DANSK CYKLIST FORBUND

An Interactive Qualifying Project Report
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ABSTRACT

This report, prepared for the Danish Cyclist Federation, describes the current status of bicycle helmet usage in Denmark according to statistics and people's attitudes on the subject. Working from publications and focus groups, we ascertained enough data to portray the bicycle helmet situation. Our results depict a population that rarely uses bicycle helmets and does not intend to despite possible mandating laws. Our recommendation is to promote voluntary helmet use through extensive campaigns because a mandatory law is not plausible.

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1.0 Introduction

Bicycle riders face many risks each time they ride their bicycles. There is always the possibility of a crash, either by the cyclist losing control and falling or by colliding with another obstruction such as a car. Head injuries are the most common cause of death and serious disability in bicycle related crashes. The Bicycle Helmet Safety Institute states that the head is hit in 38% of all bicycle accidents.

The Dansk Cyklist Forbund (Danish Cyclist Federation or DCF) is concerned about the safety of bicycle riders in Denmark, and recognizes the societal and health benefits inherent in such daily exercise. The DCF estimates that there are four million bicycles in Denmark and that one million people use bicycles as daily transportation. The Director of the DCF, Jens Pedersen, has requested information regarding bicycle helmets and bicycle safety in general. Eventually, the DCF may be asked by the Parliament to take a stand or offer an opinion on the issue of mandatory bicycle helmet use.

The Danish Cyclist Federation is a non-governmental organization focused on the promotion of bicycle use and the representation of bicyclists throughout Denmark. The DCF participates in many national council meetings dealing with the road sector. In the Traffic Safety Commission of the Danish Parliament, the DCF enjoys 1/22 voting group. The DCF sponsors a campaign to promote bicycle use, called "Vi Cykler Til Arbejde" (take your bike to work). 77,000 people participated in the 2000 campaign and an estimated one hundred thousand are expected to participate this year. The DCF is financed through dues, a bicycle accessory shop, and contributions from the Minister of Finance. For special projects, money is solicited from the government and sponsors.

There is no equivalent bicycle promotion organization with such a large membership in the United States.

In the United States, bicycle helmet use has been recently publicized. Currently, the federal government in the United States has left the issue of requiring helmets up to the states and localities, and such laws began appearing in 1987. Currently, twenty-eight states have laws requiring helmets for some age groups. Some states, like Delaware, for example, have a state law requiring helmets for everyone less than sixteen years of age. Seventeen states have passed statewide laws in the past ten years. Our team has provided the DCF with domestic (i.e., American) information to help determine its stance on whether or not Denmark should pass its own law.

The goal of this project was to gather information and statistics for the Danish Cyclist Federation so that it would have the statistical foundation to make a well-informed decision about its position on the issue of bicycle helmet use. A variety of different social and medical factors were investigated as this information was gathered. Some of these different areas include the number of people that wear helmets compared to the number that do not wear bicycle helmets, the reasons for these choices, the attitudes from around the world regarding mandatory bicycle helmet use, and various statistics on bicycle safety and the effectiveness of helmets.

This report presents background information on various topics such as bicycle helmet quality and standards, laws governing bicycle use, and statistics related to international bicycle safety. It also provides valuable insight from experts in the field through the use of interviews. Furthermore, the report describes the methods employed by the project team while in Worcester and Copenhagen with regards to the information

gathering process. Finally, this report gives the results of the focus groups and interviews conducted, and qualitatively and quantitatively analyzes those results. These results lead directly to the conclusion of this report, and our recommendations on the legitimacy and justification of a bicycle helmet mandate.

2.0 Background Information

This background information is designed to provide a context for the complex issue of bicycle safety, specifically helmet usage. Many issues need to be taken into consideration if a mandatory bicycle helmet law is going to be implemented in Denmark. This chapter will provide the Danish Cyclist Federation with the necessary information to take a stance on the subject of mandatory helmet use.

2.1 The Evolution of Bicycle Design and Safety

Ever since the early days of bicycling, there have been injuries. By far, the most dangerous have been those to the head, and people have been repeatedly looking for ways to protect themselves. The beginning of the bicycle era came in 1791, when the Comte de Sivrac showed spectators a device made up of two tandem wheels and a bar in-between (Oliver 1). This device was relatively slow and harmless, as it was propelled by the rider's feet pushing on the ground, and merely served to take most of the weight off the rider's feet. Karl von Drais, thus beginning a long story of important improvements, added the steer-able front wheel to this invention in 1816 (Henkel 9). Next came Pierre Michaux and Pierre Lallement's 1863 addition, in which pedals attached to the front axle were added (Oliver 4). This invention, when combined with larger wheels common to those models known as the "penny farthing" or "ordinary," provided the rider with a faster bicycle (Henkel 11).

As the speeds and distance from the ground increased for the riders of these bicycles, the danger of injuries grew immensely. Head injury was emerging as a real problem that demanded attention, and was quickly addressed by the cycling clubs of the 1880's. Pith, perhaps the best material around at the time, was used to fashion simple

helmets, which did not offer much in the way of protection when compared to more modern models. Sometime during the late nineteenth century and early 1900s, racers began to wear helmets made from leather, wool, and padding. The first of these were mere headbands, which were closely followed by the addition of strips running over the top of the head. These crude helmets had many drawbacks such as an affinity to rot and an inability to provide much protection other than that from skidding (Swart). This was enough padding, perhaps, for the relatively slow bicycles of that time period, and as the adult use of bicycles dwindled, any improvements in helmets lingered as well. By the late 1960s, however, interest increased again as many adults realized the potential for bicycles to provide clean transportation and wonderful exercise (Oliver 24). Thus, in 1970, the Snell Foundation created the first bicycle helmet standard in the United States, which was so strict that the lightest headgear to pass was a two-pound motorcycle helmet. This did not change the selection of bicycle helmets much because it failed to find a single one that met its specifications. Soon, however, new materials, such as stronger foams and plastic shell material emerged, producing increasingly better quality helmets that began to meet standards with ease (Swart). Current helmets are both affordable and offer extremely effective protection, although bicycle injuries obviously occur everyday all around the world. Most of the people who find themselves in these accidents are not wearing helmets, and do not seem to be learning from others' mistakes.

2.2 Quality and Effectiveness of Helmets

In light of the risks involved in bicycle riding, people should be aware of the general qualities and standards of bicycle helmets. On the average, bicycle riders are involved in an accident every 4,500 miles. Due to this inherent danger in bicycling,

helmet use is recommended by many organizations and required in many parts of the world. When purchasing a helmet, one must consider many factors ("Head Cases" Consumer Reports 45). One of the factors to consider is that the fit of a helmet is extremely important. First, the helmet will do someone little good if it comes off during a fall. Second, some accidents involve multiple collisions. For example, if the ground is hit after an initial impact with a car, the helmet must stay on for the entire accident or a more serious injury may occur. Third, if the helmet moves to a strange angle during an accident, it could possibly concentrate force onto the head and cause more trauma (Delong 243).

Another important issue is color. A bright color is recommended, especially when riding near cars. Also, ventilation is important when riding. If the head sweats excessively, it can interfere with a rider's vision. Because of the importance of being able to hear well while biking, it is important that the helmet does not create a wind whistle. The helmet should also not be too heavy because this can cause fatigue, making the rider less cautious or aware, and thus creating a dangerous situation (Delong 243).

Many standards are in effect with regards to the quality of helmets. All helmets currently sold in the United States must meet the U.S. Consumer Product Safety Commission (CPSC) standard; the American Society for Testing and Materials (ASTM) standard is another good one. Other standards, such as Snell's B-95 and N-94, are seldom used, and are even tougher than the CPSC.

In a 1999 Consumer Reports study, twelve adult helmets, eight youth, and four children models were examined. They were ranked regarding four qualities, which included impact, straps, fit, and ventilation. The Louis Garneau Globe was the only

model to receive a high rating for impact protection. The Bell EVO-2 Pro had superior straps (preventing roll-off) and the Trek Vapor had better ventilation, so these three were ranked as the best. For specifics on how each of these twenty-four helmets ranked, please see Appendix C. One important fact to note is that all helmets examined received at least a "Good" rating on impact (Consumer Reports 44).

There are two major types of bicycle accidents: collisions and falls. While falls are more common, collisions usually result in the most serious injuries (USDT, USDI 15). A good helmet must protect from both types of injuries.

Reports from the United States Department of Transportation provide extensive information on bicycles. They show that one out of three bicycle accidents involves an automobile and one out of every four bicycles involved in an accident is defective mechanically. In addition, two of every three riders killed or injured in collisions with automobiles have violated a law or safety rule. Performing improper turns, disregarding traffic signs, signals, and markings, carrying an extra rider, running into an opened door of a parked car, and failing to yield the right-of-way are frequent causes of bicycle rider fatalities and injuries (USDT, USDI 15).

2.3 Health, Exercise, and Bicycling

Despite the fact that there is a risk of an accident while riding a bicycle, there are many health benefits associated with bicycle use as well. Many medical studies in Denmark have been conducted in the past ten to fifteen years that proved exercise is a vital part of life. Exercise improves the quality and span of life, including, and possibly most importantly, life expectancy. Through these studies, evidence has emerged claiming that exercise helps people to alleviate anxiety and tension (Hammersmith 17).

The Danish Board of Health recommends one half hour of physical activity daily for adults (men and women alike, even though it has been found that adult men exercise more than adult women), and one hour daily for children (Hammersmith 13).

Bicycling is just one of the many ways that people can maintain healthy lives. Studies have found that one half hour of bicycling daily increases the average life expectancy of a person by one to two years. Bicycling has also been found to have a preventative effect on cardiovascular disease, non-insulin-dependent diabetes, colon cancer, osteoporosis, and depression (Road Directorate 13).

Another benefit of bicycling has been suggested in an all-cause mortality study done in part by Lars Bo Andersen of Denmark in 2000. This study explicitly shows the positive aspects of bicycling. Bicycling to work decreases mortality by approximately 40%, when including leisure time physical activity (Andersen 1621). Through correspondence with Andersen, the direction of this project was refined with regards to health issues discussed in the focus group interviews. To see the focus group questions, refer to Appendix D.

2.3.1 Case Study: Bicycling and Coronary Heart Disease

Studies have also shown many connections between bicycling and coronary heart disease (CHD). One such study in London observed a group of 9,400 civil servants for nine and a half years (1976 – 1986) in order to observe the heart attacks sustained within certain groups. Five hundred cases of CHD satisfied the criteria for "first attacks." 7% of this group reported that they bicycled regularly. These men had fewer than half the coronary attack rate of the whole population (Hammersmith 15). Below is a chart from the same study that describes the coronary experience of the 9,400 men studied.

Table 1: Bicycling and Coronary Heart Disease
1979-1986
Men aged 45-64 at entry
Rates per 1,000 man-years. Age standardized.

BICYCLING	NONE	SOME*	MUCH+
Total Incidence CHD	5.6	4.5	2.5
Fatal Attacks	3.3	2.6	1.6

Bicycling reported in the week before entry in 1976

+ At least an hour in the week in the round trip to work, or at least 25 miles of other bicycling in the week. (Bicyclists often reported both forms.)
* Less than this.

9376 executive grade civil servants with no previous history of coronary heart disease.

The trend portrayed in this chart is an obvious one: the men that rode bicycles more often than those that did not had a lower rate of coronary heart disease.

2.3.2 The Effect of Cars on Health

Another route for people to stay healthy is to breathe clean air and it is a well-known fact in society today that cars are a major source of air pollution. For example, in Britain in 1995, air pollution increased by 35% in the past five years and one-third of the population lives in areas where the air quality guidelines were not met for NO_x (nitrites and nitrates). There are many illnesses that can develop due to exposure to the type of air pollution given off by cars: cardiovascular and respiratory illness, a decrease in the lungs' ability to exhale, speeding up the loss of lung capacity, damage to lung cells, and the development of bronchitis, emphysema, and cancer. According to the same air pollution study, eighteen million people (38%) in England at the time were at risk from air pollution. It was also discovered that as the traffic level in an area increased, so did

the amount of illness. The World Health Organization (WHO) concluded, "Motor vehicle traffic and its emissions seriously damage the health of urban populations" (Whitelagg 6). Due to the increase in the number of cars on the roads, environmental health organizations are pushing for an increase in the number of bicycle users to improve health, as well as to decrease pollution.

