presence of all 32 NFL teams and the NFL as codefendants serves as an example of how each team is a separate legal entity, both from one another, and from the NFL).

¹⁰² See NFL, CONSTITUTION AND BYLAWS OF THE NATIONAL FOOTBALL LEAGUE art. II, § 2.1(A) (2006) (stating the NFL's purpose is to "promote and foster the primary business of [NFL] members, each member being an owner of a professional football club located in the United States").

¹⁰³ NFL CBA, *supra* note 75 at pmb1.; see also *National Football League v. Vigilant Ins. Co.*, 824 N.Y.S.2d 72, 77 (N.Y. App. Div. 2006) ("[I]t is undisputed that NFL players are employees of individual NFL teams, not the NFL itself.").

¹⁰⁴ NFLPA, *About the NFLPA*, <https://www.nflpa.com/about> [http://perma.cc/V7QV-CHU7].

¹⁰⁵ See NFL CBA, *supra* note 75, at pmb1 (outlining what the "bargaining unit" consists of).

¹⁰⁶ *Metro. Life Ins. Co. v. Massachusetts*, 471 U.S. 724, 724 (1985) ("[C]ollective-bargaining agreements [are] regulated by the National Labor Relations Act (NLRA).").

employment, or other conditions of employment.”¹⁰⁷ As such, NFL teams must adhere to relevant federal employment laws.¹⁰⁸

What is less clear is whether the NFL is considered an employer of the players.¹⁰⁹ For this paper’s purposes, it is assumed the NFL will be treated as an employer and therefore is required to adhere to relevant federal employment laws. Specifically, this paper explores the applicability and protections of the employment-related sections of the ACA, ADA, and GINA, as well as the exceptions the NFLPA and NFL may utilize to implement the previously outlined genetic testing programs. For reasons explained in Section IV.B, state law is not a serious consideration in drafting the CBA language.

B. *Why State Employment Laws Likely Are Not Implicated*

While there are state laws governing the requesting, collection, and use of employee genetic information,¹¹⁰ it is unlikely the NFL or NFLPA will need to seriously consider these statutes in crafting the proposed CBA provisions as the Supreme Court has held the Federal National Labor Relations Act (“NLRA”) preempts much of the legal field relating to CBAs.¹¹¹ Sec-

¹⁰⁷ 29 U.S.C. § 159(a) (2012).

¹⁰⁸ This is dependent upon each NFL team meeting the statutory requirements of an “employer.” *See, e.g.*, 42 U.S.C. §12111(5)(A) (“The term ‘employer’ means a person engaged in an industry affecting commerce who has 15 or more employees for each working day in each of 20 or more calendar weeks in the current or preceding calendar year, and any agent of such person . . .”).

¹⁰⁹ *Compare* National Football League v. Vigilant Ins. Co., 824 N.Y.S.2d 72, 77 (N.Y. App. Div. 2006) (“it is undisputed that NFL players are employees of individual NFL teams, not the NFL itself”), *with* Williams v. National Football League, No. 27 -CV-o8-29 778, slip op. at t6 (Dist. Ct. Minn. May 6, 2010) (finding the NFL has an employment relationship with its players for purposes of the Minnesota’s Drug and Alcohol Testing in the Workplace Act (DATWA)). On appeal, the appellate court reaffirmed the district court’s decision and noted, “we agree that the NFL is an employer, and appellants its employees, within the meaning of DATWA.” *Williams* at 396.

¹¹⁰ *See generally* Genetic Employment Laws, NATIONAL CONFERENCE OF STATE LEGISLATURES (Jan. 2008), <http://www.ncsl.org/research/health/genetic-employment-laws> [<http://perma.cc/2UGJ-BSYT>].

¹¹¹ Anna Wermuth & Jeremy Glenn, *It’s No Revolution: Long Standing Legal Principles Mandate the Preemption of State Laws in Conflict with Section 3(o) of the Fair Labor Standards Act*, 40 U. MEM. L. REV. 839, 842–49; *see also* *The Almighty CBA, NFL CONCUSSION LITIG.* (Aug. 30, 2012), <http://nflconcuSSIONlitigation.com/?p=1080> [<http://perma.cc/T9SB-RM6R>] (explaining “Section 301 of the Labor Management Relations Act preempts all state law claims if they are substantially dependent upon, are inextricably intertwined or arise under the CBAs”); *but see* *Exception for*

tion 301 of the Labor Management Relations Act (“LMRA”) grants federal courts jurisdiction over “[s]uits for violation of contracts between an employer and a labor organization representing employees in an industry affecting commerce as defined in this chapter, or between any such labor organizations.”¹¹² The Supreme Court has recognized this jurisdictional grant as valid.¹¹³

Labor law experts have noted that while Section 301 appears to be only a jurisdictional provision, it was actually intended to create a “comprehensive, unified body of federal law [that would] govern actions concerning the interpretation and enforcement of collective bargaining agreements under the aegis of the Act.”¹¹⁴ The Supreme Court has indicated as much, holding in *Allis-Chalmers Corp. v. Lueck* that Section 301 preempted not only claims alleging breach of a CBA, but also any “state-law claim [that] is substantially dependent upon analysis of the terms of an agreement made between the parties.”¹¹⁵ In *San Diego Building Trades Council v. Garmon*, the Supreme Court went as far as to find that even the mere *potential* for conflict between state and federal law sufficient to require the application of preemption.¹¹⁶

Over fifty years have passed since the *Garmon* decision, and Congress has yet to explicitly disapprove of the Supreme Court’s expansive view of

Genetic Monitoring, in 3 AMERICANS WITH DISABILITIES: PRACTICE & COMPLIANCE MANUAL § 12A:48(4)(b) (West 2018) (requiring that genetic monitoring is done in compliance with “(b) state genetic monitoring regulations, in the case of a state that is implementing genetic monitoring regulations under the authority of the Occupational Safety and Health Act of 1970 (29 U.S.C.A. §§ 651 to 678”).

¹¹² 29 U.S.C.A. § 185(a) (2012).

¹¹³ See *Garner v. Teamsters Chauffeurs & Helpers Local Union No. 776*, 346 U.S. 485, 490 (1953) (“Congress did not merely lay down a substantive rule of law to be enforced by any tribunal competent to apply law generally to the parties. It went on to confide primary interpretation and application of its rules to a specific and specially constituted tribunal [(Federal Courts)] . . . Congress evidently considered that centralized administration of specially designed procedures was necessary to obtain uniform application of its substantive rules and to avoid those diversities and conflicts likely to result from a variety of local procedures and attitudes toward labor controversies . . .”).

¹¹⁴ John E. Higgins Jr. et al, DEVELOPING LABOR LAW, 2381(John E. Higgins Jr. et al. eds., 5th ed. 2006).

¹¹⁵ 471 U.S. 202, 220 (1985); see also *San Diego Bldg. Trades Council v. Garmon*, 359 U.S. 236, 244–45 (1959) (stating that “when an activity is arguably subject to §7 or §8 of the [NLRA], the States as well as the federal courts must defer to the exclusive competence of the NLRB if the danger of state interference with national policy is to be averted.”).

¹¹⁶ 359 U.S. at 246 (“The governing consideration is that to allow the State to control activities that are potentially subject to federal regulation involves too great a danger of conflict with national labor policy.”).

Section 301. As the Supreme Court noted in *Amalgamated Ass'n of Street, Electric Railway & Motor Coach Employees v. Lockridge*, “until [Garmon] is altered by congressional action or by judicial insights that are born of further experience with it, a heavy burden rests upon those who would, at this late date, ask this Court to abandon *Garmon* and set about again in quest of a system more nearly perfect.”¹¹⁷

Despite the far reach of federal preemption regarding CBAs, there remain a few exceptions that leave preemption of the field incomplete.¹¹⁸ However, even if a case involving a CBA dispute is heard in state court, Section 301 requires the reviewing state court to apply federal law.¹¹⁹

C. Implicated Federal Laws

The Proposed CBA Provisions required adherence to federal employment laws is made especially difficult because the interplay between the ACA, ADA, and GINA is complicated and uncertain, not yet having been resolved by the courts¹²⁰ or the Equal Employment Opportunity Commission (“EEOC”),¹²¹ the agency responsible for promulgating the ADA and GINA’s regulations and enforcing the statutes’ implementation.¹²² As such,

¹¹⁷ 403 U.S. 274, 302 (1971).

¹¹⁸ These exceptions include where (1) the state is acting as a market participant, as opposed to a regulator; (2) the regulated conduct is a concern tangential to the NLRA, or (3) if the regulated conduct affects interests that are particularly deeply rooted in local feeling and responsibility. *Garmon*, 359 U.S. at 243–44. These exceptions are unlikely to apply here.

