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Non-legislative interventions for the promotion of cycle helmet wearing by children: Evidence and implications for public health

Review on which this evidence summary is based:
Owen, R., Kendrick, D., Mulvaney, C., Coleman, T., & Royal, S. (2011). **Non-legislative interventions for the promotion of cycle helmet wearing by children**. *Cochrane Database of Systematic Reviews. (11)* Art. No.: CD003985.

Review Focus

P Children and adolescents between 0 and 18 years of age
I Interventions to promote bicycle helmet use that did not require the enactment of legislation
C Usual care/No intervention
O *Primary Outcomes:* Observed bicycle helmet wearing and self reported bicycle helmet ownership and bicycle helmet wearing

Review Quality Rating: 9 (strong) *Details on the methodological quality are available here.*

Considerations for Public Health Practice

Conclusions from Health Evidence

This is a well-done review of primary studies at moderate to high risk of bias.

- Overall, non-legislative interventions (community-based, school-based and the provision of free helmets) led to increased odds, of ***observed helmet wearing*** and ***self-reported helmet wearing.***
- Specifically, *community-based* interventions may be slightly more effective than *school-based* interventions, and the *provision of free helmets* (with education) more effective than education alone on the odds of **observed** OR **self-reported helmet wearing**
- Non-legislative interventions appeared more effective on observed helmet wearing among children < than 12 years.
- There was some evidence that interventions delivered in a *healthcare setting*, had a positive impact on **self-reported helmet wearing**
- Non-legislative interventions showed no impact on the odds of ***self-reported helmet ownership***
- *Subsidized helmet provision did not improve odds of observed and self-reported helmet wearing, or self-reported helmet ownership*.
- Eight of the twenty-nine included studies provided insufficient data to be included in the meta-analysis, and showed mixed results

NOTE: When randomized controlled trials, alone, were combined, non-legislative interventions had *no significant impact* on observed or self-reported helmet wearing, or on self-reported helmet ownership

General Implications

In general, findings of this review must be interpreted cautiously given the significant differences across study findings, moderate to high risk of bias of the included studies, and the bias associated with self-reported outcomes.

Based on this review, public health should promote and/or support:

- Community- or school-based interventions to improve ***observed and self-reported helmet wearing***
- Interventions focused on those <12 years of age to improve ***observed helmet wearing***
- Provision of free helmets (with the inclusion of education) to improve odds of ***observed*** OR ***self-reported helmet wearing***
- Provision of interventions delivered in a healthcare setting to increase *observed helmet wearing*

Based on limited evidence of effectiveness, public health decision makers should not promote/support:

- Provision of subsidized helmets (with education),
- Non-legislative interventions if the goal is to increase odds of *self-reported helmet ownership*

For some of the reported outcomes the number of studies was very small (i.e. n=2), and those studies were found to be at moderate to high risk of bias, which means the reported positive effect likely overestimated

