

# **Bicycle Helmet Use Among Winnipeg Cyclists 2010**

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**September 2010**

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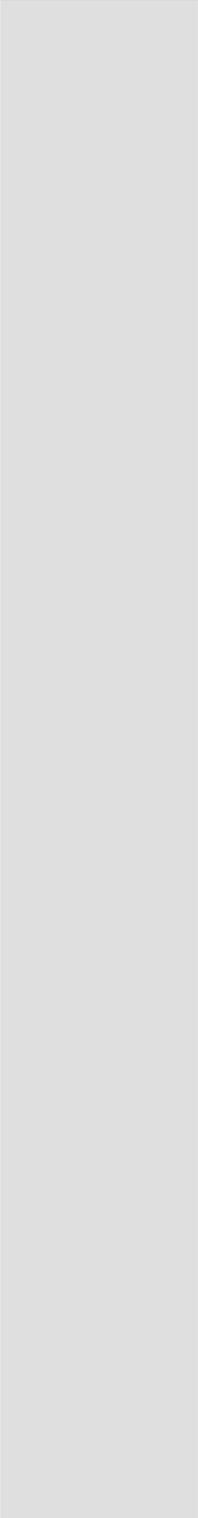
# Executive Summary

2010 marks the eighth wave of bicycle helmet use observations collected in Winnipeg by IMPACT since 1996. Data collection methods used for helmet observation at the 190 Winnipeg sites have remained consistent across all study years. In 2010, two trained observers conducted observations using standardized methods and remained at each site a maximum of 30 minutes in order to reduce the risk of double counting. In 2008 the method for coding socio-economic status of observation sites was revised with updated neighbourhood income data. The 12 Winnipeg Community Areas and 25 neighbourhood clusters of the Winnipeg Health Region were used, along with median family income and the percentage of the population living below the Low Income Cut-Off (LICO). These measure different aspects of neighbourhood socioeconomic status. In 2010 there were 13 new sites added to capture helmet use at elementary school sites in low-income areas in order to evaluate the impact of the Ride2Win campaign.

The Ride2Win campaign was developed and led by IMPACT and included launch of the Ride2Win.ca website featuring a helmet fit quiz contest and online activities for kids, teachers and parents. Many other initiatives were involved with the goal

of increasing helmet use, particularly in low-income areas. The campaign spanned May 28 to June 20. Pre- and post-observations were conducted for a period before and after those dates yet due to time constraints not all 190 sites were visited. Bicycle helmet use was observed at 104 of the 190 Winnipeg observation sites and the 13 new sites May 14-27, 2010 (pre-campaign phase; 1069 cyclists) and at the same sites June 21-July 25, 2010 (post-campaign phase; 1168 cyclists). In addition to the pre- and post-intervention data collection, all data collected in May-July 2010 were combined and analyzed.

Helmet trend data in this report demonstrate a need to continue to promote helmet use for Winnipeg cyclists of all ages. Helmet use was 34.5% in 2010, which represents a decrease from 2008, and is consistent with helmet use remaining below 40% in a jurisdiction without bicycle helmet legislation. Helmet use patterns are similar to previous years, with highest helmet use in young children, low helmet use among teens, greater helmet use by cyclists riding with both adults and children, higher helmet use by females and relatively high rates of incorrect helmet use. The age group most in need of a targeted strategy is teens and young adults. The strong



influence of adults riding with children in increasing helmet use suggests that parental helmet use should also be a focus. The disparity in helmet use between the lowest and highest income/poverty areas has not changed significantly over time, with cyclists in lower income areas being half as likely to wear a helmet as cyclists in higher income areas. These disparities warrant continued efforts in lower income communities in subsequent campaigns.

Overall helmet use in Winnipeg and correct use did not differ significantly before and after the Ride2Win campaign, however helmet use increased significantly in the four combined community areas with the lowest observed helmet use in 2010 (from 10.6% to 18.6%). When individual community areas were examined, helmet use increased significantly in one community area: Point Douglas (5.8% to 13.9%). Helmet use increased in cyclists less than 8 years of age and teens 16-19 however these differences were not statistically significant.

# Methods

This report is presented in three sections: summary of helmet use trends (1996-2010); analyses of helmet use in Winnipeg before and after the Ride2Win campaign in June 2010; and analyses for all 2010 observations combined.

## *Background*

Helmet use data have been collected by IMPACT for eight of the past 15 years in Winnipeg (1996-1998, 2003-4, 2006, 2008, 2010). The methods used for helmet observation and the 190 sites included in the dataset have remained consistent across all study years. Observation sites include parks, schools, residential streets, major intersections and cycling paths. One-sixth of observations are completed on weekends and one-sixth on weekday evenings, with the remainder on weekdays during the day. Data are collected for age (<8, 8-11, 12-15, 16-19, adult), gender, helmet use, correct use, riding companions, and the use of headphones.