2.4 Accidents

An increase in the number of bicyclists as an attempt to improve overall health is a definite benefit to bicycling, yet this could possibly cause the number of accidents to increase. The severity of these accidents and the injuries sustained vary depending on the circumstances of each accident. Many surveys and studies have been conducted to determine some of the causes of bicycle accidents in order to give riders a better understanding of the risks they take each time they ride their bicycles.

Studies on the causes and results of bicycle accidents have been conducted for many decades. A 1952 study in the Netherlands concluded that accidents were more likely to occur on two lane roads without bicycle ways, while there was a significant decrease in the number of accidents on roads with bicycle paths. Another study done in Copenhagen, Denmark in 1969, determined the benefits of bicycle tracks throughout the city. Researchers from California University studied four streets in Copenhagen, two with tracks and two without. This study concluded that bicycles hit parked cars more often on the roads without tracks and that personal injury accident rates were 60% lower on the streets with bicycle tracks (California University 44-45).

Another study by the Johns Hopkins Injury Prevention Center and sponsored by the Snell Memorial Foundation concluded that Americans make approximately 1.8

billion bicycle trips per year. Out of these 1.8 billion trips, there are three hundred injuries per million trips and one death for every two million trips. According to the United States Department of Transportation, cars killed 758 American bicycle riders in 2% of bicycle related deaths involve cars (Bicycle Helmet Safety Institute, Jan 27, 01).

The number of bicycle accidents involving automobiles has led to many statistical studies that are available on the topic of bicycle safety. For example, the U.S. Department of Transportation states that the majority of bicycle related deaths occur during the summer months between the hours of 3 p.m. and 9 p.m. (Bicycle Helmet Safety Institute, Jan 27, 01). In addition, in Denmark, 40% of all trips by Danes are between home and work and school and two times as many kilometers are traveled on bicycles during the week than on Saturday and Sunday (Road Directorate 10).

2.4.1 Causes of Accidents

There are many varieties of causes for bicycle accidents. According to statistics from the July 8, 1995 Capital Times of Madison, Wisconsin, 42% of all bicycle accidents result because motorists do not yield, 39% because cars are turning and the driver does not see the bicyclist, and 1.7% because riders run stop signs or lights. In the Greater Copenhagen area around 1996, police found that the motorist was at fault two out of three times (Road Directorate 14). Alcohol is a factor in 7% of all crashes between bicycles and automobiles; 3% of the time the car driver is drunk. In addition, the Johns Hopkins Injury Prevention Center reports that two-thirds of fatally injured bicyclists are tested for alcohol and 32% of them have been drinking. Weather is another reason that bicycle accidents occur; for example, wet pavement caused 12% of all accidents in 1995 (Bicycle Helmet Safety Institute, Jan 27, 01).

2.4.2 Injury and Death Statistics

In accordance with Johns Hopkins University, 40% of all bicyclists, approximately 567,000 people, are admitted to hospitals each year. Out of this 40%, those with head injuries are twenty times more likely to die if they were not wearing a bicycle helmet. In 1998, 98% of the people who were killed in bicycle accidents were not wearing bicycle helmets. An estimated nine hundred people in the United States die each year from bicycle related accidents (Bicycle Helmet Safety Institute, Jan 27, 01). According to the Danish Ministry of Transport, the risk of death or major injury is six times higher for a bicycler than an automobile driver (Ministry of Transport 29). In Denmark, as indicated in a study also conducted in 1998, 58 bicyclists were killed while 1,780 were injured on Danish roads. Even though only approximately 10% of all accidents are reported to the police, this is quite a decrease from the 19,830 people that were treated in casualty wards in 1996. Of this group, two out of three were injured in single accidents; meaning one person was involved in no more than one accident that year (Road Directorate 14).

Johns Hopkins University also states that many more Americans are injured on bicycles than killed. The injury rates per million people are highest among children between the ages of five and fifteen and the death rates per million people are highest from fifty years of age and older. 56% of all bicycle deaths involve people that are twenty years old and older (Bicycle Helmet Safety Institute, Jan 27, 01).

Death and injury rates are not the only statistics that are relevant to the incidence of bicycle accidents. Bicycle helmets are a major factor when addressing these types of statistics. According to the National Safe Kids Campaign, Americans who ride without

helmets are fourteen times more likely to be involved in a fatal accident than those who wear helmets. In 38% of all accidents, a head injury is sustained. This number increases to 55% when the accidents involve children between the ages of one and five. In Australia, according to hospital data, it has been documented by the University of California at Berkeley Wellness Letter of December 1997 that helmet use has decreased the number of head injures. The number of head injuries was cut in half when a new law requiring the use of helmets was passed. In addition, the number of head injuries was less serious and the hospital stay was significantly shorter when the victim was wearing a helmet than when he was not (Bicycle Helmet Safety Institute, Jan 27, 01).

2.4.3 Gender

There are factors other than helmet usage that are relevant to an examination of these statistics. There are many statistical differences between male and female bicycle riders. For example, males are seven times more likely to be killed in a bicycle accident than females. On average, males take 2.5 times as many trips as females. Most deaths among males occur between the ages of ten and fourteen.

The following two charts from the Insurance Institute for Highway Safety compare statistics between males and females.

Table 2: Total Bicycle Deaths by Year			
Year	**Male**	**Female**	**Total**
1975	820	183	1003
1976	751	163	914
1977	730	192	922
1978	714	178	892
1979	759	173	932
1980	782	183	965
1981	748	181	929
1982	720	144	864
1983	700	130	830
1984	684	153	837
1985	732	137	869
1986	789	140	929
1987	826	144	940
1988	773	128	901
1989	696	126	822
1990	732	121	853
1991	715	121	836
1992	627	90	717
1993	702	104	806
1994	687	109	796
1995	699	128	827
1996	654	107	761
1997	712	99	811
1998	659	99	758

Table 3: Bicycle Deaths Per Million People, By Gender, 1998		
Age	**Male**	**Female**
3	1	1
4	2	0
5	3	1
6	4	1
7	7	3
8	7	3
9	7	2
10	10	2
11	10	2
12	10	1
13	14	2
14	12	2
15	9	0
16	6	1
17	5	2
18	6	0
19	3	0
20 - 24	4	1
25 +	5	1

From these two charts, it can be seen that males have a higher tendency to be involved in bicycle accidents than females. The charts also show a decrease in the number of deaths over the years as well as showing that young males (between the ages of ten and fifteen) are more prone to accidents. The fact that males ride more often than females could contribute to this finding (Bicycle Helmet Safety Institute, Jan 27, 01). More charts that portray various statistics relating to accidents are located in Appendix A.

2.4.4 Children

Other surveys have also found that the majority of accidents involve children. The U.S. Department of Transportation reported that in 1998 30% of bicycle deaths

involved children younger than sixteen. Of course, this figure implies that the other 70% of deaths involved people older than sixteen, compared to 32% of people over the age of sixteen in 1975 (Bicycle Helmet Safety Institute, Jan 27, 01).

According to the St. Louis Post-Dispatch, Inc., approximately 350,000 children are brought to emergency rooms each year in the United States. Almost half of these cases are head injuries. It was estimated that 85% of these injuries could have been prevented if a bicycle helmet had been worn (Five Star Lift Edition September 4, 2000, 1).

Almost half (40%) of head injuries that result in death and 75% of other head injuries involved children fourteen years old and younger in the U.S., according to the National Safe Kids Campaign. In 1995, 250 children under the age of fourteen were killed. Cars were involved in 230 of these accidents. In 1996, 350,000 children less than fourteen years old were brought to emergency rooms and treated for bicycle related injuries (Bicycle Helmet Safety Institute, Jan 27, 01).

The inexperience and immaturity of children on bicycles could play a part in how many bicycle accidents they experience. Children under the age of fourteen in the U.S. tend to ride their bicycles during non-daylight hours: dusk, dawn, and nighttime. The risk of getting into an accident is four times greater during these hours. The following chart from the Insurance Institute for Highway Safety shows the distribution of accidents by time of day for 1998 (not specifically children).

Table 4: Deaths by Time of Day	
Time	**Percent**
Midnight - 3 am	6
3 am - 6 am	4
6 am - 9 am	8
9 am - Noon	8
Noon - 3 pm	14
3 pm - 6 pm	22
6 pm - 9 pm	23
9 pm - Midnight	16

This chart helps show that the majority of fatalities occur during the evening hours, mostly from 3 p.m. to 9 p.m. Children themselves cause 80% of the accidents they are involved in, and the main reason is their behavior. Children have a greater tendency to behave recklessly, endangering themselves and others more easily.

The National Safe Kids Campaign also states that kids are more likely to die at non-intersections (66%), between the months of May and August (55%) and between the hours of 3 pm and 6 pm (39%). 60% of children's deaths occur on minor roads (Bicycle Helmet Safety Institute, Jan 27, 01).

The Fatality Analysis Reporting System (FARS) of the U.S. Department of Transportation recorded the number of school-aged children that were killed during the school year from September 1, 1997 to June 15, 1998. The results are provided in the following chart.

Table 5: School-aged Pedalcyclists killed between the hours of 6:00 AM to 8:59 AM and 2:00 PM to 4:59 PM

Alabama	0	Indiana	0	Nevada	1	South Dakota	0
Alaska	1	Iowa	0	New Hampshire	0	Tennessee	1
Arizona	3	Kansas	0	New Jersey	0	Texas	1
Arkansas	1	Kentucky	2	New Mexico	0	Utah	0
California	5	Louisiana	0	New York	1	Vermont	0
Colorado	0	Maine	1	North Carolina	0	Virginia	0
Connecticut	0	Maryland	2	North Dakota	0	Washington	3
Dist. Of Col.	0	Massachusetts	0	Ohio	2	West Virginia	1
Florida	3	Michigan	5	Oklahoma	0	Wisconsin	0
Georgia	2	Minnesota	0	Oregon	1	Wyoming	0
Hawaii	0	Missouri	1	Pennsylvania	1		
Idaho	0	Montana	0	Rhode Island	0		
Illinois	3	Nebraska	1	South Carolina	2		

2.4.5 Location of Accidents

The statistics on this issue also vary depending on the location of the accidents according to the U.S. Department of Transportation. For example, the majority of crashes in 1998 took place in only four states. 41% of all crashes in 1998 occurred in California, Florida, New York, and Texas. The town and road locations also play a part in the percentage of bicycle accidents: 63% of accidents occur in urban areas, and 32% of accidents occur at intersections. There are even statistics on accidents on different road types: in 1998, 59% of accidents occurred on major roads and 36% occurred on local roads. Some statistics comparing the differences between the number of accidents involving adults and children provided the following results: major roads cause a higher death rate in adults than if children were riding (66% to 45%); 52% of children under the age of thirteen and 28% of adults are killed on minor roads (Bicycle Helmet Safety Institute, Jan 27, 01).

The different speed limits on all of these roads also influence some of the results of these surveys. As found in the U.S., one-third of all fatalities occur on roads that post speed limits of fifty-five miles per hour or greater. Crashes including cars and bicycles increase in severity once a car is traveling at more than fifteen miles per hour. As stated previously, alcohol is sometimes a factor in the severity of crashes, especially at increased speeds (Bicycle Helmet Safety Institute, Jan 27, 01). In Denmark, average bicycle speeds range from 15 to 25 kilometers per hour (9.32 to 15.54 mph) on flat roads while the normal speed down steep hills increases to 30 to 40 kilometers per hour (18.64 to 24.86 mph) (Road Directorate 12).

2.4.6 Case Studies: The Effectiveness and Use of Helmets

One particular case study was "A Case-Control Study of the Effectiveness of Bicycle Safety Helmets" by Robert S. Thompson, M.D. This study, comprising 235 Americans, dealt with head injuries that were brought to local hospitals. The study included two control groups: a group of 433 people that sustained injuries not involving their heads and another group of 558 people that had been in accidents the previous year.

7% of the group with head injuries were wearing helmets. 24% were wearing helmets in the first control group while 23% were wearing them in the second. Of the ninety-nine people with serious brain injuries, only 4% were wearing helmets. The conductors of this study concluded, "bicycle safety helmets are highly effective in preventing head injury. Helmets are particularly important for children, since they suffer the majority of serious head injuries from bicycling accidents" (Bicycle Helmet Safety Institute, Jan 27, 01).

