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## Groundbreaking Ice Hockey Study Uncovers Alarming Concussion Incidence Rates and Social Trends in Junior Hockey Players

CHARLOTTESVILLE, Va. – A groundbreaking study on Canadian junior ice hockey published in the November 2010 *Neurosurgical Focus* uncovers alarming head injury/concussion data and trends that raise many questions about the safety and well being of teenagers and young adults who participate in this popular sport. Companion articles and editorial discuss return-to-play issues, the importance of increasing concussion awareness through education, and social/cultural behaviors. The case studies in the editorial provide compelling, firsthand accounts detailing the devastating impact concussions have on young athletes. The articles are posted online at http://theins.org/toc/foc/current.

A prospective study of physician-observed concussions during ice-hockey: implications for incidence rates is authored by Paul Sean Echlin, MD, AIM Health Group, Family Medicine, South London, Ontario, Canada. Co-authors are Charles H. Tator, MD (Western Hospital, University of Toronto); Michael D. Cusimano, MD (St. Michael's Hospital, University of Toronto); Robert C. Cantu, MD (Boston University Medical School, Boston, Mass.); Jack E. Taunton, MD (University of British Columbia, Vancouver, British Columbia); Ross E. G. Upshur, MD (University of Toronto); Craig R. Hall, PhD, and Andrew M. Johnson, PhD (University of Western Ontario, London, Ontario); and Elaine N. Skopelja, MALS (Indiana University, Bloomington, Ind.). Additional co-authors for the second and third paper are Michael Czarnota, PhD (Wayne State University, Detroit, Michigan); Molly Driediger, MSc (University of Western Ontario); and Suzanne Rivera, PhD (Nipissing University, North Bay, Ontario).

The cumulative and long-lasting effects of sports concussions have been the subject of recent heightened attention, including Congressional hearings in the U.S. In Canada, ice hockey is a major cause of sports-related concussion. "The aftermath of a concussion can impact memory, judgment, social conduct, reflexes, speech, balance and coordination. Epidemiological studies have suggested an association between sport concussions and both immediate and later-life cognitive impairment. As such, this is a public health issue that needs to be taken more seriously by players, parents, coaches, and medical professionals," said Dr. Echlin.

This is the first study to document the incidence of concussion in junior hockey players based on the 2009 Zurich consensus statement on concussions from the 3<sup>rd</sup> International Conference on Concussion in Sport. The Hockey Concussion Education Project (HCEP), a prospective cohort study was conducted during one junior hockey regular season (2009-2010) with 67 male icehockey players, ages 16-21 from two fourth-tier teams. Prior to the start of the season, players underwent baseline assessments using the Sideline Concussion Assessment Test (SCAT2) and the Immediate Post-Concussion Assessment and Cognitive Test (ImPACT).

Concussion surveillance was done at each regular season game of the participating teams by one independent physician and one to three independent, non-physician observers. Among the key study findings:

- Seventeen players suffered a total of 21 concussions during the 52 physician-observed games.
- Twenty-nine percent (5/17) of the HCEP players suffered a second or recurrent concussion during the study period.

- Eighty-eight percent (15/17) of the players with a diagnosed concussion admitted to having suffered at least one concussion in the past. Two of the seventeen players who suffered a concussion during the study admitted that they had concealed a concussion sustained during the current season in order to keep playing.
- The forward position suffered 71 percent of the concussions; defensemen 29 percent; and no concussions were incurred by goalies.
- Fifty-seven percent of diagnosed concussions occurred in the third period, 29 percent in the second period, and 14 percent in the first period.
- Twenty-four percent (5/21) of the HCEP concussions occurred in players who were directly involved in a fight immediately prior to their diagnosis.
- The mean clinical return-to-play duration in 15 players was 12.8 days.
- Players in the education intervention groups demonstrated a positive trend toward concussion knowledge retention compared to the control group.

"This study showed a disturbing lack of compliance by the athletes to undergo requested neuropsychological evaluations and multiple physician visits, as well as a lack of understanding about the seriousness of concussion. Complaints from players, coaches, and parents about this testing gave further credence to the importance of raising awareness about the serious long-term implications of concussions through education, which does appear to be beneficial according to our findings," said Dr. Tator.

"The reluctance to report concussion symptoms may result from cultural factors, as expressed in several of the case studies – athletes demonstrate perceived toughness to their parents, coaches, team mates and peers by playing through an injury; and the belief of the athlete that he or she is invincible, so winning overrides any consideration of the effect of the injury upon long-term health. It is imperative to bring about a cultural and philosophical change in this regard through stepped-up education efforts and enforcement of concussion protocols. At risk is something far more precious than winning a game, and that is the future health and well being of thousands of young athletes," concluded Dr. Echlin.

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