## *Helmet Use by Socioeconomic Status*

In 2008 the method for coding socioeconomic status of observation sites was revised using updated neighbourhood income data. The 12 Winnipeg Community Areas and 25 neighbourhood clusters of the Winnipeg Health Region were selected

for this purpose, as there are data readily available for socio-demographic indicators as well as bicycle injury data available for these geographic areas. Community area maps were used to assign each of the 190 observation sites to 25 neighbourhood clusters (which by definition assigned them to 12 community areas); this facilitated coding of Median Total Family Income and the percentage of the population living below the Low Income Cut-Off (LICO) for each site. The entire dataset was recoded (1996-2008), enabling the comparison of helmet use by socioeconomic indicators over time. Median family income and LICO are both reported, as they measure different aspects of neighbourhood socioeconomic status. Neighbourhoods can be quite heterogeneous, having a mix of high and lower income households (e.g. downtown), and therefore may have an average median family income but a relatively high proportion of families living below the poverty line. For neighbourhoods that are more homogenous, the median family income and LICO may be more closely correlated measures of neighbourhood socioeconomic status.

### *Intervention: Ride2Win Campaign*

The Ride2Win campaign developed and led by IMPACT included: launch of the Ride2Win.ca website featuring a helmet fit quiz contest and online activities for kids, teachers and parents; helmet fit cards promoting the 2-V-1 helmet fitting strategy; distribution of free helmets to families who cannot afford them via public health, home visitors, and health care sites; Ride to Win poster and free helmets distributed to inner city schools, community centers and health care sites; education of public health and child health professionals about proper helmet fit; distribution of information to students and families through schools and child care facilities.

### *Campaign Evaluation*

In order to evaluate the impact of the Ride2Win campaign in lower income areas, community areas with the lowest observed helmet use in 2008 were oversampled in 2010 by adding 13 elementary schools. These schools were identified using the list of 15 Inner City district schools in the Winnipeg School Division. The final sample included 13 new schools; two of the 15 Inner City district schools were in the original sample of 190

sites so were excluded as new sites, an additional school not from this list was included (École Sacre Coeur) due to its inner city location, and one school was not assessed due to time constraints.

The Ride2Win campaign was launched May 28 and public communications and events continued until June 20. Two trained observers conducted observations using standardized methods and remained at each site a maximum of 30 minutes in order to reduce the risk of double counting. While the observers aimed to collect data at all 190 sites before and after the campaign, due to time constraints and the school calendar and summer vacation, some sites could not be assessed during both time periods. Bicycle helmet use was therefore observed at 104 of the 190 Winnipeg observation sites and the 13 new sites May 14-27, 2010 (pre-campaign phase; 1069 cyclists) and at the same sites June 21-July 25, 2010 (post-campaign phase; 1168 cyclists).

In the final sets of analyses all observations for 2010 (May-July) were combined and analyzed. Note that this sample is weighted to lower income areas as it includes an additional 13 sites from lower income community areas.

*Summary of Helmet Use Trends:  
1996-2010*

Between 1996 and 2010, 16,616 cyclists in Winnipeg were observed at 190 sites. For 2010 these 190 sites are included for this section of the report;

13 sites were added for the Ride2Win evaluation and weight the sample with additional low income areas sites so were excluded for trend analyses.

*Cyclist Observations by Year*

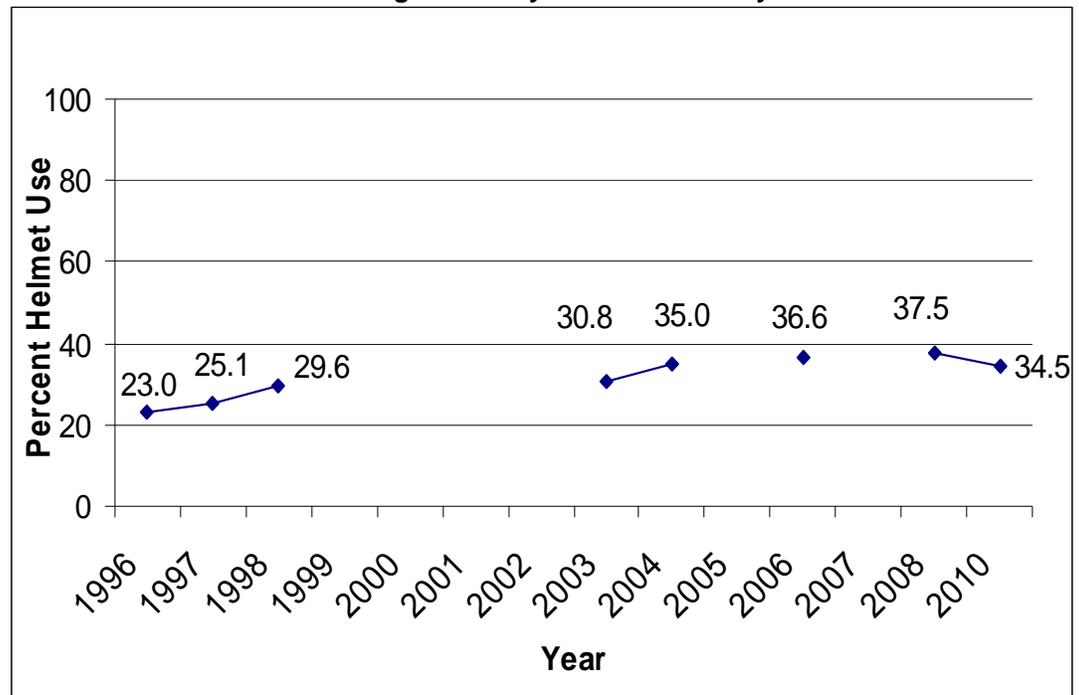
**Table 1. Cyclist Observations by Year**

