Abstract Title: High rates of bodychecking, head contacts, and suspected injuries found in youth ringette through video-analysis

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Objective: Ringette is a popular team ice sport in Canada, primarily played by females. Bodychecking is prohibited at all levels of play. This study used video-analysis to evaluate physical contact (PC), head contact (HC), and suspected injury and concussion incidence rates (IR) in youth ringette.

Study Design: Cross-sectional.

Subjects: Youth ringette players from the 2021-2022 season playing in the U16 (ages 14-15) or U19 (ages 16-18) age groups (A or AA levels). Games were filmed from regular season, provincials, and nationals (AA only).

Observation Technique: Game video-recordings were analyzed using Dartfish video-analysis software. Validated criteria were used to assess trunk PC intensity (levels 1-3=lower-intensity PC, levels 4-5=higher-intensity bodychecking), HC type (HC_1=direct player-to-player, HC_2=indirect), suspected injury (concussion, non-concussion), and penalty enforcement.

Outcome Measures: Multivariable Poisson regression analyses (adjusted for cluster by team-game, offset by game-minutes) were used to estimate PC, HC, and suspected injury and concussion IRs. Incidence rate ratios (IRR) were used to compare IR across age groups, levels of play, and game types. Proportions of bodychecks and HC_1s penalized were reported.

Results: Seventy-eight team-games were included (U16 n=40, U19 n=38; A n=30, AA n=48; regular season n=30, provincials n=32, nationals n=16). The overall bodychecking IR was 17.34/100 team-minutes (95% CI:14.80-20.33), HC 19.09/100 team-minutes (95% CI:16.74-21.78), suspected injury 1.53/100 team-minutes (95% CI:1.13-2.09), and suspected concussion 0.74/100 team-minutes (95% CI:0.48-1.13). Only 29% (95% CI:24.97-32.59) of bodychecks and 7% (95% CI:4.76-9.70) of HC_1s were penalized. No differences were found in bodychecking, HCs, or suspected injury and concussion IRs between age groups or levels of play. Bodychecking IRs were 64% (IRR=1.64; 95% CI:1.13-2.39) higher in provincials and 24% (IRR=1.24; 95% CI:1.02-1.50) higher in nationals than regular season games. A 31% (IRR=0.69; 95% CI:0.49-0.97) lower rate of HCs was reported in national games compared to provincial games. Bodychecking was the most common mechanism for concussion (70%) and non-concussion injuries (67%), with concussions most often associated with HC_2s (62.5%).

Conclusions: Bodychecking and HC_1 IRs were high among youth ringette players, despite rules prohibiting them. Future research should target prevention strategies aimed to reduce HC_1s and bodychecking to reduce injury and concussion IRs in youth ringette.