¹¹⁹ See *United Steelworkers v. Rawson*, 495 U.S. 362, 368 (1990).

¹²⁰ *E.E.O.C. v. Honeywell Intern., Inc.*, CIV. 14-4517 ADM/TNL, 2014 WL 5795481, at *5 (D. Minn. Nov. 6, 2014) (“In sum, great uncertainty persists in regard to how the ACA, ADA and other federal statutes such as GINA are intended to interact”); see also E. Pierce Blue, *Wellness Program, the ADA, and GINA: Framing the Conflict*, 31 HOFSTRA LAB. & EMP. L.J. 367, 367–85 (2014); see also Press Release, EEOC, *Employer Wellness Programs Need Guidance to Avoid Discrimination* (May 8, 2013), <https://www.eeoc.gov/eeoc/newsroom/release/5-8-13.cfm>, [<http://perma.cc/TVY2-PHLB>] (“Other panelists . . . urged the Commission to provide guidance on the application of the ADA and GINA to wellness programs in order to facilitate employer compliance and clarify the relationship between the ADA, GINA, the Health Information Portability and Accountability Act (HIPPA) and the Affordable Care Act (ACA) provisions on incentives and penalties.”).

¹²¹ The EEOC has issued a “Final Rule” on how the ADA and GINA’s Title II apply to employee wellness programs. Press Release, EEOC, *EEOC Issues Final Rules on Employer Wellness Programs* (May 16, 2016), <https://www.eeoc.gov/eeoc/newsroom/release/5-16-16.cfm> [<http://perma.cc/BL89-JBSW>].

¹²² *Laws Enforced by EEOC*, EEOC, <https://www.eeoc.gov/laws/statutes/index.cfm> [<https://perma.cc/N5RX-3MA2>].

the following analysis will briefly cover the ACA and the ADA, with an emphasis on GINA due to its role in regulating the acquisition and use of genetic information by employers.¹²³

1. The Affordable Care Act

One of the ACA's major goals is to encourage individuals to be proactive about disease prevention.¹²⁴ It aims to accomplish this goal, in part, through employer-sponsored wellness programs,¹²⁵ which are encouraged in two distinct ways. First, the ACA provides financial resources through the Prevention and Public Health Fund to help employers plan and implement wellness programs.¹²⁶ Second, the ACA increases the previously defined limits for financial incentives that employers can offer to employees in exchange for employees' participation in wellness programs.¹²⁷ Despite the

¹²³ GINA is also the best statute to focus on as it is more restrictive than the ADA regarding an employer's ability to acquire medical information. Deborah Hembree, Brian Magargle & Robin Shea, *The EEOC, GINA and Wellness Programs: It's Not that Bad*, SOC'Y HUM. RES. MGMT. (Nov. 30, 2015), <https://www.shrm.org/resourcesandtools/hr-topics/benefits/pages/gina-wellness-eeoc.aspx> [http://perma.cc/8MDT-NWML].

¹²⁴ Howard K Koh & Kathleen G. Sebelius, *Promoting Prevention Through the Affordable Care Act*, 363 NEW ENG. J. MED. 1296 (2010) (former Secretary of Health and Human Services Kathleen Sebelius has written "[t]oo many people in our country are not reaching their full potential for health because of preventable conditions [The] Affordable Care Act responds to this need with a vibrant emphasis on disease prevention.").

¹²⁵ ACA regulations define a "wellness program" as "a program offered by an employer that is designed to promote health or prevent disease." 42 U.S.C.A. § 300gg-4(j) (2010).

¹²⁶ 42 U.S.C. § 300u-11 (2016), *amended by* PL 115-123, February 9, 2018, 132 Stat 308.

¹²⁷ Elizabeth A. Brown, *Workplace Wellness: Social Injustice*, 20 N.Y.U. J. LEGIS. & PUB. POL'Y 191, 219 (2017). Prior to the ACA's passage, the Department of Labor ("DOL") had capped incentives contingent upon participation in a wellness program at 20% of the total cost of an employee's insurance plan. Nondiscrimination & Wellness Programs in Health Coverage in the Group Market, 71 F. R. 75014, 75018 (Dec. 13, 2006). The ACA not only changed the cap from 20% to 30% (42 U.S.C. § 300gg-4(j)(3)(A) (2012)), but also vested the Secretaries of Treasury, Labor, and Health and Human Services with discretion to increase the cap to up to 50% of the cost of an employee's medical coverage. 42 U.S.C. § 300gg-4 (j)(3)(A) (2010). Subsequent regulations increased the incentive cap for smoking cessation and prevention programs to 50% but kept the cap for all other wellness programs at 30%. *See* Incentives for Nondiscriminatory Wellness Programs in Group Health Plans, 78 Fed. Reg. 33157, 33159 (June 3, 2013).

ACA encouraging the development of wellness programs, federal discrimination laws limit the impact of the ACA's encouragement.¹²⁸

2. The Americans with Disabilities Act (ADA)

The relevant part of the ADA for our purposes is Title I, which aims to prevent employment discrimination.¹²⁹ For an employer to be subject to the ADA's employment provisions, the employer must be an employment agency, labor organization, joint labor-management committee,¹³⁰ or an employer with fifteen or more employees.¹³¹ It is clear the NFLPA constitutes a labor organization,¹³² each NFL team constitutes an employer,¹³³ and for the purposes of this paper, we are assuming the NFL has an employment relationship with NFL players.¹³⁴ As the NFL has more than fifteen employees, it is also subject to Title I's employment provisions.¹³⁵

Under Title I, an employer may not discriminate against an employee because of a historical, current, or perceived disability.¹³⁶ Employers are also prohibited from requiring an employee to undergo a medical examination or inquiry that indicates whether, or the extent to which, an individual has a disability.¹³⁷ Regarding pre-offer medical examinations, this prohibition

¹²⁸ See generally Jennifer S. Bard, *When Public Health and Genetic Privacy Collide: Positive and Normative Theories Explaining how ACA's Expansion of Corporate Wellness Programs Conflicts with GINA's Privacy Rules*, 39 J.L. MED. ETHICS 469 (2011) (analyzing how the ACA's incentivizing of wellness programs interplays with GINA's privacy provisions).

¹²⁹ See 42 U.S.C. § 12112(a) (2012) ("No covered entity shall discriminate against a qualified individual on the basis of disability in regard to job application procedures, the hiring, advancement, or discharge of employees, employee compensation, job training, and other terms, conditions, and privileges of employment.").

¹³⁰ *Id.* § 12111(2).

¹³¹ *Id.*; *id.* § 12111(5)(A)–(B).

¹³² NFL Players Association, NFL Players Association Constitution Preamble (March 2007), available at https://ipmall.law.unh.edu/sites/default/files/hosted_resources/SportsEntLaw_Institute/League%20Constitutions%20&%20Bylaws/NFLPA%20Constitution%20-%20March%202007.pdf [https://perma.cc/GGY4-FUD7].

¹³³ See *supra* Section IV.A.

¹³⁴ *Id.*

¹³⁵ See Davis II, *supra* note 39 (noting that at the beginning of NFL camps there are 2,880 total players in the NFL, with that number dropping by a minimum of 1,184 (to 1,696) before the regular season starts).

¹³⁶ See 42 U.S.C. § 12112(a) (2012).

¹³⁷ *Id.* § 12112(d)(2), (4)(A); see also *AARP v. U. S. Equal Employment Opportunity Comm'n*, 226 F. Supp. 3d 7, 11–12 (D.D.C. 2016) ("Title I of the ADA bars employers from requiring medical examinations or inquiring as to whether an indi-

applies to employees with and without an ADA recognized disability.¹³⁸ Furthermore, these prohibitions extend to employers engaged in the collective bargaining process.¹³⁹ These protections are legal rights incapable of being waived under the ADA¹⁴⁰ or GINA.¹⁴¹ However, players' inability to waive their legal rights under GINA or the ADA does not negate players' collective ability to agree to be bound by a mandatory CBA arbitration agreement.¹⁴²

vidual has a disability unless the inquiry or examination is job-related and 'consistent with business necessity.'").

¹³⁸ See Michelle A. Travis, *Lashing Back at the ADA Backlash: How the Americans with Disabilities Act Benefits Americans Without Disabilities*, 76 TENN. L. REV. 311, 337 (2009) (quoting 42 U.S.C. § 1211(d)(2)(A)) (pointing out the ADA's pre-offer medical examination provisions refer to all "job applicant[s]," not just qualified individuals with a disability).