Year	Number of Cyclists Observed
1996	2314
1997	1886
1998	1593
2003	1648
2004	1936
2006	2976
2008	1393
2010	2870

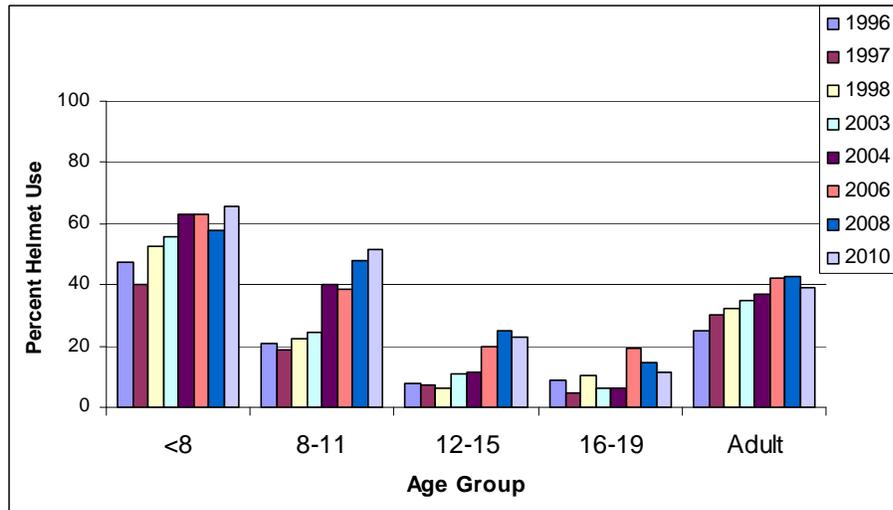
*Bicycle Helmet Use by Year*

Figure 1 illustrates the percentage helmet use by year for all ages combined, from 1996 to 2010. Helmet use has increased from 23% to 37.5% over the study years with a reduction in 2010 to 34.5%. Figure 2 shows helmet use over time by age group.

**Figure 1. Bicycle Helmet Use by Year**



### Helmet Use by Age and Year

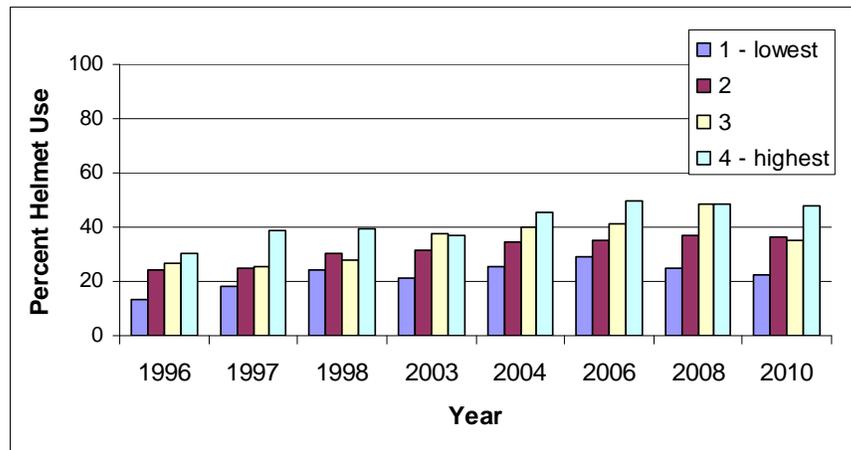


### Bicycle Helmet Use by Median Total Family Income

A stepwise socioeconomic gradient exists for helmet use which has been relatively consistent over time (Figure 3). The gap in helmet use between the lowest and highest income areas has increased slightly over time with helmet use increasing 8.7% in the

lowest income areas and 17.8% in the highest income areas. There was a gap of 16.7% in 1996 and 25.8% in 2010 for helmet use between the lowest and highest income areas. This represents a 2.2-fold difference in 1996 compared to a 2.2-fold difference in 2010.