During the spring of 2000, the Consumer Product Safety Commission performed a Consumer Product Safety Review comprising baby boomer sports injuries, and one topic reviewed was bicycle accidents. In 1998, bicycling accounted for the largest number of accidents among baby boomers in the U.S. at over 65,000. Coming in at a distant second place was basketball with fewer than 50,000 injuries. In addition, no other sport accounted for more baby boomer deaths than bicycling in 1998. Two hundred-ninety baby boomers died in bicycle accidents (255 (88%) involving automobiles), while the next highest was sixty-seven deaths from swimming and seven deaths from skiing. The Consumer Product Safety Review believes that the death rate for baby boomers in bicycle accidents is twice that of children as a result of more children wearing bicycle

helmets. 69% of children wear bicycle helmets compared with 43% of baby boomers (Bicycle Helmet Safety Institute, Jan 27, 01).

2.5 Accident Prevention Programs

In order to gain information about the bicycle safety programs in the United States, we needed to contact professionals in pertinent fields. Officer Tom Salmon of the Worcester Police Department became head of the Worcester bicycle safety program in 2000. This program is run in fifty-two area schools from the end of March through June, two times per day. This is a city-funded program that is also aided by agencies such as AAA (American Automobile Association) and UMass (University of Massachusetts) Medical Hospital. Both organizations help by providing information pamphlets, bicycle reflectors, and even bicycle helmets.

The purpose of this program is to educate young children, fourth-graders (10 year olds), about the importance of bicycle safety. The officers, along with gym teachers, teach the children bicycle regulations and laws along with safety techniques and tips such as hand signals and traffic signs. The children are also taught the benefits of wearing bicycle helmets. Officer Salmon stated that he stresses to the children that not all bicycle accidents involve tractor trailer trucks and that a helmet should be warn at all times. After the children have gathered all the pertinent information, an obstacle course is set up in the gymnasiums so they can practice what they have learned.

After the programs have been completed, the officers' jobs are not finished. Officer Salmon believes that positive reinforcement is necessary in order for the program to be successful. As a result, whenever an officer sees a child wearing a bicycle helmet, they are given a "citation" which can be redeemed at local stores for such items as candy

and ice cream. Officer Salmon reported that he has seen about a 75% increase in the number of bicycle helmets worn by children since the early days of the program.

To compare the differences between programs run in the United States and in Denmark, the project group spoke with Officer Joern Kjer of the Frederiksberg Police Department. According to Officer Kjer, educating children in how to utilize the bicycle lanes in Copenhagen is the main purpose of their program, in turn promoting bicycle safety. The officers also set up an obstacle course for the children to run through and only those wearing bicycle helmets are allowed to participate. Officer Kjer said that the importance of bicycle helmets is discussed, but once the program has finished, not much is done to reinforce this point.

2.6 Laws Governing Helmet Use

In an attempt to increase the use of bicycle helmets, the federal government in the United States has left the issue of requiring helmets up to the states and localities. Such laws began appearing in 1987 and currently twenty-eight states have laws requiring helmets for some age groups. Some states like Delaware have a state law requiring helmets for all less than sixteen years of age, while other states require helmets statewide for a certain age group. The latter are California, Connecticut, Florida, Georgia, Hawaii, Maine, Maryland, Massachusetts, New Jersey, New York, Oregon, Pennsylvania, Rhode Island, Tennessee, and West Virginia. Some states have left the issue up to localities within the state to regulate the issue of helmet usage. For example, within Arizona, Tucson and Yuma require helmets for all under eighteen years of age, but in other areas of Arizona there are no such laws. Also, some states with state laws requiring a certain age group to wear helmets contain localities with stricter laws. For example, in Alabama

the state law requires all less than sixteen years of age to wear helmets. However, in Montevallo and Homewood, helmets must be worn by all ages. States that only have local laws requiring helmets are Arizona, Illinois, Michigan, Missouri, Montana, North Carolina, Ohio, Texas, Virginia, Washington, and Wisconsin. States that have state laws and contain localities with stricter laws are Alabama, California, Maryland, New York, Tennessee, and West Virginia. Due to the federal structure of government within the United States, laws such as these are very complicated. For specifics on the 97 laws on the books in the United States with regards to helmet usage, please see Appendix B.

Many nations around the world are also passing laws with respect to bicycle helmets. Many provinces and localities in Canada have helmet laws, and in Australia, helmets are universally required for riders. In some parts of Australia, notably the State of Victoria, head-injuries decreased 41% since the law was introduced. However, there were also 36% fewer child riders on the road. In Europe, the law is being debated and applied in many countries. Sweden and Iceland are both debating putting such a law on the books, while Iceland already has a mandatory helmet law covering those below fifteen years of age. New Zealand also has a national helmet law (Bicycle Helmet Safety Institute, Jan 27, 01).

Although many countries seem quite eager to implement a bicycle helmet law, Denmark is finding many disadvantages in such an action. The Danish Ministry of Transport states that a barrier to promoting bicycle traffic is created if citizens perceive a risk in bicycling, and opponents of a bicycle helmet law fear this perception may worsen if a law is instated which mandates helmet use. Advocates claim that by passing such a law, a rider may receive the message that bicycling is unsafe, and therefore not a healthy

activity in which to participate (Ministry of Transport 9). Because the high rate of accidents is already a cause for apprehension for many people, a strategy needs to be formed that reduces the disadvantages involved with bicycling. One of these disadvantages is the need to worry about wearing a helmet. Some opponents to a bicycle helmet law believe that promoting a good setting for bicycle riders is the only way to increase bicycle usage, and requiring the use of a helmet would create a hassle for the bicyclist (Ministry of Transport 12). Such concerns will have to be explored to fully understand the controversy over the legitimacy of such a law.

There is an additional complication involving the United Nations that deters the creation of a bicycle helmet law in Denmark. The United Nations' Third Ministerial Conference on Environment and Health met in 1989, and through a survey it identified that transportation was the most important issue with regards to both the environment and health. At its London Conference the same body issued a Charter on Transport, the Environment, and Health, and as a signer, Denmark formally committed itself to promoting sustainable transportation. The charter specifically identified the importance of bicycling: "Further impetus also needs to be given to the development and promotion of public transportation and to a modal shift from motorized transport to cycling and walking." (UN 10) This quotation identifies the international focus on bicycling as a potential long-term solution to two global problems: the environment and health. As a signer to this charter, many may feel that Denmark has a responsibility to promote bicycling as a sustainable means of transportation. This must be taken into account in any decision that the Danish Cyclist Federation or the Danish government makes regarding a helmet law.

2.7 Bicycle Safety Concerns

According to the Danish Ministry of Transport, the safety of bicyclists is a major issue that should be given attention before attempting to increase the use of bicycle helmets. The desire to increase bicycle usage is common, since many people identify bicycling with both environmental and health benefits. Alarmingly however, injuries of bicyclists make up a quarter of all those injuries related to traffic, and there are many factors that could attribute to these high injury levels.

2.7.1 Bicycle Safety In Denmark

Bicycle safety in Denmark is taken very seriously due to the fact that 30% of the workforce rides a bicycle to work. Many different plans have been implemented in order to improve bicycle safety. For example, on June 1, 1999, the Ministry of Transport's statutory order on bicycle design and equipment helped boost requirements on bicycles such as lamps and reflectors. These lamps and reflectors increase the recognition distance from 5 to 35% (Road Directorate 14).

Improvements to the actual bicycles are not the only measures being taken in order to enhance bicycle safety. Copenhagen currently has approximately three hundred kilometers of bicycle tracks positioned on the sides of the roads for bicycles to utilize. The Bicycle Track Priority Plan passed by Council in 1997 is also planning to build fifty-four more kilometers of tracks before the year 2012 (Thomas). These special lanes have decreased the risk of accidents by 50% between road junctions (Hillman 120). In addition, the Danish Ministry of Transport has stated that fast-paced campaigns that include the theme of bicycle helmet use can have an enormous effect on bicyclists' road safety (Ministry of Transport 29).

2.8 Psychology of Decision Making

Although there are many inherent and tangible risks in bicycle riding that would make a helmet useful, a psychological study can explain quite well some of the factors in the decision making process that might lead a person not to wear a helmet. The most prominent reason is the tendency for people to conform to each other; according to Henry Gleitman, conformity occurs because people feel that what others do is important to their own decisions. He states that at some point in our lives we all conform to others in such ways as how we talk, how we wear our clothes, or in the way we act (Gleitman 365). This is evident in the varying accents of speech in different geographical locations, fashion trends, and the desire to be like our role models. There are two main reasons why people want to conform. These are the desire to be correct and to be liked by others in a peer group (Gleitman 366). Nobody wants to look foolish to his friends, and therefore a person will sometimes do almost anything to achieve this goal.

During the adolescent years, children tend to have a lowered self-esteem (Plotnik 388). Personal appearance plays a substantial role in their image of themselves and consequently, adolescent children are usually more susceptible to the influences of others. On the other hand, people will be less likely to follow the examples put forth by ill-informed peers if they are first made to believe that they are more knowledgeable in a subject than their colleagues (Gleitman 366). According to the results of an experiment performed by Solomon Asch, a person who is exposed to indirect peer pressure will often go against his will and agree with the others in a group, even regarding something so simple as stating which lines on a card are the same size. Asch's experiment placed one unsuspecting person in a room with eight or nine other people who were instructed in

private to unanimously answer the questions incorrectly. Each person was instructed to look at two cards and tell the administrator which ones they saw as the same length. Because the seating was arranged beforehand, the unaware test subject made his decision only after hearing all of the other answers defy his own senses, and two out of three times the test subject followed their lead and gave the incorrect answer. When asked why they acted the way they did, the test subjects responded that they began to distrust their own feelings and judgment and grew increasingly embarrassed to defy those of so many other people. At this point, the experiment showed that even when there is nothing at stake, many people follow the crowd and are dishonest about their own feelings (Gleitman 329). The experiment did not end there, however. Next, the unanimity of the opposing people was broken, and one dissenter either agreed with the test subject or disagreed with the whole group. As one might expect, the test subject was now more apt to go with his own judgment, regardless if the other dissenter agreed with him or disagreed with the entire group (Gleitman 367). Thus, once there is one person in a group to change his attitude, others will follow.

If an intensive bike helmet campaign were launched, some people may begin wearing helmets causing others to follow in their footsteps. However, there are many individuals and groups that are strongly against a helmet law. To fully understand the issue at hand, their concerns must be comprehended. One outspoken critic of such a law is Robert Davis. He believes that once a helmet campaign is successful in getting people to wear bicycle helmets, a new danger is sometimes created. He suggests that a false sense of security is formed for people who wear helmets, and these individuals will be more likely to take risks that may result in an increasingly dangerous situation for

themselves and others (Davis 175). Just as a criminal feels more confident when committing a crime while wearing a bulletproof vest, a bicyclist may feel more secure when aggressively bicycling through Copenhagen if his attire includes a bicycle helmet. Although this analogy should not be taken literally, Davis' ideas are provocative. Davis further cites several studies about the creation of new safety laws in Britain to support this argument, and points out that seatbelt laws failed to yield injury reductions. Reinforcing this result, he shows how the creation of a driver's test had no recognizable effect on accidents or danger; it simply made drivers feel that they were competent because they had passed. A more startling example is the law requiring motorcyclists to wear helmets in Britain. Not only did the rate of injury to riders fail to decrease, but the injuries that they caused to pedestrians actually increased. This unexpected effect of policies, which intended to make the roads safer, is alarming. The extent of the legitimacy of such unexpected effects must be fully understood in the discussion of a bicycle helmet law in Denmark. In a summary of Davis's book, Transport Innovation quotes Davis as saying, "if a safety feature makes motorists less careful, then it is a *danger* issue" (Transport Innovation 11).

Davis extends his discussion of bicycle helmets in a more political orientation. He believes that unfortunately, the governing bodies often shift the responsibility for safety from the motorized road user to the more vulnerable road users: the pedestrians and bicyclists. This questionable logic clouds the issue of what really causes the danger on the road, and is supported by a kind of "pseudo-logic" (Transport Innovation 12). Though pedestrians and bicyclists are environmentally the most benign commuters and represent little danger to other people on the road, they also represent nearly half of all

people killed on the road. Therefore, Davis argues, the numbers of pedestrians and bicyclists are often limited to make the roads safer. Davis uses a very graphic metaphor to support his claim: in the same manner as a negligent driver running off the road and hitting a tree, the solution in so many cases is to move the tree. Many consider the roads to be safer if there are fewer pedestrians and bicyclists on the road because they are the individuals who are the most at risk, and therefore make up a large number of the statistics representing injuries and deaths per year. In Britain, lowering of the number of bicyclists and pedestrians on the road decreased the overall number of injuries per year even though more injuries occur per mile for these types of commuters (Transport Innovation 12). Obviously, if everyone fully agreed with Robert Davis with respect to bicycle helmets, no laws making helmets mandatory would exist or even be brought up for discussion. Therefore, his conclusions cannot be assumed to be the correct ones. However, his argument articulates many of the concerns that people have about a helmet law, and raises some new objections.