¹³⁹ See Condon A. McGlothlen & Gary N. Savine, *Eckles v. Consolidated Rail Corp.: Reconciling the ADA with Collective Bargaining Agreements: Is This the Correct Approach?*, 46 DEPAUL L. REV. 1043, 1044 (1997) (arguing the ADA "obviously prohibits an employer and union from entering into a collective bargaining agreement which . . . restricts the hiring of persons with AIDS [or members of other protected classes].").

¹⁴⁰ See EEOC, EEOC ENFORCEMENT GUIDANCE 915.002 (Apr. 10, 1997), <https://www.eeoc.gov/policy/docs/waiver.html> [<http://perma.cc/4LSU-FS94>] [hereinafter EEOC Enforcement Guidance 1997] (noting that "while a private agreement can eliminate an individual's right to personal recovery, it cannot interfere with [the] EEOC[']s [sic] right to enforce Title VII the EPA, the ADA, or the ADEA by seeking relief that will benefit the public and any victims of an employer's unlawful practices who have not validly waived their claims."); see also EEOC v. Cosmair, Inc., 821 F. 2d 1085 (5th Cir. 1987) (holding, in part, that while an employee cannot waive the right to file a charge with EEOC, he/she can waive the right to recover in his own lawsuit as well as the right to recover in a lawsuit brought by the EEOC on his/her behalf).

¹⁴¹ Because Title VII's precedent applies to the ADA, and GINA adopts the same process and remedies as Title VII, it follows that employees cannot waive potential GINA claims ahead of time. See EEOC Enforcement Guidance 1997, *supra* note 140.

¹⁴² See *supra* note 14 and accompanying text. Arbitration agreements relating to anti-discrimination claims have generally been found to be enforceable. 14 Penn Plaza LLC v. Pyett, 556 U.S. 247, 274 (2009) ("[W]e hold that a collective-bargaining agreement that clearly and unmistakably requires union members to arbitrate ADEA claims is enforceable as a matter of federal law"). That said, the EEOC can nonetheless sue on behalf of an aggrieved employee regardless of if that employee is contractually bound by an arbitration clause. JOHN F. BUCKLEY IV & MICHAEL R. LINDSAY, DEFENSE OF EQUAL EMPLOYMENT CLAIMS at § 19:3 (2d ed. Supp. 2013) (stating the EEOC "may pursue injunctive relief and seek any other relief not available in the arbitral forum even on behalf of a party that signed a pre-dispute arbitration agreement.").

It is likely that an NFL genetic testing program utilizing tests like those discussed in Section III will fit squarely within the EEOC's definition of "medical examination[s]."¹⁴³ Fortunately for the NFL, the ADA provides two relevant exceptions to its general prohibition on medical examinations, each of which may facilitate the legality of the proposed NFL testing programs.

First, the ADA allows medical examinations or inquiries where the "examination or inquiry is shown to be job-related and consistent with business necessity."¹⁴⁴ An examination or inquiry is "consistent with business necessity" when an employer "has a reasonable belief, based on objective evidence, that: (1) an employee's ability to perform essential job functions will be impaired by a medical condition; or (2) an employee will pose a direct threat due to a medical condition."¹⁴⁵ Essentially, "job-relatedness requires that the inquiry pertains to the specific job in question, whereas

¹⁴³ EEOC, ENFORCEMENT GUIDANCE: DISABILITY-RELATED INQUIRIES AND MEDICAL EXAMINATIONS OF EMPLOYEES UNDER THE AMERICANS WITH DISABILITIES ACT (ADA) 915.002, July 27, 2000, <https://www.eeoc.gov/policy/docs/guidance-inquiries.html> [http://perma.cc/NGF4-DNKG] [hereinafter ADA Enforcement Guidance] (defining a "medical examination" as a "procedure or test that seeks information about an individual's physical or mental impairments or health"). The EEOC provides seven criteria to use in determining if an evaluation is a "medical examination." These criteria include: "(1) whether the test is administered by a health care professional; (2) whether the test is interpreted by a health care professional; (3) whether the test is designed to reveal an impairment or physical or mental health; (4) whether the test is invasive; (5) whether the test measures an employee's performance of a task or measures his/her physiological responses to performing the task; [sic] (6) whether the test normally is given in a medical setting; and, (7) whether medical equipment is used." *Id.*

¹⁴⁴ 42 U.S.C. § 12112(d)(4)(A) (2016); *see also* U.S. Equal Employment Opportunity Comm'n, 226 F. Supp. 3d 7, 11–12 (D.D.C. 2016).

¹⁴⁵ ADA Enforcement Guidance, *supra* note 143. The EEOC has provided several examples of situations where job-related medical examinations would fit the "business necessity exception," including where a crane operator at a construction site is on break and becomes light-headed, has to abruptly sit down, and experiences shortness of breath. In talking about this incident with his supervisor, the crane operator states he has been affected by these same symptoms on multiple occasions in recent months, although he does not know the cause. Here, the employer has "a reasonable belief, based on objective evidence, that the employee will pose a direct threat [to workplace safety] and, therefore, may require the crane operator to have a medical examination to ascertain whether the symptoms he is experiencing make him unfit to perform his job." *Id.* The extent of the tests the employer could require would depend upon what tests are needed "[t]o ensure that [the employer] receives sufficient information" to make a determination about the crane operator's ability to perform his or her job safely. *Id.*

business necessity speaks to whether the particular examination is necessary to achieve a legitimate business purpose.”¹⁴⁶

These business-necessity requirements can sometimes be met where an employer knows an employee has a certain medical condition, observes the employee having performance problems, and reasonably attributes the problems to the medical condition.¹⁴⁷ The NFL genetic testing program should fit within this interpretation. The effects of neural trauma are a continually growing area of concern for professional football players, and players miss significant playing time after suffering concussions. If team ownership can identify concussion-related symptoms—dizziness, headaches, etc.—as the reason for a player missing playing time, the ownership can reasonably attribute the player’s inability to perform to the medical condition.

Unfortunately, the EEOC’s recent Final Rule on employee wellness programs states the ADA’s “business necessity” exception does not apply to GINA.¹⁴⁸ This issue has yet to be addressed by the courts. Implementing a CBA section using the “business necessity” exception must await either an EEOC rule change or successful legal action extending the “business necessity” exception to GINA.

Second, the ADA allows medical examinations or inquiries if done as part of a voluntary¹⁴⁹ wellness program.¹⁵⁰ Employers can also conduct medical examinations as part of an employer-sponsored wellness program, as long as employees participated voluntarily, and any medical records acquired

¹⁴⁶ Jessica L. Roberts et al., *Evaluating NFL Player Health and Performance: Legal and Ethical Issues*, 165 U. PA. L. REV. 227, 262 (2017).

¹⁴⁷ ADA Enforcement Guidance, *supra* note 143, at n. 5.

¹⁴⁸ Alyson Horn, *The Need to Reexamine Gina: A Call for a Business Necessity Exception to the Genetic Information Nondiscrimination Act*, 30 J. CONTEMP. HEALTH L. & POL’Y 316, 316 (2014) (“GINA does not offer a business necessity exception as found under the ADA.”).

¹⁴⁹ The EEOC, which administers both the ADA and GINA has yet to define “voluntary” in the context of wellness programs. While the EEOC was recently tasked with creating a definition, it is unclear if they will be able to do so. Sharon Begley, *‘Voluntary’ Workplace Wellness Dealt Setback by U.S. Court*, STAT, Aug. 23, 2017, <https://www.statnews.com/2017/08/23/voluntary-workplace-wellness-court/>, [<http://perma.cc/D2K5-TAB6>]. Despite the lack of a formal definition, past EEOC guidance has said a voluntary wellness program is one which “neither requires participation nor penalizes employees who do not participate.” Peggy R. Mastroianni, *ADA: Voluntary Wellness Programs & Reasonable Accommodation Obligations*, EEOC, Jan. 18, 2013, https://www.eeoc.gov/eeoc/foia/letters/2013/ada_wellness_programs.html, [<http://perma.cc/7S89-E8SB>]; *see also* ADA Enforcement Guidance, *supra* note 143.

¹⁵⁰ 29 C.F.R. § 1630.14(d); ADA Enforcement Guidance, *supra* note 143, at n. 22, 23.

as part of the program are kept confidential and separate from personnel records.¹⁵¹ Such inquiries do not need to be job-related in nature. Common medical examinations include cholesterol testing, blood pressure screening, and cancer screening.¹⁵²

There is a dearth of ADA case law involving genetic testing. However, some legal scholars believe post-hire, employer-implemented genetic testing would be permissible if (1) all employees are tested, (2) tests are kept confidential, (3) results use complies with the ADA,¹⁵³ and (4) testing is job-related and consistent with business necessity.¹⁵⁴

3. The Genetic Information Nondiscrimination Act (GINA)

The biggest hurdle for the implementation of the proposed testing program is whether it must adhere to GINA's Title II general prohibition against covered entities "request[ing], requir[ing], or purchas[ing] genetic information with respect to an employee."¹⁵⁵ The answer hinges on whether (1) the NFL and NFLPA are considered "covered entities" under Title II of GINA, and (2) the proposed tests require and analyze "genetic information."