**Figure 3. Bike Helmet Use by Median Total Family Income**

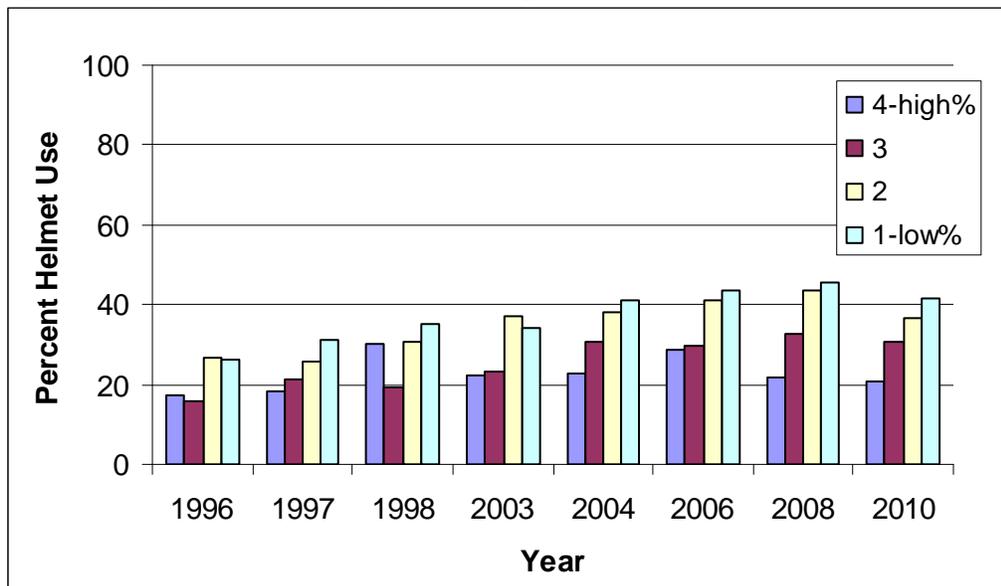


*Bicycle Helmet Use by LICO*

The gap in helmet use between the lowest and highest poverty areas has more than doubled over time; helmet use increased 3.7% in the highest poverty areas and 15.4% in the lowest poverty areas, with a gap of 9.2% in

1996 and 20.9% in 2010 between the lowest and highest income areas. This represents a 1.5-fold difference in 1996 compared to a 2.0-fold difference in 2010.