The background information contained in this section helped our team establish goals and methods for this project. Other aspects of the report, starting with a detailed methodology, are discussed in the following sections.

3.0 Methodology

In order to provide an accurate report on bicycle safety and the effectiveness of bicycle helmets, our team obtained facts and statistics and provided them to the Danish Cyclist Federation in the Background Information section. The team explored many different aspects of these issues, and as with many subjects that involve passing laws, the issue of mandatory bicycle helmet use elicits strong opinions from both sides.

The bicycle helmet issue, however, cannot be fully explored just through library research. To get a better view of the many different factors playing into a helmet law, a complex methodology was established for work to be conducted in Worcester and Copenhagen. The main thrust of the methodology was focus group interviews; this procedure was supported by interviews with experts and some roadside helmet counting.

3.1 Background Information Research

In order to get a good idea of all the areas pertaining to bicycle helmet usage, the group researched extensively; the information has been broken down into six major areas. These areas include a brief history of bicycles and helmets, a variety of different accident statistics, the health benefits of bicycling, laws that have been passed in the United States and various countries enforcing mandatory helmet use, different brands of bicycle helmets, and finally some aspects of psychology that may influence a person whether or not to wear a bicycle helmet.

As the Danish Cyclist Federation needs more information to provide a recommendation to the government on whether to make bicycle helmet use mandatory, the main task of this project was to research the current bicycle helmet usage situation. This research began long before the team's arrival in Denmark, because it was felt that

statistical material regarding bicycle helmet usage in the United States would be useful and serve as an example that might provide a context for what type of information may be found in Denmark. Many different types of material were located through computer databases such as Lexis-Nexis, along with various articles that describe state laws and town ordinances and their effect on helmet usage. Other useful sources described the quality of helmets marketed in the United States as well as provided insight into the cost barrier that sometimes inhibited individuals to purchase these helmets. In addition to these articles, material was found in medical journals that described quantitatively based studies done on children's bicycle helmet usage. These reports provided data that was useful in demonstrating some of the reasons children do not use helmets, such as parental or social concerns, as well as evaluating methods of increasing helmet use in that specific population. The Bicycle Helmet Safety Institute (BHSI) provided pertinent information along with information from such organizations as Failure Analysis Associates, the National Safe Kids Campaign, the Insurance Institute for Highway Safety, and various case studies done by different individuals and groups. Other accident statistics were obtained from different colleges and universities such as Johns Hopkins University and the University of California at Berkeley.

All the previously named resources were used to assist us in obtaining information that pertains mostly to the United States. The information that was found, however, may or may not parallel the facts relevant to Copenhagen, Denmark where the study took place. The group also found many different resources to utilize while we were in Copenhagen in order to produce results that were applicable to Denmark specifically. The libraries in the Danish Cyclist Federation proved extremely helpful to us. We also

visited the Danish Road Directorate in Roskilde, Denmark on 27 March and the sources found there were very useful in ascertaining accident statistics. This data was later added to the literature review.

3.2 Focus Group Interviews

Upon an initial glance at the purpose of this project, it might seem as if using a systematic survey that polled a sample of Copenhagen's population would have been the best method to find the desired results. However, upon further research on surveying methods, it was seen that an accurate survey of this nature would require a tremendous number of telephone calls, mailings, or interviews which realistically could not be completed in seven weeks. Therefore, the group decided to use focus group interviews.

3.2.1 Constraints of Surveys

In particular, a mail-in survey seemed the most feasible because it did not require any face to face contact, and thus would only require the time needed to select random names, put questionnaires and instructions in envelopes, and mail them to the respondents. However, the number of steps in an effective mail survey are actually quite time consuming and costly. Priscilla Salant and Donald Dillman, two experts on the subject, require four initial steps, as well as additional measures for those respondents who do not submit a reply after the first steps. The first step is mailing an advance notice to the respondent, the second is the actual questionnaire, the third is a follow-up postcard, and last is mailing a second questionnaire to those that did not respond (Salant 45). This response rate would only be about 60% with the use of personal cover letters, attractive questionnaires, follow-up contacts, handwritten signatures and addresses, and first class postage on all mailings (Salant 138). Once the large numbers were observed, this survey

method was discarded due to time constraints. A drop-off survey described by Salant and Dillman, where the questionnaires are given directly to the respondents and picked up at a later date, would be a good method for a group that has a limited budget, has a relatively short questionnaire, a small staff, but a large sample size (Salant 43). The project group would have to put in even more time than is needed for a mail survey, however, and this would be a big drawback to the use of this type of survey method as well.

The mail-in and drop-off surveys would be great methods for groups with more financial resources and personnel available. For these reasons these surveys will not be used in obtaining data for this project. However, interviews with individuals and groups of bicycle riders that are not chosen randomly will provide ideas that can be used for further research and give insight into the possible factors that determine whether or not someone chooses to wear a helmet when they ride a bicycle.

3.2.2 Components of Focus Group Interviews

After exploring the idea of conducting interviews of Danes on the way to work, our team decided, with the advice of our advisor and approval of our sponsor, to conduct focus group style interviews. This was chosen because focus groups provide a full range of perceptions and ideas about a program or service. "The purpose of a focus group is to stimulate people's thinking and elicit ideas about a specific topic" (Salant 29). Though the insights from focus groups can be very valuable, it must be noted that the conclusions of a focus group cannot be assumed to be the opinions of the entire population. Our team decided on focus group interviewing with the intent of yielding a great deal of information about Danish opinions with regards to such a law, and provide the full-range

of factors that might affect the legitimacy of such a law. The data generated from the interviews is explained in the results section and referenced extensively in the conclusion section. Appendix D contains the questions that were asked during our focus group interviews, and Appendix E and F are notes and a manuscript of the focus groups.

Upon first glance the idea to pass a law mandating helmet usage seems to be simple and uncontroversial. However, when the publications like the British Medical Journal (January, 2001) speak out against such mandates because they are seen as impediments to the promotion of bicycling and, therefore, a possible obstruction to a healthy lifestyle, the issue becomes more complicated. Experts warn, due to complex problems, focus group size should be restrained to under seven participants (Berg 111). Therefore, our team has decided to limit the size of our focus groups accordingly.

Before the focus group interviews took place the outcome that our team would eventually be led to was by no means clear. Such a social science technique often leads to unanticipated results. "In focus groups, the goal is to let people spark off one another, suggesting dimensions and nuances of the original problem that any one individual might not have thought of. Sometimes a totally different understanding of the problem emerges from the group discussion" (Berg 115). Our team planned several such focus groups, which took place on 3, 5, and 6 of April. After conducting these focus groups, our team had a clearer perception of the Danish opinion. The particulars of how the focus group participants were chosen are discussed later in this methodology section.

Our team's job was by no means less challenging than it would have been if a survey approach had been attempted. We had developed focus group questions and tested these questions to discover their effectiveness. Many of the team's actions on the

day of the interview were essential. The role of a moderator in any focus group is complex and extremely important. The moderator should introduce and perform introductory activities. A moderator should also make a statement with regards to the basic guidelines for the focus group. Short question and answer discussions as well as special activities and guidance when dealing with potentially sensitive issues are responsibilities of the moderator (Berg 121).

Another challenge facing the moderator is the invention of videoconferencing, which has expanded the versatility of focus groups recently. A Danish law will, of course, cover Danes beyond the capital city, and technological advances may allow our researchers to interview citizens not residing in Copenhagen. Today, a researcher can conduct a focus group with individuals or groups in several different cities simultaneously (Berg 129). Our team looked into such a possibility while researching our project but did not find this type of interviewing to be feasible or pertinent because of lack of equipment.

The focus groups proved to be challenging, but much insight was gained from them. The first involved six professionals from the "Green Flash" Gronnebude courier organization. This very visible business employs hundreds of deliverymen and women who transport a variety of goods by bicycle. As a general policy, all of them wear helmets. Upon visiting their headquarters (Blagaardsgaade 22, 2200 Koebenhavn N.) we conducted a very informative on-the-spot focus group with them on 3 April. The results of this interview will be discussed in the following results section of the report. For the second and third focus groups, a mixture of helmet and non-helmet wearers was gathered from the membership of the Danish Cyclist Federation. The first of these consisted of

two from the DCF, and the second 5. The results of these focus groups are also discussed later in this report, and thorough notes and a transcript of the entire discussion is included in Appendices E and F.

3.3 Professional Interviews

In addition to the focus group interviews, we also spoke with police officers. Our team based this decision on the unique insight police officers could furnish. A police officer would have information on whether or not he sees a helmet law as enforceable or necessary. As this is a complex issue with many factors involved, learning from these individuals may refine the focus of our team.

Before arriving in Copenhagen and performing these interviews, practice interviews were conducted in Worcester, Massachusetts. Among the list of people interviewed are members of the Worcester Polytechnic Institute (WPI) bicycling club and the aforementioned Officer Tom Salmon of the Worcester Police Department.

Perhaps the most valuable resources available to assist us in attaining information on bicycle helmet use are the actual groups of people involved with the use and promotion of bicycle helmets. As our college has an active cycling club, our team has interviewed a few of its members in order to both record their attitudes towards helmets and revise our questions in an effort to increase the efficiency of the interviews conducted during the Denmark portion of our project.

Our team also met with the previously mentioned Officer Joern Kjer of the Frederiksberg Police Department on 2 April. This interview proved fruitful, as he and his fellow officers run a program educating sixth graders (twelve year olds) on "how to

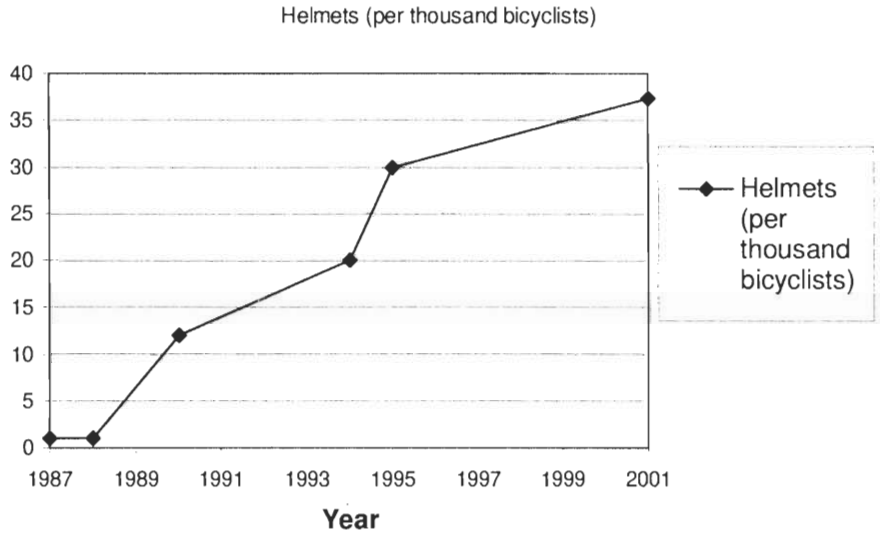
behave like a cyclist in traffic." Officer Kjer's thoughts will be presented in the results section of this report.

3.4 Tabulation of Helmet Use

Long before these interviews took place, we discovered that statistics had already been gathered for past years regarding the percentage of bicycle riders who wear helmets. The methods that had been used in the past were well described and documented by the counter, Niels Jensen, and formed the basis for our own procedure. Our team contacted Jensen directly and he outlined the details of his methodology for us in a letter, part of which is cited here.

> I found my notes on counting helmet users during rush hours (3 pm to 5 pm) from 1987 to 1995. I counted at Dr. Louises Bridge, in one direction (from Centre). I have counted both drivers and passengers (children) use of helmets but the results are only taking drivers use of helmets into account.

Please see the figure below for his data, as well as the data collected in 2001 by our team.



Our team repeated his methodology on 20, 23, and 30 April on the Dronning Louises Bridge in order to examine any recent changes in the percentage of citizens wearing

helmets. After several days of counting, the recent percentage of individuals wearing helmets will be analyzed and the reasons for these changes will be considered.

Different branches of the Danish Cyclist Federation were also contacted by Jens Pedersen to participate in various types of helmet counts. No precise instructions were given to these branches on how to conduct the counts. The branches only conducted counts on one day and the sample size of each of these counts were small, possibly skewing the data. Some of this data is presented in Appendix G.