Like the ADA, GINA regulations define a "covered entity" as "an employer, employing office, employment agency, labor organization, or joint labor-management committee."¹⁵⁶ As noted in Section IV.A, because the NFLPA and NFL teams are "employers" of NFL players, they are "covered entities." Like the ADA,¹⁵⁷ the NFLPA further qualifies as a "covered entity" because it constitutes a "labor organization" as defined by GINA.¹⁵⁸

¹⁵¹ See 42 U.S.C. § 12112(d)(4)(B) (2012); H.R. REP. NO. 101-485, pt. 2, at 75 (1990) ("As long as the programs are voluntary and the medical records are maintained in a confidential manner and not used for the purpose of limiting health insurance eligibility or preventing occupational advancement, these activities would fall within the purview of accepted activities.")

¹⁵² 29 C.F.R. § 1635.8(b)(2)(i)(A) (2016).

¹⁵³ 42 U.S.C. § 12112(d)(3) (2012).

¹⁵⁴ See *id.* § 12112(d)(4)(A); see also Roberts et al., *supra* note 146, at 266.

¹⁵⁵ 42 U.S.C. § 2000ff-1(b) (2008); 29 C.F.R. § 1635.8(a) (2011).

¹⁵⁶ Compare 42 U.S.C. § 12111(2) (defining "covered entity" to mean "an employer, employment agency, labor organization, or joint labor-management committee"), with 29 C.F.R. § 1635.2(b) (defining "covered entity" to mean "an employer, employing office, employment agency, labor organization, or joint labor-management committee.").

¹⁵⁷ See *infra* Section IV.C.2.

¹⁵⁸ 29 C.F.R. § 1635.2(h) (2011) (defining "labor organization" according to 42 U.S.C. § 2000(d), to mean an "organization with fifteen or more members engaged in an industry affecting commerce, and any agent of such an organization in which

Once again, we assume the NFL is also an “employer” under GINA,¹⁵⁹ and therefore a “covered entity.”

We consider to whether the proposed tests require and request “genetic information,” which is defined in GINA as including “information about: ¶ (i) An individual’s genetic tests” and “any request for, or receipt of, genetic services, or participation in clinical research which includes genetic services, by such individual.”¹⁶⁰

EEOC regulations implementing GINA further define a “genetic test” to mean “an analysis of human DNA, RNA, chromosomes, proteins, or metabolites that detects genotypes, mutations, or chromosomal changes.”¹⁶¹ The most viable current testing options for the proposed wellness program, outlined in Section III, fall within GINA’s definition of a “genetic test” as they analyze human DNA to detect either genotype variations or differences in gene expression.¹⁶² Furthermore, the gene to be examined as part of the NFL testing program are comparable to those examined in other “genetic tests” that the EEOC has listed in GINA regulations, including tests to determine predisposition to breast cancer (BRCA 1 or BRCA 2 gene variants), hereditary nonpolyposis colon cancer, Huntington’s Disease,¹⁶³ and alcoholism or drug use.¹⁶⁴

employees participate and which exists for the purpose, in whole or in part, of dealing with employers concerning grievances, labor disputes, wages, rates of pay, hours, or other terms or conditions of employment.”).

¹⁵⁹ 29 C.F.R. § 1635.2(d) (defining “employer” to mean “any person that employs an employee defined in § 1635.2(c) of this part, and any agent of such person, except that, as limited by section 701(b)(1) and (2) of the Civil Rights Act of 1964, 42 U.S.C. § 2000(e)(b)(1) and (2)”). This definition has several exceptions, but they do not apply to the instant situation. *See e.g.*, 29 C.F.R. § 1635.2(d) (noting “employer” does not “include an Indian tribe, or a bona fide private club (other than a labor organization) that is exempt from taxation under section 501(c) of the Internal Revenue Code of 1986.”).

¹⁶⁰ 42 U.S.C. § 2000ff(4)(A–B) (2008); 29 C.F.R. § 1635.3(c)(1)(iv) (2011).

¹⁶¹ 29 C.F.R. § 1635.3(f)(1).

¹⁶² Michael McCrea et al., *Role of Advanced Neuroimaging, Fluid Biomarkers and Genetic Testing in the Assessment of Sport-related Concussion: A Systematic Review*, 51 BRIT. J. SPORTS MED. 919, 925–26 (2017) (providing a review of recent concussion-related genetic testing research).

¹⁶³ 29 C.F.R. § 1635.3(f)(2)(i), (ii), (vi) (“(2) Genetic tests include, but are not limited to: ¶ (i) A test to determine whether someone has the BRCA1 or BRCA2 variant evidencing a predisposition to breast cancer, a test to determine whether someone has a genetic variant associated with hereditary nonpolyposis colon cancer, and a test for a genetic variant for Huntington’s Disease.”).

¹⁶⁴ 29 C.F.R. § 1635.3(f)(4)(ii).

EEOC GINA regulations also further define “genetic services” as including “genetic test[s], genetic counseling (including obtaining, interpreting, or assessing genetic information), or genetic education.”¹⁶⁵ The proposed NFL testing programs includes all three of these aspects—it will provide genetic testing and analysis, genetic counselors to inform players of their results and then educate players about the future implications of their testing results.

Therefore, as the proposed tests qualify as “genetic tests,” they constitute “genetic services.” As such, the proposed testing program must adhere to GINA’s Title II general prohibition. For the Proposed CBA Provisions creating the three NFL testing programs to be legal, these provisions must fit within one of the six exceptions to GINA’s general prohibition.¹⁶⁶ Of these six, there are two that allow for the lawful implementation of the Proposed CBA Provisions: (1) the employer-sponsored wellness program exception (“Wellness Program Exception”),¹⁶⁷ and (2) the genetic monitoring program for toxic substances in the workplace exception (“Genetic Monitoring Exception”).¹⁶⁸

a. Wellness Programs

GINA allows covered entities to collect genetic information where “health or genetic services are offered by the employer, including . . . services offered as part of a wellness program.”¹⁶⁹ Employer-sponsored wellness programs, whether GINA or ADA compliant (or both), are relatively common, with an estimated one half to two-thirds of employers having such programs.¹⁷⁰ For a wellness program including genetic services to be lawful, it must adhere to four requirements laid out in GINA, and its accompanying regulations.¹⁷¹ These requirements are discussed in turn.

¹⁶⁵ 29 C.F.R. § 1635.3(e).

¹⁶⁶ 42 U.S.C. § 2000ff-1(b) (2008).

¹⁶⁷ *Id.* § 2000ff-1(b)(2).

¹⁶⁸ *Id.* § 2000ff-1(b)(5).

¹⁶⁹ *Id.* § 2000ff-1(b)(2)(A). Such health or genetic services must also adhere to *id.* § 2000ff-1(b)(2)(B–D).

¹⁷⁰ Soeren Mattke et al., *WORKPLACE WELLNESS PROGRAMS STUDY: FINAL REPORT*, 101 (RAND ed., 2013) (estimating that 391,000 to 521,333 out of the approximately 782,000 employers with 15 or more employees offer some type of employer-sponsored wellness program).

¹⁷¹ The EEOC’s “Final Rule” guidance for wellness programs noted that such programs must also comply with Title I of the ADA and other EEOC enforced employment anti-discrimination laws. *See* 29 C.F.R. § 1635 (2011). A wellness program that provides medical care, including genetic counseling, may constitute a

i. The Wellness Program is Reasonably Designed

The proposed wellness program must be “reasonably designed to promote health or prevent disease.”¹⁷² A wellness program will meet this requirement if the program:

has a reasonable chance of improving the health of, or preventing disease in, participating individuals, and it is not overly burdensome, is not a subterfuge for violating Title II of GINA or other laws prohibiting employment discrimination, and is not highly suspect in the method chosen to promote health or prevent disease.¹⁷³

While courts have had limited opportunity to address this requirement in the context of GINA,¹⁷⁴ a rational analysis of the Player Wellness Program indicates it has a reasonable chance of improving the health of participating players. Players voluntarily participating in the program are likely to already be cognizant of their neural health. Therefore, if a player learns he has a significant predisposition to poor neural recovery post-concussion, it is reasonable to think the player will alter his playing style, attitude towards returning from a concussion, or the duration of his NFL career. One or more of these changes would likely lead to improved neural health.