**Figure 4. Bicycle Helmet Use by Percentage LICO**

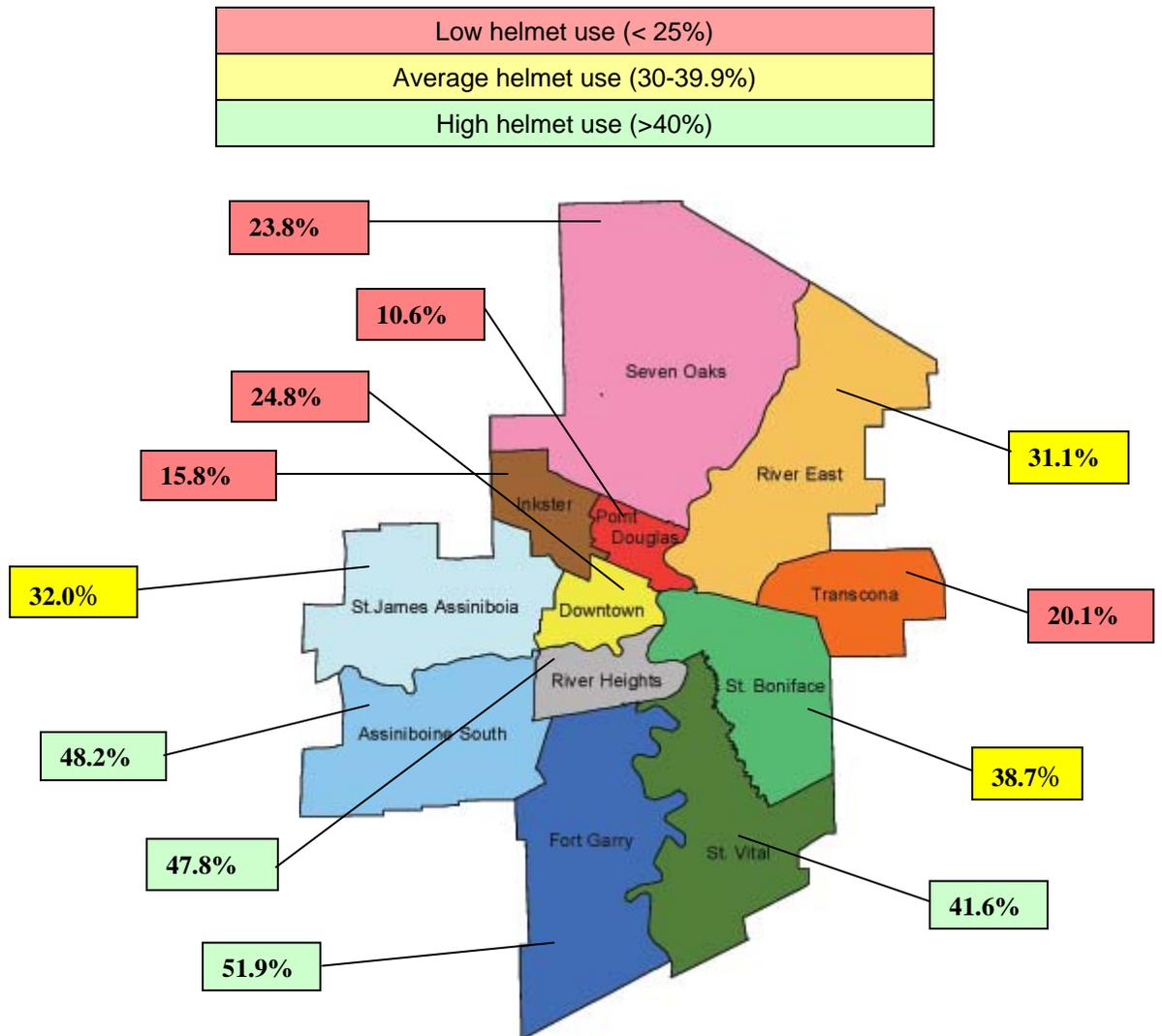


**Bicycle Helmet Use by Community Area**

Helmet use was then summarized by community area to describe the variation in helmet use across regions of the city (Table 2). Central and northern Winnipeg community areas

have lower helmet use (Point Douglas, Inkster, Transcona, Seven Oaks, Downtown). The highest helmet use was seen in River Heights, Assiniboine, St. Vital, and Fort Garry.

**Table 2. Bicycle Helmet Use by Winnipeg Community Area**



# Ride2Win Campaign Evaluation

The Ride2Win campaign was developed and led by IMPACT and included: launch of the Ride2Win.ca website featuring a helmet fit quiz contest and online activities for kids, teachers and parents; helmet fit cards promoting the 2-V-1 helmet fitting strategy; distribution of free helmets to those who cannot afford them via public health, home visitors, and health care sites; Ride to Win poster and free helmets distributed to inner city schools, community centers and health care sites in June 2010; education of public health and child care professionals about proper helmet fit; distribution of information to students and families through schools and child care facilities.

Methods related to the campaign evaluation are described on page 4.

## *Results: Highlights*

- Helmet use increased significantly in the four combined community areas with the lowest observed helmet use in 2010 (10.6% to 18.6%).
- When individual community areas were examined, helmet use increased significantly in one community area: Point Douglas (5.8% to 13.9%).
- Helmet use increased in cyclists less than 8 years of age and teens 16-19 however these differences were not statistically significant. Helmet use decreased among teens 12-15 years of age (11.0% to 4.1%).
- Overall helmet use and correct helmet use did not change significantly.

## *Summary*

Helmet use increased significantly in community areas targeted by the Ride2Win campaign. Further analyses are required to identify the most important predictors of helmet use, particularly among cyclists with the lowest helmet use.

### Summary Results: Helmet Use Before vs. After the Ride2Win Campaign

	Statistical Significance	Results
<b>Overall helmet use</b>	n.s.	30.1% vs. 29.3%
<b>Sex</b>		
Female	n.s.	39.6% vs. 35.4%
Male	n.s.	26.3% vs. 27.0%
<b>Age group</b>		
<8 years	n.s.	35.5% vs. 55.6%
8-11 years	n.s.	42.3% vs. 32.9%
<b>12-15 years</b>	<b>X<sup>2</sup>=4.46 p&lt; .05</b>	<b>Decreased from 11.0% to 4.1%</b>
16-19 years	n.s.	6.4% vs. 12.4%
Adults	n.s.	37.0% vs. 36.9%
<b>Community Area</b>		
1-St James	n.s.	30.0% vs. 34.0%
2-Assiniboine South	n.s.	56.6% vs. 46.2%
3-Fort Garry	n.s.	41.2% vs. 41.2%
4-St Vital	n.s.	40.0% vs. 36.5%
5-St Boniface	n.s.	55.2% vs. 37.0
6-Transcona	n.s.	10.2% vs. 20.0%
7-River East	n.s.	34.3% vs. 23.6%
8-Seven Oaks	n.s.	23.2% vs. 26.1%
9-Inkster	n.s.	10.4% vs. 19.4%
<b>10-Point Douglas</b>	<b>X<sup>2</sup>=5.146 p&lt;.05</b>	<b>Increased from 5.8% to 13.9%</b>
11-Downtown	n.s.	29.6% vs. 28.9%
12-River Heights	n.s.	51.7% vs. 41.2%
<b>Community Areas with Low, Mid-range and High Helmet Use</b>		
<b>LOW (CA 6,8,9,10)</b>	<b>X<sup>2</sup>=7.943 p&lt;.01</b>	<b>Increased 10.6% to 18.6%</b>
MID (CA 1,5,7,11)	n.s.	32.1% vs. 29.1%
HIGH (CA 2,3,4,12)	n.s.	46.3% vs. 41.2%

