Frequently Asked Questions related to the NFL–NFLPA Helmet Evaluations

1. **The poster includes a green-yellow-red color scheme. What does that indicate?**
   A statistical analysis was performed to group helmets based on similarity of performance, with the groups designated by color on the poster. The dark green group includes the highest ranked helmets that performed statistically similar to the top performing helmet models for 2022. The helmet rankings continue with the light green group whose helmets performed similar to models included in last year's dark green group based on the statistical analysis. The combined light and dark green groups are designated as *Top-Performing* helmets. Helmets with poorer laboratory performance were placed in the *Not Recommended* (yellow) or *Prohibited* (red) groups. Players are encouraged to wear helmets in the green. New players and those who did not wear a helmet from the yellow group during the 2021 season are not permitted to wear helmets from the yellow group this season; players who wore a *Not Recommended* (yellow) helmet during the 2021 season are encouraged to have a discussion with their team equipment manager or medical personnel about an alternate helmet choice in the green group prior to the 2022 season. No player may wear a helmet in the *Prohibited* group, which includes previously prohibited helmets and one additional model added to the list based on this year's testing.

2. **Are players required to wear one of the helmets in the top-performing (green) group?**
   Players are strongly encouraged to wear a helmet in the top-performing group. Over 99% of players wore a top-performing helmet during the 2021 season. Players must wear a helmet that is less than ten years old, has been certified to NOCSAE standards, and has been evaluated in the NFL-NFLPA testing program but is not one of the helmets that has been prohibited. A list of *Prohibited* helmets may be accessed online (Helmet Laboratory Performance Results). These prohibited models performed poorly in laboratory testing or were produced by companies no longer manufacturing football helmets. New players and those who did not wear a helmet from the yellow group during the 2021 season are not permitted to wear helmets from the *Not Recommended* (yellow) group this season and must wear a helmet from the top-performing group. Any player currently wearing a *Not Recommended* (yellow) helmet is encouraged to have a discussion with their team equipment and medical personnel about an alternate helmet choice in the green group prior to the 2022 season.

3. **Am I unsafe if I don't wear one of the top-performing green helmets?**
   All the helmets tested have been certified to NOCSAE standards which state: "a helmet certified to a NOCSAE standard provides a substantial level of protection for serious head injuries, including concussions" (https://nocsae.org/about-nocsae/faqs). The laboratory tests conducted in this study demonstrated that some helmets, those in the dark green group, performed better than other helmets in tests intended to replicate impacts experienced in NFL games. While analysis of the on-field injury rates by helmet model from 2015-2019 generally support the findings of the laboratory testing, it is important to remember the testing was done in a laboratory setting and only involved a limited number and type of impacts.[i]

4. **What did this study contribute?**
   This laboratory testing evaluated how helmets manage forces and motions that have been associated with concussions. Specifically, the testing accounts for linear acceleration and directional rotational kinematics of the head in assessing the performance of the helmets. There is mounting scientific evidence that a major component of concussion injury is caused by rotational motion of the head. The NFL and NFLPA believe these data and the resulting helmet

groupings provide valuable information to be shared with players about helmet safety. We also know that there is a lot more work to be done and this study, while important, comprises only a part of the NFL and NFLPA's broader research and education initiatives.

5. **If I wear one of the top-performing helmets, how much will it decrease the risk that I will sustain a concussion?**
   This study assesses the relative performance of helmets in controlled laboratory test conditions and cannot be used to predict a specific reduction in risk on the field. There are many other factors to consider when assessing risk including fit of the helmet, player position, player's medical history, and type of impact. These studies are ongoing and are updated annually. On-field helmet usage and concussion data from the 2015-2019 seasons has been analyzed to estimate the on-field rate of concussion relative to laboratory performance of helmets. This analysis determined that players wearing prohibited helmets were 24% more likely to sustain a concussion than those wearing helmets that ranked higher on the poster.[i] No helmet system can completely protect against serious brain and/or neck injuries a player might sustain while participating in football.

6. **Was there failure of any helmets?**
   The shells and paint cracked on the LIGHT LS1 Composite and LIGHT LS2 helmets at the highest test velocities indicating these helmets may not be able to withstand the rigors of the NFL game and practice environment; these models are prohibited for all players. Several other helmets sustained minor damage, listed below. The rankings are based exclusively on the ability of the helmet to reduce head impact severity in laboratory testing and do not address issues with helmet fit, retention, and long-term durability.

   Facemasks on all helmet models deformed at the highest impact speeds. Chin straps tore or pulled through the buckles in a few severe impacts for some helmets. Buckles came undone on some of the impacts. The chinstrap on the Xenith Shadow helmet tore and the cam-loc chinstrap attachments on the Riddell SpeedFlex shell helmets slipped and jammed during some highspeed facemask impacts. A facemask weld broke on the Schutt Vengeance Pro LTD helmet in a direct facemask impact at the highest impact speed. While damage occurred in these helmets, it occurred during tests at the highest impact speed to components that are routinely replaced.