Using the same reasoning, the wellness program likely also prevents disease, as participating players would be informed and educated about their genetic predisposition to developing neurological diseases like CTE. If players responded to this information with altered playing style, attitude towards concussion recovery, or early retirement, the wellness program may prevent or at least mitigate the development of CTE.

It is likely the proposed Player Wellness Program is also not “overly burdensome.” The program is completely voluntary, with players not required to participate, incentivized to participate, or punished for not participating. Any impact that participation in the wellness program has on the

group health plan that is required to comply with a host of other statutes including HIPAA nondiscrimination provisions as amended by the ACA (26 U.S.C. § 9802), section 702 of the ERISA (29 U.S.C. § 1182), and section 2705 of the PHS Act (i.e., Title I of GINA). 29 C.F.R. § 1635.8(b)(2)(vii) (2016).

¹⁷² 29 C.F.R. § 1635.8(b)(2)(i)(A).

¹⁷³ *Id.*

¹⁷⁴ *See, e.g.,* Dittmann v. ACS Human Services LLC, No. 2:16-CV-16-PPS-PRC, 2017 WL 819685, at *1 (N.D. Ind. Mar. 1, 2017) (stating in dicta that an employee wellness program, which incentivized participation in an online health questionnaire and wellness screening meant to determine if employees were smokers, with the employer’s removal of a \$500 tobacco surcharge charged annually to employees, was reasonably designed to improve employee health through encouraging employees to quit using tobacco).

player's monetary or employment outlook, will be a result of the player voluntarily acting upon the information he has been provided. The Player Wellness Program will also not be overly burdensome to the NFL or NFLPA, as they are hypothetically opting to include this program in the next CBA, rather than being forced to do so.

EEOC regulations further state that for a program testing or screening for health-related information to be "reasonably designed to promote health or prevent disease," the program must provide participants with follow-up consultation designed to improve the participants' health *or* the information collected must be "used to design a program that addresses at least a subset of conditions identified."¹⁷⁵ The proposed NFL Wellness Program fulfills the first of the two options. As explained above, the program has a reasonable likelihood of improving participant health by empowering players to make better-informed decisions about their neural health.

ii. The Employees Voluntarily Participate in the Wellness Program

An employee's participation in the Player Wellness Program must be voluntary.¹⁷⁶ Despite the significant importance of the "voluntary" requirement for wellness programs, Congress did not provide a definition of the term in either the ADA or GINA. The EEOC has, however, provided hints at the meaning of "voluntary" through regulations and enforcement guidance. A player's participation in the Player Wellness Program is likely to be found "voluntary" under GINA if the player is not required to participate in the wellness program, nor penalized for a lack of participation.¹⁷⁷ While employers offering wellness programs that don't involve genetic testing are able to offer employee inducements to facilitate participation,¹⁷⁸ the NFL cannot do so because of the genetic nature of its proposed testing.¹⁷⁹

¹⁷⁵ 29 C.F.R. § 1635.8(b)(2)(i)(A) (2016). Requiring the NFL teams to hire doctors to protect players' safety is not a new concept. The existing CBA already requires NFL clubs to hire doctors with a range of specialties including neurology, cardiovascular disease, and orthopedics. NFL CBA, *supra* note 75, at art. 39, § 1(a)–(b).

¹⁷⁶ 42 U.S.C. § 2000ff-1(b)(2)(B) (2008).

¹⁷⁷ 29 C.F.R. § 1635.8(b)(2)(i)(A) – (B) ("The provision of genetic information by the individual is voluntary, meaning the covered entity neither requires the individual to provide genetic information nor penalizes those who choose not to provide it."); *see also* Mastroianni, *supra* note 149.

¹⁷⁸ *See* Incentives for Nondiscriminatory Wellness Programs in Group Health Plans, 78 Fed. Reg. 33157, 33159 (June 3, 2013).

¹⁷⁹ *See* 29 C.F.R. § 1635.8(b)(2)(ii) (2016) ("[A] covered entity may not offer an inducement (financial or in-kind), whether in the form of a reward or penalty, for

To ensure voluntary participation, the participating employee must provide “prior, knowing, voluntary, and written authorization.”¹⁸⁰ An authorization form is only valid if it (1) is written in a way that is reasonably likely to be understood by the participating individual; (2) outlines the genetic information to be obtained, and the purpose of obtaining it; and (3) states how the collected information will be protected and handled according to GINA’s restrictions on disclosure of genetic information.¹⁸¹

iii. The Wellness Program Adheres to Reporting and Confidentiality Requirements

GINA requires any individually identifiable genetic information gathered as part of a player’s participation in a wellness program only be provided to the participating player and the “licensed health care professional[s] or board certified genetic counselor[s] involved in providing such services.”¹⁸² Such genetic information may not be disclosed to the employer, or anyone who makes employment decisions for the employer, unless disclosure is done in aggregate terms that do not reveal specific employees’ identities.¹⁸³

If genetic information is disclosed to the covered entity, the entity must maintain this information in files separate from personnel files and must treat this genetic information as a confidential medical record.¹⁸⁴ Regardless of how a covered entity acquires an employee’s genetic information,

individuals to provide genetic information”); *see also* 29 C.F.R. § 1635.8(b)(2)(iv) (“A covered entity may not . . . condition participation in an employer-sponsored wellness program or provide and inducement to an employee . . . in exchange for an agreement permitting the sale, exchange, sharing, transfer, or other disclosure of genetic information.”).

¹⁸⁰ 42 U.S.C. § 2000ff-1(b)(2)(B) (2008). Such authorization may be provided in electronic format. *Id.*

¹⁸¹ 29 C.F.R. § 1635.8(b)(2)(C)(1–3) (2016).

¹⁸² 42 U.S.C. § 2000ff-1(b)(2)(C) (2008); 29 C.F.R. § 1635.8(b)(2)(i)(D) (2016).

¹⁸³ *See* 42 U.S.C. § 2000ff-1(b)(2)(D) (2008); 29 C.F.R. § 1635.8(b)(2)(i)(D–E) (2016). EEOC regulations have noted a covered entity will not violate the requirement that information be provided to the entity in aggregate form if the entity “receives information that, for reasons outside the control of the provider or the covered entity (such as the small number of participants), makes the genetic information of a particular individual readily identifiable with no effort on the covered entity’s part.” 29 C.F.R. § 1635.8(b)(2)(i)(E) (2016).

¹⁸⁴ 29 C.F.R. § 1635.9(a)(1–2) (2011). Whether an entity may maintain an employee’s genetic information in the same file as other confidential medical information is subject to 42 U.S.C. § 12112(d)(3)(B) (2009).

there is a general prohibition against the covered entity disclosing this information.¹⁸⁵

These limitations on confidentiality and reporting are reflected in the Proposed CBA Provisions, as well as in the general structure of the wellness program. The wellness program is organized to be operationally independent of the NFL and to ensure the NFL exercises as little influence over the Player Wellness Program as possible. It is hopeful this independence will not only help maintain the reporting and confidentiality requirements once implemented, but also will serve to alleviate players' worries regarding wellness program participation, thereby encouraging participation.¹⁸⁶

b. Genetic Monitoring Programs

Another exception to GINA's blanket prohibition on employers collecting employees' genetic information is the Genetic Monitoring Exception.¹⁸⁷ This exception allows an employer to "acquire [an employee's] genetic information for use in genetic monitoring of the biological effects of toxic substances in the workplace."¹⁸⁸

There is no discernable case law or news coverage of an employer's use of this exception. That said, a rational analysis of the Genetic Monitoring Exception could find the proposed tests to be carried out in the Biomarker Monitoring Program and CTE Monitoring Program to constitute instances of "genetic monitoring of . . . biological effects of toxic substances in the workplace."¹⁸⁹

i. Genetic Monitoring Definition

GINA regulations define "genetic monitoring" as: the periodic examination of employees to evaluate acquired modifications to their genetic material, such as chromosomal damage or evidence of increased occurrence of mutations,¹⁹⁰ caused by the toxic substances they use or are

¹⁸⁵ See 29 C.F.R. § 1635.9(b) (2011). This general prohibition is subject to six exceptions where the entity may disclose an employee's genetic information. *See id.*

¹⁸⁶ It is reasonable to believe players will worry that if they volunteer to participate in this program, that their test results will end up in the hands of NFL clubs' front offices, and consequently negatively affect the players' employment opportunities and contractual bargaining power.

¹⁸⁷ 29 C.F.R. § 1635.8(b)(5) (2016).