n.s. – not statistically significant; X<sup>2</sup> – the chi-squared statistical test

# 2010 Helmet Use Summary

In 2010, there were a total of 3235 cyclists observed between May and July at the 190 sites and 13 new sites.

### *Bicycle Helmet Use*

In 2010, overall bicycle helmet use was 33.8% (34.5% excluding the 13

new sites). Correct use was observed among 76.0% of bicycle helmet users (825 of 1086). The most common reasons for incorrect use included wearing the helmet too far back or forward and the straps not being properly positioned (Table 2).

**Table 2: Reasons for Incorrect Helmet Use**

Reason	Number (%)
Too far back	166 (63.6)
Too far forward	46 (17.6)
Straps loose or undone	38 (14.6)
Size – too large or too small	8 (3.1)
Angled sideways	2 (0.7)
Too far back + Straps not correct	1 (0.4)
Total	168 (100)

Teens 16-19 years of age (72.2%) and children less than eight years of age (72.3%) were more likely to be observed with incorrect helmet use. Adults had the highest rate of correct use (76.8%) closely followed by children 8-11 years of age (76.2%).

### *Bicycle Helmet Use by Gender*

Male cyclists had lower rates of helmet use (Table 3). This difference was statistically significant ( $\chi^2 = 32.732$ ,  $p < .0001$ ).

**Table 3. Bicycle Helmet Use by Gender**

Gender	Helmet Use % (n)	Cyclists (%)
Female	41.2% (393)	955 (29.5)
Male	30.8% (700)	2275 (70.3)
Unknown	20.0% (1)	5 (0.2)
Total	33.8% (1,094)	3,235 (100%)

*Bicycle Helmet Use by Age*

Helmet use was highest in children less than eight years of age and lowest in teens 16-19 years of age

(Table 4). Statistical testing of helmet use by age group yielded a statistically significant difference ( $\chi^2 = 214.803, p < .0001$ ).

**Table 4. Bicycle Helmet Use by Age**

Age Group	Helmet Use % (n)	Cyclists (%)
Less than 8	58.6% (65)	111 (3.4)
8-11	48.9% (110)	225 (7.0)
12-15	21.6% (100)	463 (14.3)
16-19	11.4% (54)	476 (14.7)
Adult	39.0% (765)	1960 (60.6)
Total	33.8% (1,094)	3,235 (100%)

*Bicycle Helmet Use by Riding Companions*

Cyclists riding with both adults and children had the highest helmet use rates (73.3%), followed by cyclists

riding with adults and cyclists riding alone (Table 5). Cyclists riding with children but no adults had the lowest helmet use rate. These differences were statistically significant ( $\chi^2 = 133.815, p < .0001$ ).

**Table 5. Helmet Use by Riding Companions**

Riding Companions	Helmet Use % (n)	Cyclists (%)
Riding Alone	33.1% (755)	2285 (70.6)
Riding with Children	20.5% (101)	493 (15.3)
Riding with Adults	46.1% (164)	356 (11.0)
Riding with Children and Adults	73.3% (74)	101 (3.1)
Total	33.8% (1,094)	3,235 (100)

### *Bicycle Helmet Use and Income*

Helmet use mostly increased with increasing median income (Table 6).

This difference was statistically significant ( $\chi^2 = 112.738$ ,  $p < .0001$ ).

**Table 6. Helmet Use by Median Total Family Income**

SES Category	Income Range	Helmet Use % (n)	Cyclists (%)
Low	26,583-42,556	24.1% (293)	1215 (37.6)
Low-Mid	42,557-54,726	36.4% (245)	674 (20.8)
Mid	54,727-64,944	34.9% (240)	688 (21.3)
High	64,945-83,654	48.0% (316)	658 (20.3)
Total		33.8% (1,094)	3,235 (100%)

Helmet use decreased with increasing poverty of the observation site neighbourhoods (Table 7). This difference was statistically significant

( $\chi^2 = 62.627$ ,  $p < .0001$ ). In the highest poverty areas, helmet use was 23.9%, much less than the rates seen in the lowest poverty areas (41.7%).