3.5 Visitation of Local Bicycle Shops

For additional insight into the bicycle helmet situation, our team also went to several bicycle stores in Copenhagen to get an understanding of the price of bicycle helmets and the number of bicycle helmets sold annually. The stores our team visited on 4 April were Cykelhandlerkaeden (located at 43 Tagensvej); Sport Cykler (located at 118 Jagtvej); and Soegade Cykler (located on the corner of Oester Soegade and Soelvgade). An interesting fact that we inquired about was the number of helmets sold compared to the number of bicycles sold. The outcome of this inquiry will be discussed in the results section.

The methodology our team implemented in Copenhagen was extremely important to the success of our project, and many factors were impossible to forecast until our arrival in Copenhagen. Our team has marginally altered the methodology in this report as compared to the proposal completed before our arrival. In order to make data collection more consistent and less arbitrary; such changes in methodology were made relatively early in the data collecting process. Our team is confident this methodology has proven efficient and produced results that are satisfactory to the Danish Cyclist Federation.

4.0 Results and Analysis

The methodology yielded a variety of raw data that will be qualitatively outlined in this section. Our team broke the data down into several subsections, including nuances pointed out by experts in the area, the direction of discussion of the several focus groups our team conducted, and the number of helmeted versus non-helmeted individuals that our team counted. This results section will serve as a foundation for the next and final section, which contains the conclusions and recommendations.

4.1 Gronnebude

The Gronnebude provided a unique vantage point on the subject of bicycle safety and a possible bicycle helmet law. According to the organization's rules, all couriers of the Gronnebude are required to use their helmets when wearing the company uniform, even when off-duty. They expressed their dismay with regards to this policy, complaining about, among other things, the discomfort that wearing a helmet creates, especially in the summer. As for reasons for the policy, they all agreed that it was to symbolize a professional image. None of the Gronnebude couriers we spoke to consistently buckled the strap of the helmet, and when we inquired about use of the strap, they showed how they buckled it: over the top of the helmet! In addition, none of the couriers we spoke with wore their helmets consistently when doing off-work city bicycling. One, who was a mountain biker, wore his only when doing such higher-risk biking. They did not support a helmet law for the general population, but did see a level of justification in requiring young children to wear them.

4.2 Focus Groups

The focus group interviews conducted in Denmark represent the foundation of this entire project. The results generated from the insightful comments of the participants are outlined here. For the notes and transcripts of the two focus groups, please see Appendices E and F.

Participants for the focus groups were selected from the membership of the Danish Cyclist Federation. Some were adamant about the safety benefits of wearing a helmet, while others felt very strongly that they should set a positive example as parents and wear helmets so that their children would also wear them. Many expressed how highly organized and sophisticated the bicycle lane system is in Copenhagen and how wearing helmets, though a good idea, was unnecessary under such conditions. These and numerous other issues that were raised in the focus group discussions shed new light on the subject, and proved quite useful when trying to understand the cycle helmet usage situation in Denmark.

When discussing the frequency of accidents among the cyclists in the group, it became clear that accidents were not uncommon, and a good number involved professional medical attention. Of the seven participants, five had been in an accident, and one of these had involved hospital care while another was the cause of recurring migraines. It was the general consensus that cycling accidents are actually quite common for the rest of the population as well, and this does not go along with the idea of Copenhagen being safe for cyclists.

Even though the city's cycle routes were thought of as relatively safe, many of the participants admitted that they used helmets and felt that it would be beneficial for

everyone to wear them. Every person agreed however, that for a variety of reasons, they did not see justification a mandatory law. First, the city is not ready for all its cyclists to bring a helmet everywhere they go for the simple reason that there is no place to store them when not in use. Some thought it silly to wear a helmet while shopping; a helmet takes up a lot of space in a bag and a helmet can be easily damaged in one. It was pointed out that it is much easier not to wear a helmet and therefore, people are not likely to be bothered bringing one with them. Second, the current police force is considered inadequate to enforce this law, and this public opinion is not far from the truth. Officer Kjer admitted that he felt it would be close to impossible for he and his colleagues to issue tickets to everyone who violated a cycle helmet law.

Instead of a law, participants in our focus groups thought campaigns that taught the benefits of helmet use would be more effective. A good example of the effect that famous people have on cycle helmet use was brought up in both groups, although the effect was more negative than positive. A few years back, the Danish Prime Minister had been seen in the media wearing a helmet that was too small for him, and the general consensus was that it looked ridiculous. This damaged many people's image of the cycle helmet, as one participant in the second group suggested. He thought that many more Danish citizens would be wearing helmets while cycling today if the Prime Minister had not appeared so undignified.

Participants further speculated that programs could quite easily persuade children to use a helmet when riding, and it was also brought up that a high percentage already wears one. Some of the participants, who grew up in situations where helmets were never an option, thought that in the future it might be much easier to urge those citizens

who wore a helmet as a child to continue to wear one as an adult. Programs that would expose the public to the many heartbreaking stories that can follow a cycle accident in which the cyclist was not wearing a helmet were thought to be effective as well. When combined with success stories from the emergency room that tell of people who lived because they were wearing a helmet, it was believed that a general increase in helmet usage could be attained.

4.3 Officer Joern Kjer of the Frederiksberg Police Department

In order to understand fully the types of programs in the Copenhagen area, we contacted Officer Joern Kjer. The Frederiksberg Police, with the help of teachers, instruct students on bicycle traffic rules and the dangers of several different traffic situations using photos, skits, and at the end, tests. By observing the students throughout the course, the instructors evaluate their performances and distribute diplomas accordingly. The police officers only allow students wearing helmets to run the course. Officer Kjer also mentioned that there is currently a law on the books requiring motorcyclists to wear helmets and recalled a program that was run several years ago that gave cycle helmets to students. He strongly advocated parents' role of setting the example by wearing helmets themselves and mentioned a program based on a British model that tried to influence parents to do this via television commercials. This program definitely contrasts the one that Officer Salmon runs in Worcester, Massachusetts. The main goal of that program is to promote bicycle safety along with helmet use. Even when the program is concluded, the police officers try to promote helmet use, but here in Copenhagen, once the program is over, there is no positive reinforcement for the children to persuade them to wear helmets.

4.4 Helmet Counting

It can be seen when living in Copenhagen that very few cyclists wear helmets, and we expected the results of the helmet counting to show only a small percentage of Danes wearing helmets to and from work. The percentages that were obtained were much lower than expected. However, according to the chart on page 38, helmet usage has moderately increased since 1987. Out of 1,269 people counted coming out of central Copenhagen in the afternoon of 20 April, only 35 people (2.76%) were wearing bicycle helmets! In addition, 9 out of the 35 helmet wearers were members of the Gronnebude who are required to wear helmets while on the job. It was raining on the morning of 23 April, which could contribute to the increase in helmet use when the people were counted going into central Copenhagen. The results of this count were 50 helmets out of 1,071 riders (4.67%). Out of these 50 helmet wearers, 11 were members of the Gronnebude. Our third count, conducted on the morning of 30 April, found 69 helmet wearers among a group of 1,782 cyclists (3.87%). Of these, 7 were uniformed members of the Gronnebude. When combining the numbers from the three counts conducted and ignoring the members of the Gronnebude who are required to wear helmets, the percentage of observed cyclists who were wearing helmets came to 3.08 percent.

The group received seven sets of data from the branches of the Danish Cyclist Federation that were previously contacted. However, due to the diverse methods used by people in other DCF branches to collect the data, not all the results were utilized. Appendix G contains charts and graphs depicting the results of these counts.

4.5 Bicycle Shops

Our team gathered the prices of the various bicycle helmets on the market at three different bicycle stores in Copenhagen. Through interviewing the managers at the stores, we also ascertained the approximate number of bicycles and helmets the store sold per year. The results were very suggestive. The price of the helmets varied from 199 Danish Kroner (approximately $25) to 598 Danish Kroner (approximately $75). All three managers estimated that between 150 and 200 helmets were sold annually at their establishment. The most interesting statistic was that they also believed that they sold approximately 1 helmet for every 3 bicycles sold, and that individuals purchasing bicycles rarely bought helmets at the same time. Through our helmet counts, our team has shown that clearly fewer than one out of three bicyclists wear a helmet in Copenhagen. The conclusions that our team draws from this data are discussed in the next section.

5.0 Conclusions and Recommendations

After completing the focus group interviews, interviewing several experts in the fields of law enforcement and health care, polling several bicycle shops on the prices, quality, and numbers of helmets sold annually, and counting the number of helmets worn by Danes daily, our team feels that it has established a clear foundation on which to make conclusions and recommendations on the subject of a bicycle helmet law. The conclusions that our team established are categorized below. The categories include the disparity between the number of helmets sold and the number worn, the areas of improvement in the design of helmets currently on the market, the areas of improvement in meeting some of the consumer requirements for helmets, possible ways to make Denmark more "helmet-friendly," and finally, some non-legislative ways to promote and increase the use of helmets throughout Denmark.

5.1 Unworn Helmets

Our team has established that a large percentage of the Danish population owns helmets but does not wear them. This fact alone challenges any justification for a give-away campaign aimed at increasing bicycle helmet usage, and is supported by one of the observations of the first focus group our team conducted: reasons for not wearing helmets are not economic, but practical. The staff at three bicycle stores our team visited in Copenhagen estimated that they sold one bicycle helmet for every three bicycles sold. They also pointed out that most bicycle helmets are sold independently of bicycles. From this premise, one might assume that around 1/3 of bicyclists would be wearing helmets regularly. However, based on our helmet count information, less than five percent of

Danish cyclists actually wear helmets. One conclusion that can be drawn from these facts is that many bicycle helmets are owned, but not worn.

5.2 Design Weaknesses

Overall, bicycle helmets offer excellent means of head protection. This fact is indisputable, and is fully substantiated by material in the Background Information section of this report. However, there is still ample room for improvement in the design of bicycle helmets. As pointed out in the second focus group our team conducted, the fear of fatigue, especially of faintness in warm weather, caused by the added weight and insulation of bicycle helmets, is a significant problem. The designers of helmets will have to address these concerns if they hope to gain a larger market share of bicyclists.

5.3 Style of the Helmet

One of the participants in our focus group stated emphatically, "I haven't seen a smart helmet yet." And she wears a helmet. The overall disdain that Danes feel for the appearance of helmets was reinforced by both focus groups our team conducted. Many agreed that if there were stylish helmets sold in regular stores under such popular and recognizable brands as Levi's, Coca Cola, or Disney, the use of helmets would be much more widespread, especially among the younger Danes. Even many of those who wore helmets felt that they looked very foolish doing so, and that they received disagreeable looks from their fellow bicyclists for wearing a helmet. The sporty design seems to be a deterrent to wearing a helmet for some members of the Danish population. Many Danes apparently pride themselves on their sophisticated look; few wear sneakers and ski jackets when out in Copenhagen, unlike the scene one might observe in many American cities. The style of helmets is also a factor among the workforce. Many Danes who ride

their bikes to work feel the helmet does not match their work attire along with making their heads sweat and thus causing a frazzled look by the time they get to work. A more sophisticated looking helmet would surely be popular among Danes.

5.4 What to do with a Helmet?

Many helmet wearers in our focus groups commented on how the facilities for bicycle helmets are sub par. What is one to do with their helmet when they are not on their bicycle and are away from home? To be sure, one can throw it into a backpack, or just carry it around with them, but the inconvenience this causes is substantial according to many Danes. Some policies that could be implemented to increase helmet usage would be to have free lockers or even just hangers outside of stores and cafés in which to place a helmet. Also, designing a helmet with a locking mechanism that could attach to a bicycle would be another option as well. Finally, if a helmet could be manufactured that provided good impact-protection and could fold up or collapse when not in use it would be excellent; such a product would be beneficial to promoting helmet use. Now that the impact-protection of today's helmets is so excellent, new design improvements should be focused on allowing helmets to be more convenient.

5.5 Helmet Promotion

Most of the Danes interviewed in our focus groups would continue to bicycle and wear helmets if a law was passed, but were skeptical that bicycle use could be maintained at current levels. They saw other avenues for the promotion of helmet usage as better options for the Danish society. For example, if television campaigns stressing parental responsibility and accident success stories were in effect, many more people would probably be motivated to wear helmets. Such campaigns could point out how fatal or

serious accidents could have been made less severe with helmet use. Another option would be to demonstrate how an individual who was unharmed in an accident probably would have been severely injured had they not been wearing their helmet. All three focus groups our team conducted concluded that helmet promotion would be a very beneficial avenue for the Danish government to take to increase helmet usage.