¹⁸⁸ *Id.*

¹⁸⁹ *Id.*

¹⁹⁰ The quoted text preceding this note is hereinafter collectively referred to as "Part 1" of the "genetic monitoring" definition.

exposed to in performing their jobs,¹⁹¹ in order to identify, evaluate, and respond to the effects of, or to control adverse environmental exposures in the workplace.¹⁹²

1. *Acquired Genetic Modifications*

It is unlikely that the genetic tests discussed in Section III would fall within Part 1 of the genetic monitoring definition, as these tests' purpose is to test for genotype, not to evaluate acquired genetic modifications that may have occurred in the workplace. However, both the blood-based biomarker tests that objectively confirm neural injury and in vivo CTE testing will likely fall within Part 1 of the genetic monitoring definition.

Blood-based biomarker tests are likely to meet Part 1 as several recent studies have found TBI causes adverse genetic alterations, alteration of gene expression,¹⁹³ oxidative stress that damages proteins,¹⁹⁴ apoptotic cell death,¹⁹⁵ and accumulation of toxic proteins.¹⁹⁶ CTE testing should also meet Part 1 as studies have shown CTE causes, among other things, cellular

¹⁹¹ The quoted text subsequent to note 277 and preceding this note is hereinafter collectively referred to as "Part 2" of the genetic monitoring definition. The quoted text subsequent to this note is hereinafter collectively referred to as "Part 3" of this definition.

¹⁹² 29 C.F.R. § 1635.3(d) (2011).

¹⁹³ Compare 29 C.F.R. § 1635.3(d) (2011) (defining "genetic monitoring" as including the evaluation of genetic modifications including "chromosomal damage or evidence of increased occurrence of mutations"), with Qingying Meng et al., *Traumatic Brain Injury Induces Genome-Wide Transcriptomic, Methylation, and Network Perturbations in Brain and Blood Predicting Neurological Disorders*, 16 EBIO MEDICINE 184, 191–92 (2017) (finding TBI-caused genetic alterations put the injured individual at an increased risk for diseases including ADHD, Alzheimer's, Parkinson's, schizophrenia, and post-traumatic stress disorder); see also Richelle Mychasiuk et al., *The Development of Lasting Impairments: A Mild Pediatric Brain Injury Alters Gene Expression, Dendritic Morphology, and Synaptic Connectivity in the Prefrontal Cortex of Rats*, 288 NEUROSCIENCE 145 (2015) (finding mTBIs alter gene expression, synaptic connectivity, and dendritic morphology in rats).

¹⁹⁴ Joshua A. Smith et al., *Oxidative Stress, DNA Damage, and the Telomeric Complex as Therapeutic Targets in Acute Neurodegeneration*, 62 NEUROCHEM INT. 764 (2013) (finding oxidative stress is a major contributor to central nervous system injury pathophysiology, including TBI).

¹⁹⁵ Christopher C. Giza & David A. Hovda, *The New Neurometabolic Cascade of Concussion*, 75 NEUROSURGERY S24, S29 (2014) ("In addition to the effects of chronic energy impairment as a trigger to protease activation and apoptotic cell death, it is well known that normal cellular protein homeostasis depends upon a functioning system of protein degradation . . . it is not surprising that these links are now being made in TBI.").

death.¹⁹⁷ As all human cells carry chromosomes,¹⁹⁸ CTE-caused cellular death would consequently damage the cell's chromosomes, thereby fulfilling Part 1.

2. *Modifications are Caused by Toxic Substances in the Workplace*

We then move to Part 2 of the genetic monitoring definition—whether the genetic modifications in Part 1 were “caused by the toxic substance [employees] use or are exposed to in performing their jobs.” Unfortunately, GINA is of little use in this endeavor, as neither its text, nor its regulations define “toxic substances.”

Next, we apply traditional canons of statutory interpretation. In ascertaining Congress's intent to effectuate the purpose of the law in question,¹⁹⁹ courts will start with the statute's language, as this is the primary indication of Congress's intent.²⁰⁰ A reviewing court will likely first look to the ordinary meaning of the term or word,²⁰¹ which is often done by looking at the term's dictionary definition(s)²⁰² and colloquial meaning.²⁰³

¹⁹⁶ *Id.* (“it is well known that normal cellular protein homeostasis depends upon a functioning system of protein degradation There are many examples in neurodegenerative disease of cellular oxidative stress leading to oxidatively damaged proteins that can affect metabolic enzymes and/or the ubiquitin-proteasome system. This could then result in the accumulation of abnormal/toxic proteins [I]t is not surprising that these links are now being made in TBI.”).

¹⁹⁷ Ann C. McKee & Daniel H. Daneshvar, *The Neuropathology of Traumatic Brain Injury*, 127 *HAND. CLIN. NEUROLOGY* 45, 53 (2015) (noting CTE causes focal neuropathologic changes including “disseminated microgliosis and astrocytosis, myelinated axonopathy, and focal neurodegeneration.”).

¹⁹⁸ *Chromosomes*, NIH (June 16, 2015), <https://www.genome.gov/26524120/chromosomes-fact-sheet/> [<https://perma.cc/7Y4C-YGFC>].

¹⁹⁹ *DuBois v. Workers Comp. Appeals Bd.*, 5 Cal.4th 382, 387 (1993) (“A fundamental rule of statutory construction is that a court should ascertain the intent of the Legislature so as to effectuate the purpose of the law.”).

²⁰⁰ *United States v. Aguilar*, 21 F.3d 1475, 1480 (9th Cir. 1994), *aff'd in part, rev'd in part*, 515 U.S. 593 (1995).

²⁰¹ *Perrin v. United States*, 444 U.S. 37, 42 (1979) (“A fundamental canon of statutory construction is that, unless otherwise defined, words will be interpreted as taking their ordinary, contemporary, common meaning.”).

²⁰² *Smith v. United States*, 508 U.S. 223, 228–29 (1993) (the Supreme Court, in carrying out an exercise in statutory interpretation, looked to several dictionary definitions to determine a statutory term's ordinary and natural meaning).

²⁰³ *See Nix v. Hedden*, 149 U.S. 304, 307 (1893) (the Supreme Court considered testimony regarding the colloquial meaning of “tomato” in determining whether such is a fruit or vegetable); *but see United States v. Aguilar*, 515 U.S. 593, 616 (1995) (“Statutory language need not be colloquial.”).

Merriam-Webster Dictionary defines “toxic” as: “containing or being poisonous material especially when capable of causing death or serious debilitation,”²⁰⁴ and “substance” as “physical material from which something is made or which has discrete existence.”²⁰⁵ The tau protein that characterizes CTE’s development likely constitutes a “toxic substance” as tau protein is a poisonous material that can cause serious debilitation and death.²⁰⁶ The neurometabolic cascade the brain experiences post-concussion should also be found to be a “toxic substance,” as the cascade causes, among other things, apoptotic cell death, oxidative stress that damages proteins, and an abnormal accumulation of toxic proteins.²⁰⁷

A court is likely to also look at the use of “toxic substances” in other similar statutory contexts, such as the Toxic Substances Control Act²⁰⁸ and parts of the Occupational Safety and Health Standards Act (OSHA).²⁰⁹ Among the toxic substance categories listed in OSHA regulations are “bloodborne pathogens,”²¹⁰ which are defined as “pathogenic microorganisms that are present in human blood and can cause disease in humans.”²¹¹ As discussed in Section I.A. and III, mTBI cause a neurometabolic response in the brain that often causes secondary injury, which contributes to CTE—a diagnosable disease.

As the Genetic Monitoring Exception’s language is clear, courts are unlikely to heavily consider legislative history.²¹² However, if a court sought to do so, it would find such history lacking, as the Genetic Monitoring Exception was created by EEOC regulation, not by GINA’s enact-

²⁰⁴ *Toxic*, MERRIAM-WEBSTER DICTIONARY, <https://www.merriam-webster.com/dictionary/toxic> [<https://perma.cc/4267-3R6K>].

²⁰⁵ *Substance*, MERRIAM-WEBSTER DICTIONARY, <https://www.merriam-webster.com/dictionary/substance> [<https://perma.cc/Q66N-ZQ7C>].

²⁰⁶ Amanda L. Woerman et al., *Tau Prions from Alzheimer’s Disease and Chronic Traumatic Encephalopathy Patients Propagate in Cultured Cells*, 113 PROC. NATL. ACAD. SCI. 8187, 8187 (2016) (stating studies indicate tau protein plays a harmful role in neurodegeneration. Specifically, tau is linked to frontotemporal lobar degenerative diseases, including argyrophilic grain disease, corticobasal degeneration, Pick’s disease, and progressive supranuclear palsy).

²⁰⁷ See *infra* notes 192–95 and accompanying text.