**Table 7. Helmet Use and Poverty (% LICO)**

LICO Category	Helmet Use % (n)	Cyclists (%)
4-11% (low poverty)	41.7% (367)	881 (27.2)
11.1-22%	36.4% (358)	985 (30.5)
22.1-34%	30.5% (193)	632 (19.5)
34.1-58 (high poverty)	23.9% (176)	737 (22.8)
Total	33.8% (1,094)	3,235 (100%)

### *Bicycle Helmet Use by Site Type*

Cyclists observed on cycling paths had the highest rates of helmet use (55.0%), whereas helmet use was

lowest on residential streets (29.9%, Table 8). These differences were statistically significant ( $\chi^2 = 41.832$ ,  $p < .0001$ ).

**Table 8. Helmet Use by Site Type**

Site Type	Helmet Use % (n)	Cyclists (%)
Cycling Path	55.0% (55)	100 (3.1)
Major Intersection	31.4% (292)	931 (28.8)
Park	40.9% (248)	606 (18.7)
Residential Street	29.9% (197)	659 (20.4)
School	32.2% (302)	939 (29.0)
Total	33.8% (1,094)	3,235 (100%)

### *Bicycle Helmet Use by Community Area*

Cyclists were observed in the 12 WRHA community areas. The highest rate of helmet use were found in Fort Garry (55.0%), whereas helmet use

was lowest in Point Douglas (10.3%, Table 9). These differences were statistically significant ( $\chi^2 = 233.79$ ,  $p < .0001$ ).

**Table 9. Helmet Use by Community Area**

Community Area	Helmet Use % (n)	Cyclists(%)
1 – St. James	32.0% (40)	125 (3.9)
2 – Assiniboine South	48.2% (157)	326 (10.1)
3 – Fort Garry	51.9% (207)	399 (12.3)
4 – St. Vital	41.6% (91)	219 (6.8)
5 – St. Boniface	38.7% (63)	163 (5.0)
6 - Transcona	20.1% (30)	149 (4.6)
7 – River East	31.1% (82)	264 (8.2)
8 – Seven Oaks	23.8% (44)	185 (5.7)
9 - Inkster	15.8% (19)	121 (3.7)
10 – Point Douglas	10.3% (30)	290 (9.0)
11 - Downtown	29.0% (223)	768 (23.7)
12 – River Heights	47.8% (108)	226 (7.0)
Total	33.8% (1,094)	3,235 (100%)

The community areas were subsequently grouped to increase the power of the statistical test by having three groups instead of 12. The following three community area groups resulted:

- LOW helmet use- community areas 10, 9, 6, 8 (10-24%)
- MID helmet use- community areas 11, 7, 1, 5 (29-39%)
- HIGH helmet use- community areas 4, 12, 2, 3 (42-52%)

Helmet use increased significantly between low, mid and high helmet

use community areas ( $\chi^2 = 211.208$ ,  $p < .0001$ ) as seen below in Table 10.

**Table 10. Use of Bicycle Helmet Use by Community Areas**

CA Group	Helmet Use % (n)	Cyclists (%)
1 -- LOW	16.5% (123)	745 (23.0)
2 -- MED	30.9% (408)	1320 (40.8)
3 -- HIGH	48.1% (563)	1170 (36.2)
Total	33.8% (1,094)	3,235 (100%)

*Headphones*

Headphones were reported for 5.4% of riders; rates of helmet use differed

significantly by headphone use ( $\chi^2 = 7.432$ ,  $p < .05$ ; Table 11).

**Table 11. Helmet Use by Headphone Use**

Headphones	Helmet Use % (n)	Cyclists(%)
Yes	35.8% (62)	173 (5.4)
No	34.1% (1013)	2973 (91.9)
UK	20.5% (18)	88 (2.7)
Total	33.8% (1,094)	3,234 (100%)

# Summary and Conclusions

## *Helmet Use Trends*

- Helmet use increased an average of 1.2% per year from 1996-2008 followed by a decrease of 3% between 2008 and 2010.
- Helmet use has increased more significantly among teens (12-19 years of age) in recent years (2006, 2008) however they are still the least likely to wear helmets compared to other age groups. Rates are now declining slightly.
- Cyclists observed in lower income/higher poverty areas have significantly lower helmet use rates.
- The disparity in helmet use between the lowest and highest income/poverty areas has not changed significantly over time, with cyclists in lower income areas being half as likely to wear a helmet as cyclists in higher income areas.