There is evidence that there might currently be some momentum in the promotion of helmets. As can be ascertained by analyzing the results of Niels Jensen's methodology of counting the percentage of helmets on the Dr. Louises Bridge, the use of helmets has increased since 1987. This could be a result of a number of factors including the modest promotional campaigns already in existence and the effect that the mandatory-helmet policy of the Gronnebude has on the counts. According to a phone-interview with the Gronnebude (4 May 2001) this policy came into effect in 1999. This date occurred between Niels Jensen's last count on when we commenced our counting.

5.6 Children and Helmets

As many children are the victims in bicycle accidents (see appendix A), much of the support for helmet laws is directed at assisting the youngest of Danes. Our team has determined, through the conversations of the participants of our focus groups, that a good first step for the Danish government would be to provide facilities for the storage of bicycle helmets at all schools and universities in Denmark. It is a better avenue for the government to popularize helmet usage by first supporting those who voluntarily wear helmets than to try to force others to wear helmets.

5.7 A Helmet Law

A consensus emerges from each focus group our team conducted: it would be much more popular and successful if the Danish government focused on making Danes want to wear helmets instead of passing a law which forced them to do so. In one focus group, the argument surfaced that seatbelt laws save lives too, but that many people still do not wear their seat belts. The best solution to the problem of the small percentage of Danes wearing their helmets cannot be solved by helmet giveaways, for many Danes do not regularly wear the helmets they own. A law forcing Danes to wear helmets, such as the one attempted in Australia, cannot address the problem satisfactorily because many Danes would possibly stop riding their bicycles if such a law were passed. The best course of action for the Danish government is to provide support and advice to helmet manufacturers on possible design improvements for helmets, provide better facilities in Copenhagen for the temporary storage of helmets, and to commence a campaign designed to make Danes understand the safety and health benefits of cycling while wearing a helmet.

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7.1 APPENDIX A

This appendix consists of various charts and graphs pertinent to the United States.

Table 5: Deaths by Day of Week 1998	
Time	**Percent**
Sunday	12
Monday	11
Tuesday	15
Wednesday	15
Thursday	13
Friday	19
Saturday	14

Source: Insurance Institute for Highway Safety, 2000

Table 6: Percent of Bicycle Deaths Involving People 16 Years and Older			
Year	**Percent**	**Year**	**Percent**
1975	32	1987	53
1976	33	1988	56
1977	33	1989	55
1978	36	1990	65
1979	40	1991	63
1980	45	1992	58
1981	47	1993	62
1982	52	1994	62
1983	47	1995	64
1984	50	1996	67
1985	50	1997	69
1986	52	1998	70

Source: Insurance Institute for Highway Safety, 2000

Table 7: Distribution of Bicycle Deaths by Month, 1998	
Month	**Percent**
January	6
February	5
March	7
April	7
May	9
June	10
July	11
August	12
September	12
October	9
November	5
December	7

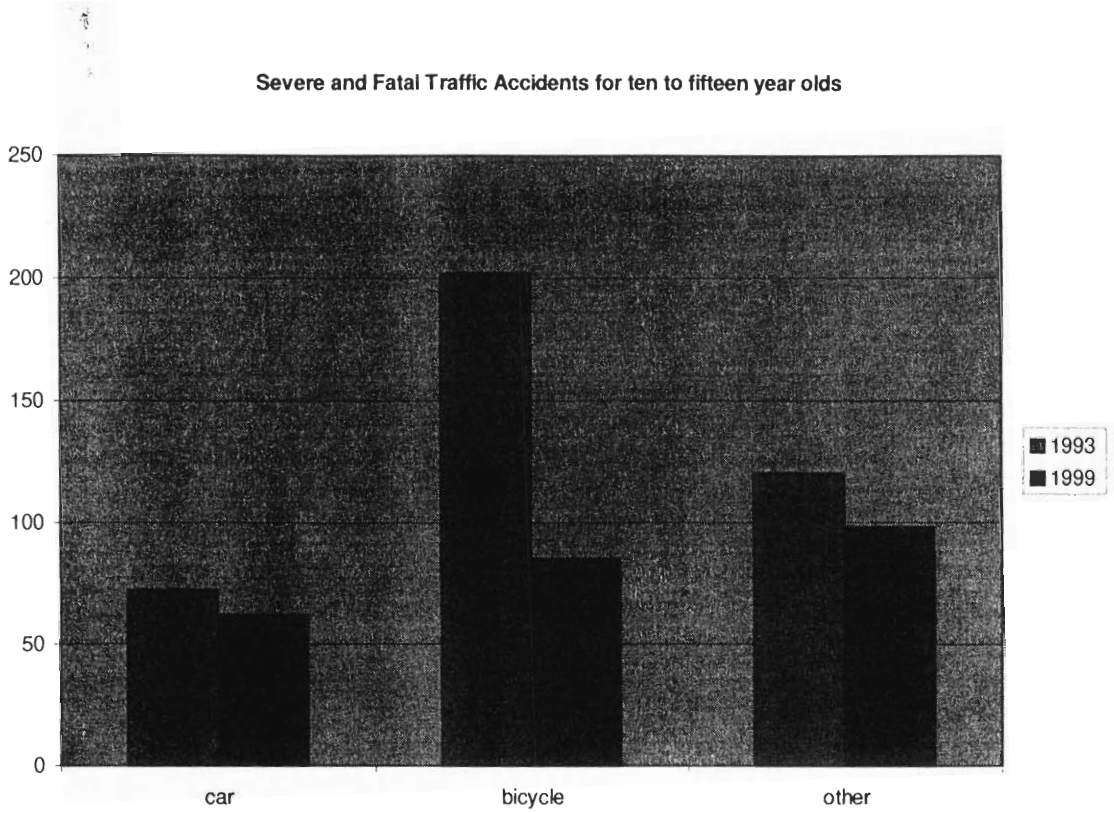
Source: Insurance Institute for Highway Safety, 2000

Table 8: Statistics for Failure Analysis Associates Injuries Associated with Example Items in 1989	
Product	**Number of Injuries**
Motor Vehicles	1,744,903
Stairs, Steps, Ramps and Landings	854,500
Bicycles and Accessories	514,700
Beds	299,200
Household Chemicals	65,900
Doors (not glass)	46,200
Pens and Pencils	29,900
Money	28,700
First Aid Equipment	27,300
Toothpicks	5,500
Combs or Hairbrushes	3,700

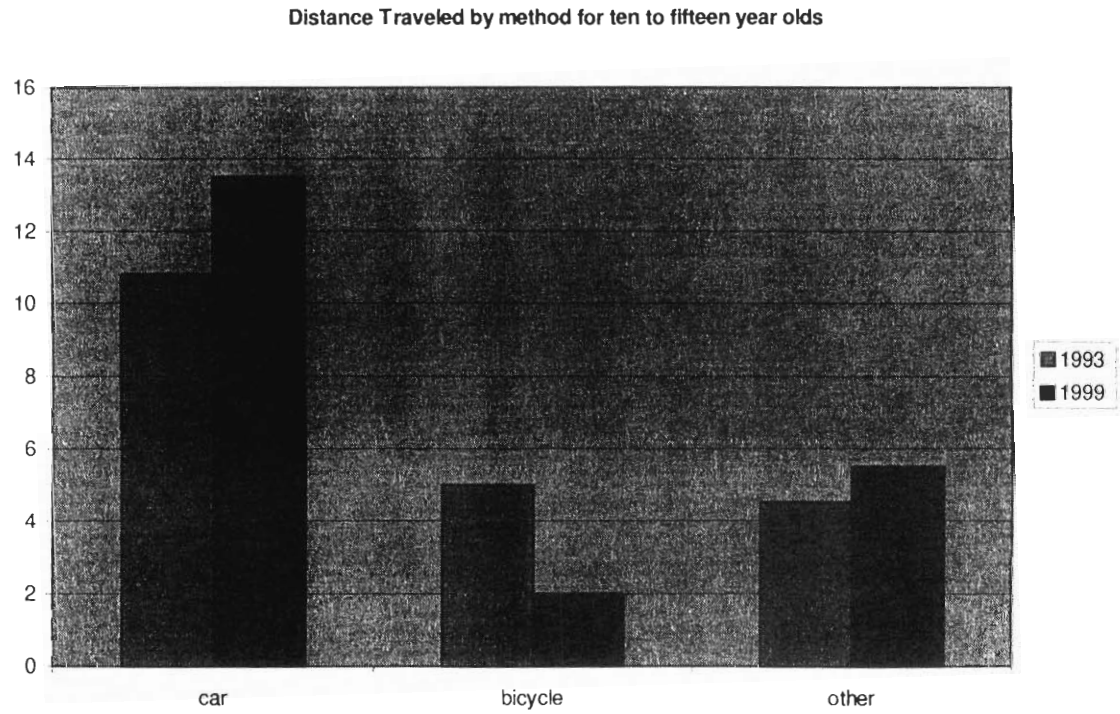
Source: Statistics from Failure Analysis Associates, 1989

Table 9: Estimate of Fatal Risk by Activity	
Activity	# Fatalities per 1,000,000 exposure
Skydiving	128.71
General Aviation	15.58
On-road Motorcycling	8.8
Scuba Diving	1.98
Living (all causes of death)	1.53
Swimming	1.07
Snowmobiling	0.88
Passenger Cars	0.47
Water Skiing	0.28
Bicycling	0.26
Flying (scheduled domestics airlines)	0.15
Hunting	0.08
Cosmic radiation from transcontinental flights	0.035
Home living (active)	0.027
Travelling in a School Bus	0.022
Passenger Car Post-collision fire	0.017
Home Living, active & passive (sleeping)	0.014
Residential Fire	0.003

Source: Statistics from Failure Analysis Associates, 1989



Source: Wedderkopp



Source: Wedderkopp

7.2 APPENDIX B

The following appendix refers to the bicycle laws in the United States.

Alabama	State Law Under 16 1995 Montevallo All ages 1993 Homewood All ages 1994
Arizona	Tucson Under 18 1993 Yuma Under 18 1997
California	State Law Passengers under 5 1987 State Law Riders under 18 1994 Bidwell Park, All ages 1991 Chico, CA
Connecticut	State Law Under 15 1993/1997 Seymour REPEALED All ages 1998 REPEALED 1999
Delaware	State Law Under 16 1996
District of Columbia	Under 16 2000
Florida	State Law Under 16 1997 (public property (fines 1-1-98) only.)
Georgia	State Law Under 16 1993
Hawaii	State Law Under 16 1/1/2001
Illinois	Barrington Under 17 1997 Inverness Under 16 1999
Maine	State Law Under 16 1999
Maryland	State Law Under 16 1995 Allegheny Co Under 16 1992 Howard County Under 17 1990 Montgomery Co Under 18 1991 Sykesville All ages 1995
Massachusetts	State Law Passengers under 5 1990 State Law Riders under 13 1994
Michigan	E. G6rand Rapids Under 18 1995 Adrian Under 15 1998 Kensington Metropark All Ages 1998 Farmington Hills Under 16 1999
Missouri	Creve Coeur All ages * 2000
Montana	Billings Under 16 2001 New Jersey State Law Under 14 1992

New York

State Law Passengers under 5 1989
State Law Riders under 14 1994
Chemung Co. Under 15 1995
Erie County Parks All ages 1993
Greenburgh All ages 1994
Guilderland Under 14 1992
Rockland County All ages 1992
Onondaga County Under 18 2000 ?

