



Written Statement of
Richard M. Greenwald, PhD
before the Pennsylvania House Committee on Children & Health
Hearing on prohibiting the use of non-wood bats (HB 1482)
September 27, 2007

I am an Adjunct Associate Professor at the Thayer School of Engineering and Dartmouth College in Hanover, New Hampshire, and a specialist in bioengineering. I have focused in particular in my career on sports injuries. I have conducted extensive research on many sports-related safety issues, including safety and equipment performance issues relating to baseballs and softballs, baseball bats, skiing injuries, and football injuries.

I am President of the International Society for Skiing Safety, and President and founder of Simbex, a research and development company that develops products in the areas of sports protective equipment, rehabilitation equipment and mobility. Simbex has developed products used to monitor and record accelerations of the head during impact in football, products related to wrist injuries in sports such as snowboarding and in-line skating, and procedures designed to train the elderly to reduce falling. I have published peer reviewed papers on batted ball performance using wood and metal bats, as well as on the dynamic properties of baseballs, among many other sports-related topics.

I serve on a number of committees for the American Society of Testing Materials ("ASTM"), and am a chairman of the subcommittee of ASTM on baseball and softball equipment.

It is my understanding that the Committee is holding an informational hearing on Pennsylvania House Bill 1482, introduced by Representative Mike Carroll, which would prohibit non-wood bats in amateur softball and baseball games in the State of Pennsylvania.

As a leading expert in the field of sports safety, science, and equipment, and one who has done considerable research into this specific area, I would strongly oppose this legislation because there is no evidence that today's regulated non-wood bats are any more dangerous than wood bats.

Based on my research and testing experience with baseball bats, and in reviewing and analyzing data related to sports injuries in general, I would oppose any statement that linked such a limitation on using non-wood bats to injury, simply because there are no publicly available, peer reviewed scientific data to support this contention.

While there have been injuries, including a very few serious injuries, from batted balls off metal baseball bats, there is no scientific basis to support that these injuries were due to or caused by the use of a metal bat, or that these injuries would not also have occurred if the ball had been hit by a wood bat.

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I am aware of a number of sources of data on baseball injuries, including the University of North Carolina's catastrophic injury database, NCAA data and the National Emergency Injury Surveillance System database.

There are no data that I have seen that would support the contention that there has been any increase in the incidence or severity of impact injuries from batted balls at any age level, or in any specific league as a result of the use of non-wood bats. There is no literature of which I am aware to support the contention that metal bats have caused an increase in batted ball injuries to pitchers. Baseball and softball appear to have remained at the very low end of the sports-related injury incidence lists.¹

Additionally, there is nothing inherent in any particular material used in baseball bats which would lead to a greater safety risk. I know from my own research that there are significant variations in batted ball velocity between different models of metal bats.

It is also true that balls hit off wood bats have exit speeds similar to hits off metal bats. In my testing of wood bats and metal bats (which predated current NCAA and high school regulations with respect to metal bats), my colleagues and I found that there were batted ball speeds off wood bats that were at levels that were consistent with the highest performing metal bats we tested.

There was also far more variation in batted ball speeds from hit to hit for any given bat than there was in average batted ball speeds when comparing different bats.² Most of the (pre-regulation) non-wood bats in that study were found to have higher average batted ball speeds than wood bats.

Governing bodies in baseball (e.g. league, association, town) typically regulate the game of baseball via rules that may include bat and ball performance requirements. I understand that, in the past, such restrictions on bat and ball performance were typically aimed at adjusting levels of offense, home runs, game time. These issues can be addressed by regulation of the characteristics of the bat, rather than by a prohibition of all bats utilizing particular materials.

¹ It is important to note that a significant number of batted ball (and thrown ball) injuries in youth baseball arise from a condition called commotio cordis. Commotio cordis involves sudden cardiac death from being struck in the chest, but can occur from a baseball traveling at a low velocity as well as a higher velocity. Recent research has indicated that the injury is more likely dependent on the relative timing of the ball impact on the player's chest and the player's heart rhythm than on the velocity of the ball impact.

² While it is true that some of the metal bats used in my published research papers from our "Frozen Ropes" field study did outperform wood bats, none of those bats would qualify under today's NCAA baseball bat performance test (commonly known as the BESR, or Ball Exit Speed Ratio, test). One bat we tested which had characteristics more similar to today's regulated metal bats did not generate exit speeds which were statistically different from the tested wood bats.