²⁰⁸ See generally 15 U.S.C. §§ 2601–2629.

²⁰⁹ See 29 C.F.R. § 1910 (subpart Z) (2012).

²¹⁰ *Id.* § 1910.1030 (2012).

²¹¹ *Id.* § 1910.1030(b) (2012).

²¹² *Blum v. Stenson*, 465 U.S. 886, 896 (1984) (“Where, as here, resolution of a question of federal law turns on a statute and the intention of Congress, we look first to the statutory language and then to the legislative history if the statutory language is unclear.”).

ment.²¹³ If a reviewing court reaches this step, it may also consider the term's usage in regulatory programs²¹⁴ or prior cases.²¹⁵

3. *Monitoring is Meant to Identify, Evaluate, Respond to, or Control Adverse Exposures in the Workplace*

The Biomarker Monitoring Program is designed to objectively identify mTBIs. This program will also enable doctors to effectively evaluate and respond to mTBIs by providing information about the severity of the injury, informing steps for treatment, and indicating when a player has sufficiently recovered to return to play.²¹⁶ These improved tools hold promise in decreasing the likelihood of Second Impact Syndrome (SIS).²¹⁷

The CTE Monitoring Program is designed to identify the potential existence of CTE, and if it does exist, evaluate the extent of the injury. Furthermore, some think that gene editing could be used to treat, or at least mitigate the damage, of tau-related neurological diseases like CTE. As such, the CTE Monitoring Program would serve as the first line of defense, identifying the existence of CTE, thereby providing players with the necessary information to seek out potential gene editing treatments. The CTE Monitoring Program serves to empower players' autonomy through access to improved neural health information and education. This enables players to

²¹³ See 29 C.F.R. § 1635.8(b)(5) (2011).

²¹⁴ See, e.g., *Toxics Release Inventory (TRI) Program*, EPA, <https://www.epa.gov/toxics-release-inventory-tri-program/tri-listed-chemicals> [<https://perma.cc/LN6Y-FJ7F>] (outlining the EPA-created TRI program, which lists chemicals that cause: (1) cancer or other chronic human health effects, (2) significant adverse acute human health effects, (3) significant adverse environmental effects).

²¹⁵ *City of Waukesha v. E.P.A.*, 320 F.3d 228, 251 (D.C. Cir. 2003) (detailing an Environmental Protection Agency report on the toxicity of uranium, which said there is no threshold level of safety for uranium as it is a radionuclide that emits radiation that can cause cancer).

²¹⁶ See Svetlana A. Dambinova, Richard L Sowell & Joseph C. Maroon, *Gradual Return to Play: Potential Role of Neurotoxicity Biomarkers in Assessment of Concussions Severity*, J. MOLECULAR BIOMARKERS & DIAGNOSIS 1 (2013), doi:10.4172/2155-9929.S3-003.

²¹⁷ Second impact syndrome (SIS) occurs when an individual sustains an initial concussion, and then sustains a second concussion before the first has fully healed. This “causes the brain to ‘lose its ability to self-regulate pressure and blood volume flowing’ and causes rapid and severe brain swelling.” *Second Impact Syndrome: The Dangerous Effect of Multiple Concussions*, REVERE HEALTH (Sept. 20, 2016), <https://reverehealth.com/live-better/second-impact-syndrome-dangerous-effect-multiple-concussions/> [<https://perma.cc/9AJJ-NCNF>].

make better-informed decisions regarding whether to assume the risk of continuing to play football.

i. Statutory Requirements

Even if both the blood-based biomarker and the *in vivo* CTE testing programs meet GINA's definition of "genetic monitoring," the programs still must adhere to four main structural requirements to be GINA-compliant.

1. Written Notice

An employer wishing to carry out genetic monitoring must provide written notice of such to its employees.²¹⁸ Furthermore, GINA regulations require all participating employees in such a program to "give prior knowing, voluntary and written authorization."²¹⁹ The only instance in which authorization does not have to be voluntary is if genetic monitoring is required by federal or state statute.²²⁰ If a genetic monitoring program's proposed type of testing is not required by federal or state law, as is the case with the two proposed NFL programs, an employer may not retaliate or discriminate against an employee for refusing to participate in the monitoring.²²¹ As such, players' participation must be voluntary.²²²

2. Adequate Authorization Form

To satisfy the "prior knowing, voluntary, and written authorization" in the first requirement, the covered entity must use an authorization form that meets the same standards as the authorization form required by the

²¹⁸ 29 C.F.R. § 1635.8(b)(5) (2016).

²¹⁹ *Id.* § 1635.8(b)(5)(i) (2016). To adhere to GINA, the Genetic Monitoring Program's authorization requirements will need to meet the same threshold level as the Wellness Program Exception. *See id.* § 1635.8(b)(2)(i)(C).

²²⁰ *Id.* § 1635.8 (2016) (stating GINA's general prohibition against "requesting, requiring, or purchasing genetic information does not apply . . . [w]here an employer requests medical information from an individual as required, authorized, or permitted by Federal, State, or local law").

²²¹ *Id.* § 1635.8(b)(5) (2016); *see also* Regulations Under the Genetic Information Nondiscrimination Act of 2008, 75 FR 68912-01 ("the covered entity is prohibited from taking any adverse action, as that term is understood under Title VII of the Civil Rights Act of 1964 and other civil rights laws, against the individual.").

²²² *See infra* notes 176–78 and accompanying text.

Wellness Program Exception.²²³ This requirement should be easily met with regard to the CTE Monitoring Program, as this program will be implemented similarly to the proposed wellness program in Section IV.C.3.a.—in a controlled environment with relatively less testing urgency than the Biomarker Monitoring Program.

However, securing the necessary authorization for the Biomarker Monitoring Program will be more difficult because of the program’s designed time of use—immediately following a suspected neural injury. Besides the practical hurdles of trying to get a potentially injured player to fill out authorization forms on the sideline or in a locker room, it is unlikely a concussed player could give “knowing” or “voluntary” authorization as they have an altered, lessened mental state.²²⁴ To avoid these problems, season-long authorization for participation in the Biomarker Monitoring Program for the entire season should be obtained at the beginning of every NFL preseason.

3. *Genetic Monitoring Complies with Other Federal Genetic Monitoring Statutes and Accompanying Regulations*

GINA-compliant genetic monitoring programs must also adhere to other federal genetic monitoring statutes and regulations, including those “promulgated by the Secretary of Labor pursuant to the Occupational Safety and Health Act of 1970 (29 U.S.C. 651 *et seq.*), the Federal Mine Safety and Health Act of 1977 (30 U.S.C. 801 *et seq.*), and the Atomic Energy Act of 1954 (42 U.S.C. 2011 *et seq.*).”²²⁵ Of these, the Occupational Safety and Health Act is the most likely to have a bearing on the proposed NFL genetic monitoring programs’ legality because of its broad applicability.²²⁶

²²³ *Id.* § 1635.8(b)(5)(i) (2016); *see* 29 C.F.R. § (b)(2)(i)(C) (2016).

²²⁴ *Reid v. IBM Corp.*, 1997 WL 357969, at *7 (S.D.N.Y. June 26, 1997) (holding that a contract executed by a party who suffers from a mental illness or defect is voidable); *see also* *Kovian v. Fulton County Nat’l Bank and Trust Co.*, 857 F.Supp. 1032, 1039 (N.D.N.Y. 1994) (holding a contract executed under duress “is not per se void, but merely is voidable”); *see also* RESTATEMENT (SECOND) OF CONTRACTS § 175 (1981).

²²⁵ These include regulations “promulgated by the Secretary of Labor pursuant to the Occupational Safety and Health Act of 1970, 29 U.S.C. 651 *et seq.*, the Federal Mine Safety and Health Act of 1977, 30 U.S.C. 801 *et seq.*, and the Atomic Energy Act of 1954, 42 U.S.C. 2011 *et seq.*” 29 C.F.R. § 1635.8(b)(5)(ii) (2016).

²²⁶ *Am. Fed’n. of Lab. v. Hodgson*, CIV. A. 2515-72, 1973 WL 13961, at *2 (D.D.C. Jan. 2, 1973) (“It is designed specifically to achieve on a uniform, nationwide basis the far reaching goal of ‘assur[ing] so far as possible . . . safe and healthful

4. Provision of Testing Results

Regardless of whether a genetic monitoring program is required by applicable state or federal law, GINA nonetheless requires that participating employees be provided with their individual testing results.²²⁷ Meeting this requirement should be relatively easy for both of the NFL's proposed genetic monitoring programs, as these programs will adhere to a similar organizational structure and operational processes as the proposed NFL Wellness Program.²²⁸

However, as with the Wellness Program Exception, covered entities may not receive testing results, unless the results are provided in aggregate terms that do not disclose the identity of specific individuals.²²⁹ For the CTE Monitoring Program, this requirement is likely easily met utilizing the same confidentiality safeguards implemented in the proposed NFL Wellness Program.