North Carolina

Black Mountain All ages 1996
Boone All ages 1995
Carolina Beach Under 16 1994
Carrboro Under 16 1997
Chapel Hill Under 16 1992

Ohio

Beachwood Under 16 1990
Brecksville Under 18 * 1998
Centerville Under 16 1999
Glendale Under 19 * 2000
Orange Village Ages 6 to 15 1992
Strongsville Under 12 1993
Waynesville Under 17 * 2000

Oregon

State Law Under 16 1993

Pennsylvania

State Law Passengers under 5 1991
State Law Riders under 12 1995

Rhode Island

State Law Under 9 1996
State Law Under 16 1998

Texas

Arlington Under 18 1997
Austin Under 18 1996/97
Bedford Under 18 1996
Benbrook Under 17 1996
Coppell All ages 1997
Dallas All ages 1996
Fort Worth Under 18 1996
Houston Under 18 1995

Tennessee

State Law Under 12 1994
Clarksville All ages 1993

Virginia

Alexandria Under 15 1994
Arlington County Under 15 1993
Blacksburg Under 15 1994
Fairfax County Under 15 1993
Falls Church Under 15 1993
Front Royal Under 15 1996
Manassas Under 15 1995
Manassas Park Under 15 1997
Newport News Under 15 1997
Prince William Co. Under 15 1995
Virginia Beach Under 15 1995

Washington State

Aberdeen All ages 2001
Bremerton All ages 2000
Eatonville Under 16 1996
Fircrest All ages 1995
Gig Harbor All ages 1996

	King County All ages 1993 (excludes Seattle) Lakewood All ages 1996 Milton All ages 1997 Orting Under 17 1997 Pierce County All ages 1994 Port Angeles All ages 1993 Poulsbo Under 18 1995 Puyallup All ages 1994 Steilacoom All ages 1995 Tacoma All ages 1994 University Place All ages 1996
West Virginia	State Law Under 15 1996 Clarksburg Under 18 1993 Morgantown All ages 1993 South Charleston Under 18 1994 St. Albans Under 18 1995
Wisconsin	Port Washington Under 17 1997

Ratings & Recommendations Bike helmets

Louis Garneau Globe, $50

Trek Vapor, $32, A CR Best Buy

Giro Wheelie, $35

Bell Half Pint Pro, $30

Overall Ratings *Within types, listed in order of overall score*

Brand and model	Price	Weight	Overall score (0 P F G VG E 100)	Impact	Straps	Fit	Vent	Comments
ADULT MODELS								
Bell EVO-2 Pro	$90	12 oz.		◓	●	◓	◓	Fitting pads effective and easy to position. Snap-type strap guides easy to adjust. Bonded design helps show dents.
Louis Garneau Globe	50	11		●	◓	◓	○	Fitting pads effective and easy to position. Effective rear stabilizer.
Trek Vapor **A CR Best Buy**	32	9		◓	●	○	●	Effective rear stabilizer. Effective reflectors.
GT Gator	40	9		◓	●	○	◓	—
Schwinn Typhoon 2.0	40	12		◓	●	○	○	Straps hard to move.
Giro Riviera	35	12		○	●	◓	◓	Effective rear stabilizer. Snap-type strap guides easy to adjust. *SIMILAR: Incline*, with visor, about $45.
Giro Boreas	150	10		○	●	◓	◓	Snap-type strap guides easy to adjust. Bonded design helps show dents.
Giro Helios	100	10		○	◓	◓	●	Effective rear stabilizer. Snap-type strap guides easy to adjust. Bonded design helps show dents. Effective reflectors.
Specialized Sub Zero	90	9		○	●	○	◓	Bonded design helps show dents. Front and rear reflectors for better visibility.
Specialized Air Wave	35	9		◓	◓	○	○	Effective reflectors.
Giro Gila	75	11		○	○	◓	●	Effective rear stabilizer. Snap-type strap guides easy to adjust. Effective reflectors.
GT Stinger	50	10		○	◒	○	○	On most samples, straps stretched too much. Straps hard to move. Effective reflectors.
YOUTH MODELS								
Giro Wheelie	35	11		◓	●	◓	—	Effective rear stabilizer. Snap-type strap guides easy to adjust.
Bell Mischief Pro	40	11		◓	●	◓	—	Snap-type strap guides easy to adjust. Buckle pinch guard. Effective reflectors.
Pro Action Voltage	25	11		◓	●	○	—	Effective reflectors. *SIMILAR:* adult *Solaris*, about $25.
PTI Barbie	20	8		◓	●	○	—	Effective reflectors. No rear stabilizer.
Trek Scout	32	8		○	●	◓	—	Effective rear stabilizer. Buckle pinch guard. Effective reflectors.
Schwinn Thrasher	34	11		◓	◓	○	—	Visor may not break away in a crash.
Specialized Air Wave Mega	35	9		◓	◓	○	—	Effective reflectors.
GT Lightning	35	9		○	●	○	—	Fitting pads effective and easy to position. Effective reflectors. Visor may not break away in a crash.
TODDLER MODELS								
Bell Half Pint Pro	30	9		◓	●	◓	—	Snap-type strap guides easy to adjust. Buckle pinch guard. Effective reflectors.
Pro Action Tru-Fit	20	8		○	●	○	—	Fitting pads effective and easy to position. Effective reflectors. No rear stabilizer.
GT Lil' Thunder	35	8		○	◓	◓	—	Fitting pads effective and easy to position. Buckle pinch guard. Effective reflectors. No rear stabilizer.
PTI Kid Cats	8	9		◓	◒	○	—	On most samples, straps stretched too much. No rear stabilizer.

The tests behind the Ratings

Overall score is based mainly on impact absorption. We also measured ventilation, strap effectiveness, and ease of adjustment. Helmets with equal scores are listed alphabetically. **Impact** reflects how the helmet held up when mounted to a metal "head" and dropped from various heights corresponding to different impact levels. Helmets that scored ○ or better passed the test at the CPSC-standard level. Those that scored higher also passed higher-impact tests. **Straps** is how well, when adjusted for a good fit, they kept the helmet in place under the stress of a sudden jerk by a falling weight. **Fit** is how easy it was to adjust straps and fitting pads for a snug, secure fit.

Vent reflects how much moisture evaporated from a test "head" covered with a wet cloth, heated, and placed in a wind tunnel. **Price** is the estimated average based on a survey. **Weight** is [illegible]

● Excellent
◓ Very good
○ Good
◒ Fair
◒ Poor

► **Can't find a model?** Contact the manufacturer. See page 57.

7.4 APPENDIX D

The following questions were asked during the focus group interviews conducted in Copenhagen.

1) Do you ride a bike?
   - How often do you ride?
2) What are your reasons for riding a bike?
3) Have you ever been in a bicycle accident?
4) Do you wear a helmet when you ride?

   Y:

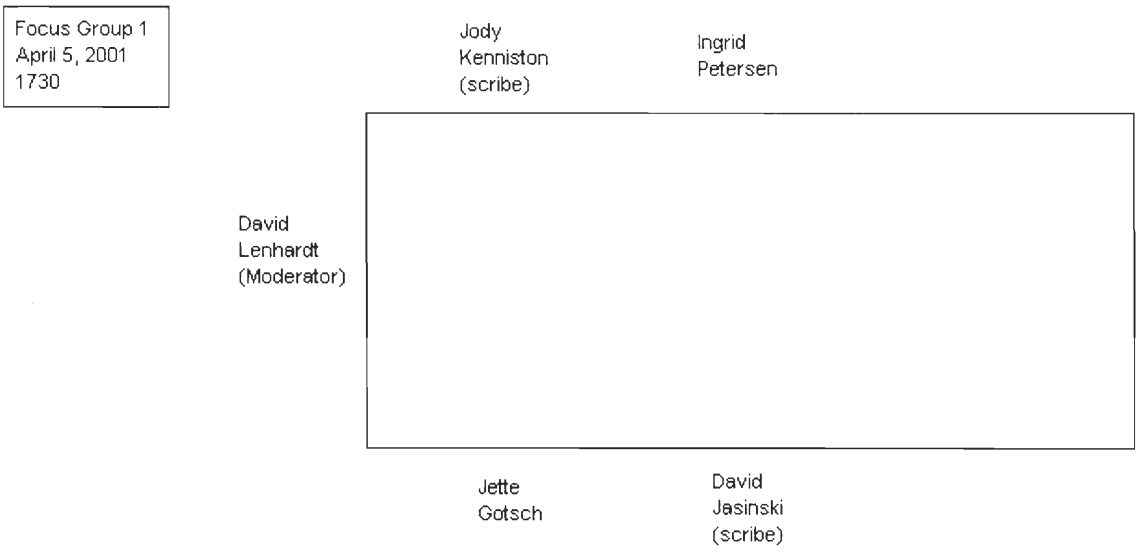
   - What kind/brand?
   - Is there a reason you bought that specific helmet?
   - Do you feel safer when you ride while wearing a helmet?
   - What are your main reasons for wearing a helmet?
   - Does the location in which you ride affect your helmet use?

   N:

   - Do you have a general idea of the price range of helmets?
   - What are your main reasons for not wearing a helmet?
   - Would you feel safer if you were to wear a helmet while you ride?
   - Would you wear a bike helmet if you could have a free helmet of your choice?
5) Would you wear a cheap, Styrofoam helmet if that's all you could afford?
6) On what type of terrain do you ride?
7) What are your feelings about a law that would require mandatory use of a helmet?
   - How would you react if such a law was passed?
8) If a mandatory law was passed would you stop riding your bicycle?
   - Do you think this would have an adverse affect of your overall health?
   - Would you participate in other recreational sports in its place?
8) Do you think professional bicyclists wearing helmets would promote helmet use?
9) Do you know anyone else that would be willing to help us in another focus group interview?

7.5 APPENDIX E

The following appendix consists of notes from our focus group interview conducted on 5 April, 2001 at the Danish Cyclist Federation.



DL: Dave Lenhardt
JG: Jette Gotsch
IP: Ingrid Petersen
DJ: David Jasinski
JK: Jody Kenniston

DL How often do you ride your bicycles?

JG Every day.

IP I ride mine every day also.

DL How do you feel the conditions are for bicycle riders?

IP Excellent, but they could be a lot better.

JG Yes, they could be better. The holes in the road are repaired much slower then for bicycle lanes than cars. The conditions are much better than in London, Paris, and Rome, where you don't even see bicycles.

DL We were wondering what your reasons for riding were, maybe for recreation or riding to work?

JG I ride mine for recreation.

IP Yes, also for recreation, but not mountain biking. I have a small, delicate bike. I don't bike for sports but for practicality, and because I like it.

JG It is my main means of transport, my first priority. I have no car and am about five kilometers from work, and I can get to work faster by bike.

IP My family has a car, but my husband takes it to work because he was injured, but on weekends my family usually travels by bike.

DL How does the colder weather and winter affect your bicycling?

JG I normally bike to work unless it's icy; then it's too dangerous. The ice, snow, and wind make it dangerous and affect me, not cold.

IP Same for me, I agree. I take my son to daycare every day and do not like to do it when it is icy.

DL Have either of you ever been in an accident?

IP Yes, I was hit by a bus. I was wearing my helmet and was not really hurt.

JG I was in a very small one. I was hit by a car, but it was not serious. I was cutoff and my bicycle was damaged. I was not wearing a helmet; I never do unless I am racing, you have to wear one to race.

DL Do a lot of people have accidents?

IP Yes, it is a common experience, happens all the time.

JG Yes.

IP I feel stupid wearing a helmet in stores, people look, but that's ok. I don't think it is silly, it just looks silly. I haven't seen a smart helmet yet.

JG Five years ago, the prime minister was wearing a helmet and looked very foolish wearing it. I think that changed a lot of people's minds about helmets.

DL Do you feel safer with a helmet?

IP Yes.

JG Yes, it would I guess. My coat is bright, and that makes me feel safer.

IP I wouldn't be a good Mom if I didn't wear a helmet. I don't like riding without a helmet like I used to before I had children. I forgot my helmet once, and I went slower because of that. I go faster with a helmet, even though I know it is not that much safer.

JG I agree. I am more careful when I ride without my lights and bright jacket.

DL We are doing this project to investigate whether or not there should be a mandatory helmet law. Do you feel that there should be one, and how would it affect you if there were such a law?

JG I would wear one. A lot of people don't wear seatbelts, though, and that is a law too.

DL What if there was a fine with the law?

JG If you don't get caught there is no fine.

IP I think people have more respect for some laws then others. If you don't run a red light, it is because that kind of law affects other people, the society. More people will follow that law then a helmet law, which just affects yourself, your own responsibility.

JG I disagree. People don't think twice about crossing with a red light, they don't think at all.

IP Maybe you're right.

DL Do you think that the law could be enforced?

IP No, the police force is not big enough.

JG Many people will stop riding bicycles with such a law.

IP They should have a television campaign focusing on the injuries you can get without wearing a helmet, and focusing on a parent's responsibility. They could have better marketed helmets. If there were a Levi's helmet, or a Coca Cola helmet, or a Disney helmet sold in regular stores, more people would wear them. Helmets aren't cool to wear. Where can you put one if you go to a café, or out for a night? They are wet and dirty, and they are not good on the head. I wish there was a box to lock them in, or a backpack to put them in.

JG Most helmets are worn by parents and children.