	the true treatment effect. Public health should be aware and consider *that* the *long-term* effectiveness of these interventions remains unknown. Also, most sub-analyses (e.g. community-based interventions vs. control) were based on studies at **high risk of bias**. No/insufficient studies assessed: the impact of interventions in low-income communities; communities with existing bicycle helmet legislation; potential adverse effects (e.g. reduced cycling); or the impact of peer educators. This review did not evaluate if non-legislative interventions promoting the wearing of helmets resulted in fewer **head injuries** sustained by children.
Evidence and Implications	
What's the evidence?	**Implications for practice and policy**
1. Observed Helmet Wearing (11 studies, 3000 participants) • Overall, interventions increased the odds of observed helmet wearing (**OR 2.08**, 95%CI 1.29 to 3.34). ➢ Specifically, *community-based* (**OR 4.30**, 95%CI 2.24 to 8.25, four studies)*; school-based* (**OR 1.73**, 95%CI 1.03 to 2.91, eight studies)*; provision of free helmets* (**OR 4.35**, 95%CI 2.13 to 8.89, two studies); *population 12 years of age and under* (**OR 2.50**, 95%CI 1.17 to 5.37, five studies) • No impact with interventions providing subsidized helmets (with education).	**1. Observed Helmet Wearing** • Public health decision makers should support non-legislative interventions, based in community or schools, to increase observed helmet wearing, particularly among those aged 12 years and under. • Public health decision makers should support the provision of free helmets (with education), as preliminary evidence suggests a positive impact. • Public health interventions *should not* focus on provision of subsidized helmets (with education).
2. Self-reported Helmet Ownership (7 studies, 1529 participants) • No impact (**OR 2.67**, 95%CI 0.89 to 8.03), overall, with interventions on self-reported helmet ownership compared to no intervention, except in studies providing free helmets (**OR 2.14,** 95%CI 2.14 to 63.16, 3 studies).	**2. Self-reported Helmet Ownership** • To increase self-reported helmet ownership, public health decision makers should support non-legislative interventions *only* if the intervention includes provision of free helmets, while noting studies describing free provision were at high risk of bias.
3. Self-reported Helmet Wearing (9 studies, 1850 participants) • Overall, the odds of self-reported helmet wearing were greater among those receiving interventions (**OR 3.27,** 95%CI 1.56 to 6.87). ➢ Specifically, s*chool-based* (**OR 4.21**, 95%CI 1.06 to 16.74, six studies); *healthcare setting* (**OR 2.78**, 95%CI 1.38 to 5.61, two studies); *provision of free helmets* (**OR 7.27**, 95%CI 1.28 to 41.44, three studies); *provision of education-only* (**OR 1.93**, 95%CI 1.03 to 3.63, seven studies); and, *age >11 years* (**OR 4.99,** 95%CI 1.68 to 14.83, three studies) • No impact, specifically, on those < 12 years of age.	**3. Self-reported Helmet Wearing** • Public health decision makers should support non-legislative interventions to increase self-reported helmet wearing. • When prioritizing programs decision makers should note that the greatest impact is achieved when free helmets are provided. Public health decision makers *should not* support non-legislative interventions if the goal is to improve self-reported helmet wearing among those < 12 years of age.
4. Studies not Included in the Meta-analysis (8 studies) • Found mixed effects on both self-reported helmet ownership, and observed helmet wearing, across a variety of intervention settings.	**4. Studies not Included in the Meta-analysis** • Public health decision makers may want to consult these additional studies; however, because these studies could not be included in the meta-analysis due to poor outcome reporting, it is likely that they would over/underestimate the true intervention effect.

Legend: P – Population; I – Intervention; C – Comparison group; O – Outcomes; CI – Confidence Interval; OR – Odds Ratio; RR – Relative Risk
***For definitions please see the healthevidence.org Glossary http://www.healthevidence.org/glossary.aspx*

Why this issue is of interest to public health in Canada

In Canada, unintentional injury remains the leading cause of death for children ages one to fourteen years[1] and is estimated to cost the Canadian health care system approximately $10.7 billion annually.[2] Injury prevention is an important health promotion area to target as most injuries are preventable.[2] Cycling injuries specifically represented 7% of hospitalizations from unintentional injuries in Canadian children 1-14 years of age from 2000-2005.[3] In Ontario, 18 490 emergency room visits were a result of cycling injuries in children under 14 years in 2007-2009.[4] A properly fitted helmet decreases the risk of serious head and brain injury by as much as 85 per cent [6]; this means that 4/5 head injuries could be prevented if every cyclist wore a helmet.[6] Each severe brain injury costs our medical system over $400,000 at the time of injury, and has a significant long-term impact on a child's life and family functioning. Notably, Ontario's Chief Coroner 2012 report on cycling deaths included the recommendation "to promote and support helmet use for cyclists of all ages."[7] Cycling is a common form of exercise, an accessible form of active transportation and promotes independence in children and youth.[6] As such, promoting and enabling safe cycling practices should remain a public health priority.

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Other quality reviews on this topic are available on www.healthevidence.org

Suggested citation

McRae, L., Workentine, S., & Dobbins, M. (2012). Non-legislative interventions for the promotion of cycle helmet wearing by children: Evidence and implications for public health. Hamilton, ON: McMaster University. Retrieved from http://www.healthevidence.org/documents/byid/16356/Owen2011_EvidenceSummary_EN.pdf