Fulfillment of this requirement is more difficult when it comes to the Biomarker Monitoring Program. The crux of the problem is the way the program is meant to be utilized—on a sideline or in a locker room immediately following suspected neural injury. Because as few as one player might be suspected of receiving a concussion during a game and consequently undergoing biomarker testing, the likelihood of covered entities receiving aggregate information being able to attribute a testing result to a specific individual would be very high.

While GINA regulations note that such a situation, where a covered entity discerns the identity of a tested employee because of a small sample size, is not a GINA violation,²³⁰ this nonetheless would likely cause significant worry among NFL players. Adding additional confidentiality and reporting safeguards to the CBA provision relating to the Biomarker Monitoring Program is something players, via the NFLPA, would likely seek during the collective bargaining process.

working conditions" for all employees working in establishments engaged in interstate commerce' citing 29 U.S.C. § 651(b)).

²²⁷ 29 C.F.R. § 1635.8(b)(5) (2016).

²²⁸ See *infra* Section IV.C.3.a.

²²⁹ 29 C.F.R. § 1635.8(b)(5)(iii) (2016).

²³⁰ See 29 C.F.R. (b)(2)(i)(e) (2016) ("a covered entity will not violate the requirement that it receive information only in aggregate terms if it receives information that, for reasons outside the control of the provider or the covered entity (such as the small number of participants), makes the genetic information of a particular individual readily identifiable with no effort on the covered entity's part.").

VI. ARE THE PROPOSED GENETIC TESTING PROGRAMS LAWFUL?

While the genetic testing programs proposed in this article for the NFL are novel, the same is not true regarding the use of genetic testing by other major U.S. sports organizations. The NBA has had several high-profile instances of genetic test results impacting players' ability to secure employment.²³¹ MLB has also utilized genetic testing, in several instances using DNA tests to confirm or disprove the identity and age of certain Latin American baseball prospects.²³²

The NCAA, however, has been the most prolific user of genetic testing among major sporting organizations. Specifically, the NCAA requires all athletes competing under its umbrella be tested for the sickle cell gene trait,²³³ or alternatively sign a waiver exempting the NCAA (and the athlete's school) from liability in the event the player suffers harm related to the effects of sickle cell disease.²³⁴ Clearly, the utilization of genetic testing by large sports organizations is not a novel idea.

²³¹ In one instance, New York Knicks player Cuttino Mobley tested positive for hypertrophic cardiomyopathy (HCM), a genetic heart ailment, and was subsequently declared unfit to play. See *Mobley v. Madison Square Garden LP*, No. 11-8290, 2012 WL 2339270, at *2 (S.D.N.Y. June 14, 2012) (complaining the Knicks forced the plaintiff to retire against his will because of his HCM condition). In another instance, Isaiah Austin withdrew himself from the 2014 NBA draft after a physical revealed he suffered from Marfan Syndrome—a rare genetic disorder, which can comprise the heart's integrity during strenuous activity. Associated Press *Baylor Center Out of N.B.A. Draft*, N.Y. TIMES (June 23, 2014), <https://www.nytimes.com/2014/06/24/sports/basketball/baylor-center-out-of-nba-draft.html> [<https://perma.cc/L9C2-8DC7>] (on file with the Harvard Law School Library).

²³² Michael S. Schmidt & Alan Schwarz, *Baseball's Use of DNA Raises Questions*, N.Y. TIMES (July 21, 2009), <http://www.nytimes.com/2009/07/22/sports/baseball/22dna.html> [<https://perma.cc/JL6H-BUH7>] (on file with the Harvard Law School Library).

²³³ Sickle cell trait and sickle cell anemia are genetically inherited conditions that affect the shape of red blood cells, and consequently the ability of those cells to absorb and transport oxygen. Rose Eveleth, *Exercising Caution: Intensive Athletic Activity Could be Fatal to Those with Sickle-Cell Trait*, SCI. AM. (Aug. 13, 2013), <https://www.scientificamerican.com/article/athletic-activity-could-be-fatal-to-those-with-sickle-cell-trait/> [<https://perma.cc/SX8R-582V>] (on file with the Harvard Law School Library).

²³⁴ NCAA, NCAA SICKLE CELL TRAIT (SCT) TESTING - WHAT YOU NEED TO KNOW (2014), <https://www.ncaa.org/sites/default/files/SCT%20testing%20brief%202014.pdf> [<https://perma.cc/6T4C-W4BY>]. It is important to note the NCAA is not subject to the same employment-related restrictions on medical tests and acquisition of genetic information as professional sporting leagues like the NBA, MLB, and NFL.

A. *Is the Wellness Program Lawful?*

Distilled down, GINA's Wellness Program Exception allows employers to collect employees' genetic information as part of an employer-sponsored wellness program where (1) the wellness program is reasonably designed to achieve its stated health-improving outcomes, (2) participating employees voluntarily agree to the collection of such information, and (3) such information is only reported back to the employer in an aggregate, non-identifiable form.²³⁵ As analyzed in Section IV and V, the proposed CBA language fulfills these statutory requirements, and therefore an initial analysis of the legality of the proposed NFL Wellness Program should lead to the finding that it is lawful under the federal employment laws analyzed in this article.

That said, a dearth of case law addressing the legality of wellness programs that utilize genetic testing creates uncertainty regarding how the EEOC and addressing courts would rule on the legality of the proposed program.

B. *Are the Genetic Monitoring Programs Lawful?*

Courts have not had the opportunity to address (1) what constitutes genetic monitoring under GINA, (2) what constitutes a "toxic substance," (3) how GINA's Genetic Monitoring Exception is treated when other statutes, such as the ADA, are applied, and (4) whether a genetic monitoring program is legal under GINA's relevant provisions. Furthermore, the enforcing regulatory agencies have not issued guidance letters or statements in relation to GINA's genetic monitoring provisions. As such, how the EEOC or the courts would treat the proposed NFL genetic monitoring programs is largely unknown. That said, a reasoned analysis of the Genetic Monitoring Exception considering commonly-employed rules of statutory interpretation lead to the conclusion that the proposed genetic monitoring programs would be held lawful under GINA.²³⁶

CONCLUSION

Despite Dr. Omalu's stern warnings regarding the connection between football-caused head trauma and long-term neurological afflictions, he nonetheless does not go so far as advocating for the end of football. Rather, Dr.

²³⁵ See *infra* Section IV.C.3.a.

²³⁶ See *infra* Section IV.C.3.b.

Omalu has challenged us to “[t]rust in the great American ingenuity.” He believes “[w]e can derive more intelligent, more brain-friendly ways we can play football,” and that “[t]here are no rules that say we must play football the way it’s played today.”²³⁷

While the NFL failed to acknowledge Dr. Omalu’s initial repetitive head trauma and CTE-related warnings, it now has the chance to ensure it doesn’t make the same mistake again. The NFL should heed Dr. Omalu’s advice in trusting in the great American ingenuity. While blood-based biomarkers, advanced neuroimaging dyes, and genetic predisposition tests are important tools that show great promise for future application, they require further testing and validation to determine their clinical utility in best mitigating the negative long-term consequences of mTBI.

The NFL cannot wait around for researchers to develop these tests and technology on their own. The concussion epidemic is upon the NFL and it is not going to get better unless we can truly understand how the brain reacts to neural trauma. As many economists have opined, innovation occurs less frequently than is socially optimal.²³⁸ This is in large part because of the research and development costs associated with innovation.²³⁹ The NFL has an opportunity to accelerate the pace of innovation by making a genuine public and financial investment to developing the technologies outlined in this paper.

If these tests are sufficiently developed by the time the next NFL CBA is negotiated, the NFL and NFLPA should make a concerted effort to incorporate the Player Wellness Program, CTE Monitoring Program, and Biomarker Monitoring Program into the CBA’s language in a way that will comply with applicable federal laws, most notably GINA. The Wellness Program Exception and Genetic Monitoring Exception provide viable vehicles for the NFL to do this.

While the proposed genetic testing programs will not solve the “concussion epidemic,” they will help the NFL better treat mTBI when they do occur, and will best mitigate the negative long-term consequences that are the true crux of the fear that is behind the “concussion epidemic.” It is time for football to use the human head in a different, more productive way.

²³⁷ See *supra* note 53.

²³⁸ See Mansfield, *supra* note 80.

²³⁹ *Id.*