7. **I am not happy with my current helmet and would like to switch. How do I choose from the helmet rankings?**
   This study's helmet evaluation should be regarded as one component used in assessing which helmet works best for a player. The equipment managers of each team are knowledgeable on the fit and performance of helmets. This season, players who change helmets may only select from the top-performing (green) helmets. Therefore, it is recommended that you work with your team's equipment manager to ask questions and ultimately select a helmet that works best for you.

8. **The helmet I want to wear is not listed on the poster. Am I permitted to wear it?**
   Several older, lesser-worn helmet models were removed from the poster this year and added to a legacy list of models that can be accessed online (Helmet Laboratory Performance Results). Models on the legacy list are colored by the group they would fall into for the 2022 poster. As with the helmets listed on the poster, helmets on the legacy list in dark green, light green, and yellow (unless you are new to the league in 2022 or did not wear a *Not*

Recommended (yellow) helmet in 2021) may be worn. If your helmet is not listed on the poster or legacy list, you may contact your equipment manager to request that your helmet model be tested so long as it meets all other certification requirements.

9. **Some of the helmets on the poster are listed in gray text. What does this mean?**
   This designation reflects that while the helmet is eligible to be worn by players, very few, if any, players wore that helmet last season. Helmets introduced prior to this season are listed in gray text on the poster if they were worn by fewer than 1% of players in 2021. This distinction is intended to offer players further information about their helmet decision.

10. **I use a facemask from a different manufacturer than my helmet. Was that considered in the testing?**
    No. The helmets tested included helmets and facemasks from the same manufacturer. However, you can use any facemask that is certified to NOCSAE standards for your particular helmet model and approved by the League Office. Certified facemasks for each helmet model are listed on the Safety Equipment Institute website (www.seinet.org).

11. **My helmet is a Virginia Tech five-star helmet but is not in the top-performing group on the poster. How can this happen?**
    While the Virginia Tech star ratings and this study both quantify helmets' ability to mitigate translational and rotational motion of the head, there are several differences between the test methodologies. The helmet impact locations, test apparatus, and evaluation metric are among these differences. In addition, the conditions chosen for our helmet evaluation represent impacts that are significant or caused concussion in the NFL. The Virginia Tech ratings assess helmets and weight results based on findings from collegiate players wearing instrumented helmets across a broad range of impact severities, including more mild impacts that did not cause concussion. Given these differences, the Virginia Tech ratings are worth considering in conjunction with the findings of this study when you make your helmet choice. Understanding the differences between the two studies and their results should help your decision making. Results and details about the different test methodologies can be found at www.nfl.com/playerhealthandsafety and www.helmet.beam.vt.edu.

12. **You have said that there is a lot more work to be done. What is the next step?**
    The NFL and NFLPA are working on numerous related projects to document on-field performance of helmets. When a player sustains a concussion in a game or practice, information on the player's position, type of play, contacting surface, and the helmet model is being collected. We also compare the on-field performance of helmet models to their corresponding performance in the laboratory testing. As we gain more information on the on-field conditions responsible for injury, we will periodically update the conditions and methodologies used to assess helmet performance in the laboratory. This information is regularly shared with equipment managers and players to further help guide helmet choice. This year we have begun to evaluate helmets based on their performance for impacts specific to different player positions and have evaluated several helmet shell add-on devices for use in practice scenarios.

13. **Who designed the experiments and conducted the analysis?**
    The experimental design and data analysis were performed by NFL-appointed engineering consultants, Dr. Jeff Crandall, Dr. Ann Good, and Dr. James Funk in conjunction with two NLFPA-appointed engineering consultants, Dr. Barry Myers and Dr. Kristy Arbogast. An

independent biostatistician, Dr. Timothy McMurry, was retained to help with the analysis of the data.

14. Who performed the testing?

The testing was conducted by an independent testing facility, Biokinetics Inc. of Ottawa, Canada. Biokinetics developed the linear impactor and test hardware that was used in the current study. Biokinetics has over 40 years of impact testing experience and has recognized expertise in helmet testing.

15. How do these results translate to performance for other levels of football?

It is important to emphasize that these results were based on testing intended to represent NFL impacts and thus, the conclusions on helmet performance cannot be applied to collegiate, high school, or youth football.

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[i] Bailey, A. M., McMurry, T. L., Cormier, J. M., Funk, J. R., Crandall, J. R., Mack, C. D., Myers, B. S. & Arbogast, K. B. (2020). Comparison of laboratory and on-field performance of American football helmets. *Annals of Biomedical Engineering, 48*(11), 2531-2541.