## *Ride2Win Evaluation*

- Helmet use increased significantly in the four combined community areas with the lowest observed helmet use in 2010 (10.6% to 18.6%).
- When individual community areas were examined, helmet use increased significantly in one community area: Point Douglas (5.8% to 13.9%).
- Helmet use increased in cyclists less than 8 years of age and teens 16-19 however these differences were not statistically significant. Helmet use decreased among teens 12-15 years of age (11.0% to 4.1%).
- Overall helmet use and correct helmet use did not change significantly.

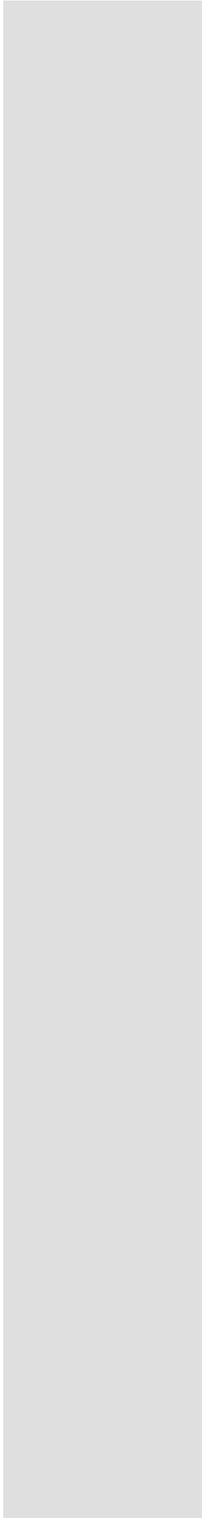
## *Helmet Use in 2010*

- Children less than 8 years of age have the highest helmet use (58.6%) and teens 16-19 years of age have the lowest helmet use (11.4%).
- Cyclists riding with both adults and children have the highest helmet use rates (73.3%).
- Incorrect use remains a significant issue (24%), particularly for teens and younger riders.
- Females are 1.3X more likely to wear helmets than males.
- There is a two-fold difference in helmet use between the lowest and highest income/poverty areas.
- Helmet use is lowest on residential streets and schools and highest on cycling paths.

# Recommendations

Helmet trend data in this report demonstrate a need to continue to promote helmet use for Winnipeg cyclists of all ages. Helmet use has increased very slightly over time, and remains well below 40%. Socioeconomic gaps remain, and are *increasing over time*, indicating a need to expand and build upon strategies directed at these disparities. The youngest cyclists, who have had the highest helmet use consistently over time, appear to have leveled off, and dropped slightly in 2008. Helmet use in adults has also leveled off, indicating a need to consider additional strategies to increase and remain above 40%. Numerous other jurisdictions have experienced a similar trend, with helmet use approaching 40% with a variety of non-legislative strategies. Research has shown that legislation is required to increase rates significantly above this level.<sup>1,2,3</sup> Research has also shown that legislation reduces bicycle-related injuries requiring hospitalization. A Canadian study demonstrated that bicycle-related head injury admissions reduced 45% between 1994 and 1998 in provinces with legislation compared to 27% in provinces and territories without legislation.<sup>4</sup>

Of particular importance is the observation that children riding with adults have the highest helmet use. Promotion of helmet use for the entire family should be a priority objective of any future initiative. This is also supported by research literature that demonstrates the highest helmet use in children accompanied by helmeted adults.<sup>5</sup> Children riding with helmeted adults are nine times more likely to wear a helmet than children riding with non-helmeted riders; in this study helmet use was 95% for children riding with helmeted adults and 41% for children riding with non-helmeted adults.<sup>5</sup> While all ages legislation has been shown to increase helmet use in adult cyclists,<sup>2</sup> helmet legislation for cyclists less than 18 years of age has increased helmet use only among cyclists in that age group, and not among older cyclists.<sup>6</sup> Self-reported helmet use increases significantly as the comprehensiveness of helmet legislation increases; helmet use was over 70% for respondents with all-ages legislation compared to 40% for those with legislation for children <18 years of age and 27% with no legislation. The impact of legislation was strongest for rural cyclists, who were 22 times more likely to wear a helmet where there was all-ages legislation vs. no legislation.<sup>7</sup> In other words, all



ages legislation is required to increase helmet use in adults, which is strongly correlated to helmet use in children. A successful helmet promotion strategy will also require ongoing and enhanced promotion of helmet use through public education and targeted programs such as low cost helmet distribution and other strategies to address disparities observed in lower income areas. Correct helmet use

continues to be an issue and should be an ongoing focus of public education campaigns. Helmet use is one important aspect of a broader safe cycling strategy which should also include evidence-based measures which address road, cyclist, and driver factors. Collaboration with other community and provincial partners will be critical to the success of these strategies.

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