DL We were wondering that if you see professionals, like the Gronnebude, wearing helmets, whether that could have an influence on others wearing helmets? If there were famous people looking good in helmets, would that help?

IP Not even famous people look good in helmets; people don't always want to be sporty, to be identified with doing sports.

JG I agree. You also need more room to carry things, there is so much more to carry when riding then when in a car. When driving, you just need keys, but when bicycling, you need a coat, maybe an extra coat, and a helmet.

DL If helmets were given away free, would more people wear them?

IP No, that wouldn't help at all. Lots of people have helmets at home that don't wear them.

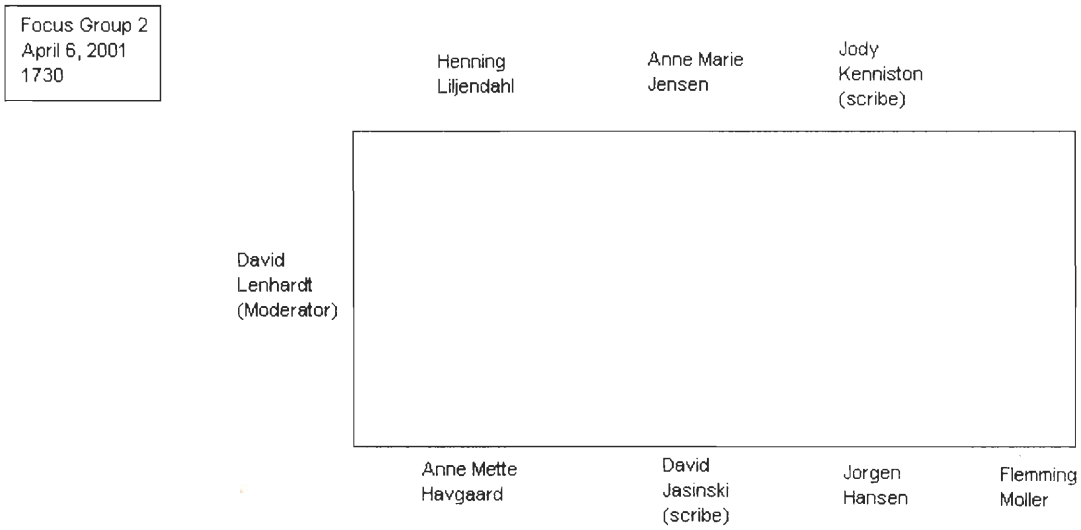
JG I agree, the reasons are not economic, but practical.

IP It is becoming more and more accepted to bike.

JG Yes, but lots of people think only of cars though, not bikes. There are no accommodations for bikes, they are accepted, but not considered.

7.6 APPENDIX F

The following appendix consists of a transcript from our focus group interview conducted on 6 April, 2001 at the Danish Cyclist Federation.



DL: Dave Lenhardt
AJ: Anne Marie Jensen
AH: Anne Mette Havgaard
FM: Flemming Moller
HL: Henning Liljendahl
JK: Jody Kenniston
JH: Jorgen F Hansen

DL What are your reasons for riding a bike?

AH Yes, I use it just to [go to] work, it's easy to get around in the city. Much more easy than a car or public transportation

JH I bike to work, I have done it for five years and the reason is that the distance has been about fifteen kilometers and when I started to bike to work, it was because I noticed that it was difficult walking, the best way is to do it when going to work. Then there is no question, and then I cycle the whole year. Also in wintertime and in rain, it's not always so common.

FM Ok, my reasons for cycling are almost the same as already mentioned, because I had not thought of buying an auto. Its cheaper and I have been cycling since 1977, or rather since 1969 when I first started my first job and I have had jobs in the city here, and by my home, and also as far as 20 kilometers away.

DL That's pretty far.

FM That's all year round of course, because I haven't anything else, and even for the long 20 kilometers my time and travel was shorter then if I [used] the public transportation. Also, I use it for leisure, for holiday both short and long distances.

AJ Well ten years ago, I [used] it for work, but not now – I use the public transportation, but I use [a bike in] my spare time.

DL For exercise?

AJ No, because it's easier than a car and I can't afford to have a car.

DL I hear the cars here have very high taxes.

AJ That's right…

DL What are your reasons for riding a bike?

HL Well, I don't have a car and I don't need a car, living approximately eight kilometers from here, and its six kilometers from home to my job, so I don't need a car and I use my bike for leisure time as well.

DL Ok, so pretty much, with everyone it's expensive to have a car. The next question, we just want to get an idea how many people have been in an accident with their bikes. Yesterday we had two people that said they both were in bike accidents when they were riding their bikes, so we're just curious to see what kind of answers we have.

AH I have not been in an accident.

JH It depends on what you mean by accidents, there are accidents where one goes to the hospital and so on, and an accident where something happens but not worse than that.

DL Anything . . . that you hit a car or anything other than an impact with the road or anything like that.

JH Because I have been involved in one, an accident that involved the hospital. This was with another cyclist and the path he cycled directly against me and one time, a year ago perhaps, I had a minor accident. Five years ago, I [was] involved [in] what could be a serious accident.

FM Wearing a helmet?

JH No, no, but it wasn't necessary at all, in that situation.

FM I have been involved in one accident, alone accident, and I didn't come to medical care until 4, 6 hours afterwards. It was my own fault; I fell on the road in creating much speed down hill, and hit my head on a stone. [It] was something with the cycle paths in different counties north of Copenhagen. Some have very shallow stones and some have stiff stones, and some have no stones at all. Some haven't got bicycle paths at all so it was [difficult] in the dark to see whether there was a path or not. So I mistook and go into a stone at very high speed and after that I decided to buy a cycle helmet and I have had one since - that was in '81. I have had different helmets since, but have always worn one.

AH I really haven't been in any accidents.

DL Well that's good then we're glad to hear that!

HL I have been involved in one minor accident, the road was icy so I fell.

DL Nothing involving a car?

HL No.

DL I just want to thank you for bearing with us, speaking English because I know it may be difficult for some of you, so thank you very much for trying your best.

FM I have one addition to what I said before; I got [chronic] migraines after this event.

DL Oh yeah, how long did that last?

FM It lasted until I had some proper treatment with acupuncture. Same five years ago, and also maybe some drugs, but it has diminished, luckily.

DL Well, that's good then. So, some people have said if they wear a helmet. Fleming said that he wears a helmet now, and I think you [Anne Mette Havgaard] wear a helmet because I saw you wearing one when you were coming in. Do you wear a helmet?

JH No.

DL Ok, and pretty much you said you ride to work and on the road, correct?

JH Yes, yes, I am using the path, too.

HL In my case, I don't wear a helmet when I go to my job, but when I am on tour, I always, nearly always use my helmet [but] if the temperature is too high, I won't wear it.

DL Ok, I think a lot of people say that.

HL The problem is that I fear I will faint.

DL When you say going on tour, do you mean traveling around, greater distances, or…

HL It's all kind of tours, they have a local department of cyclists operation. Well, we have tours every Tuesday night in the summer period. And we have two or three times Sunday tours also in the summer period. But of course also there is off and on biking.

DL So, we're kind of wondering – a lot of different countries are discussing whether or not to make a helmet law, where everyone will have to wear one, or where a kid would have to wear one under a certain age, or things like that. And we were just wondering what your feelings are on – if there was a law like that that was passed that said "if you are riding a bike, you have to wear a helmet or you'll get a 500 Dkr fee" or something like that, how do you think you would react to a law that would make you wear a helmet?

AH I don't think we should have a law, but I think we should use helmets. Maybe they should acclimate a little more wearing a helmet.

DL And say the reasons why you should wear one?

AH Yes.

DL That's a good idea – so it's not actually forcing.

JH I have several opinions about the other questions you had – I think if there was a law, I would use it.

DL You would?

JH Yes. It is easy to see – it's the same situation for motorbikes – 20 years ago it was law, but of course one sees a few other types without helmet today – bikes, motorbikes are all using . . . but the trouble for me is also the same as with the temperature. I think it's difficult to regulate the temperature because here, the temperature changes so much and I'm sweating a lot. On the other hand, it's cold and I need something warm.

DL I could understand that.

FM I would say that even though I've been a helmet user for more than 20 years, I wouldn't like it to be mandatory. We had the case for motorbikes – I think it was in the 50's. It was mandatory for motorcyclists, and it made a terrible racket in

the media, but I think that if the government would place a law, then I would comply with it.

DL There would be no change for you anyway . . .

FM You're so used to the motorbikes out, it eventually becomes a law.

AJ When people don't like to be saying that they have to wear a helmet, but all the kids are wearing helmets, so I think when they are grown up, they are still using a helmet.

DL Do you think most people would wear helmets if it was a law, or do you think that most people would decide to ignore it?

AJ It's like the safety belt in a car – there are still a lot of people that don't use it, but it's the law that you have to wear it.

HL It's not so easy to see [if you don't wear a seat belt].

AJ No, but that's right. You can easily see if you have a helmet on or not.

HL Personally, I think it's a good idea to wear a helmet but on the other hand, there are a lot of problems with it. School children need some place to have their helmets during the daytime without the helmet being stolen or crashed. The other problem is a problem I heard from Australia – Australians, when they got a law, many people stopped using a bike and that could not be good to the public health. If that was the consequence . . .

DL Yeah, I guess then people would stop riding and then get less healthy because they're not riding, so it would actually be bad.

JK Do any of you think that people would just stop riding, or do you think, more or less, that they'd just wear a helmet?

FM I think some people would stop riding; the people with minor need of cycling.

HL In that case we're not good representatives for the bikers because we like to use our bikes. We're not like average bikers.

FM There's lots of reasons to make other subjects more important than the topic of wearing helmets or not. For instance, teaching the bicyclists to stop at red lights, to wear lights at night and so on, is much more important. And also, wearing a helmet is no guarantee, especially not if it doesn't fit well. It's [a] very important case where many children were wearing helmets and hadn't been taught to wear them properly and it's no use at all, maybe it's dangerous.

DL We were thinking at looking maybe not at a mandatory helmet law, but as a method to increase people using helmets, because I think it probably couldn't hurt to wear a helmet when you ride to work. We were wondering if a good way to make more people wear helmets is to actually have important people that everybody sees, such as maybe the royal family or any other people that are in the media a lot, if there's pictures or commercials of them on TV with them wearing helmets, do you think that would affect where most people are wearing helmets?

FM Certainly. If [Prime Minister] had stopped using his helmet on that very day, then many more Danes would wear helmets.

JK Is that the picture that we were talking about yesterday?

FM Our Prime Minister, if he had left it at home that day, then I think that thousands of Danes more would have been using helmets.

DL If he'd left his home, more people would have worn theirs?

FM Because he looks terrible with a helmet. . . especially when it's not properly fitted.

HL It was far too small <laughter, everyone talking>

FM So, you're right, if there's a very big importance when known people use it or not.

DL So actually, that had a negative effect?

HL On the other hand, known people also have some kind of status in the society, and you don't have status if you use a bike – you use a car to get status.

DL In this society? That's the way ours is also. . .

HL People with status are of course not using their bike.

DL Do you think that's changing at all, from the past years as we move on, do you think it's becoming more and more accepted to ride a bike to work, as opposed to take a car?

AJ Well, statistics said that less people use a bike now than 20, 30 years ago.

FM I think it has nothing to do with helmets.

AJ No, no.

JH I think also a big issue is how one looks with a helmet or not; for some people it's a big problem, other have the opinion that it's not necessary at all because a lot of people who cycle slowly and not very often [don't feel they need a helmet] and

then there is some of us who cycle a lot and perhaps fast, and so on, and then there is a problem. There is some different groups and problems and for people who cycle not much, and for children I think, it's a good idea to make some PR about perhaps use of helmets. It would do a lot and perhaps it's also these people who is in the [risk takers?] to have accidents because they do not cycle much and people who cycle a lot is more aware of where it's dangerous, and therefore it's possible to [stay away from] trouble.

FM I think that if the need for use of helmets is to be promoted, I think it would be a good idea to bring success stories from the hospitals – whether the accidents have turned out to be minor because of use of helmets – just the same way as the motorcars with or without. . .

AH Safety belts.

FM Safety belts.

DL I agree.

FM When you seriously consider, every year there are statistics about accidents I think and every person who's dead there is a signature plus or minus one life lost. [Our group decided that Fleming feels strongly for more people wearing helmets, and that for every life lost due to the lack of people wearing helmets, there is one more vote for some action being taken for more helmets being worn.]

DL Do you feel that the streets in Copenhagen in particular are fairly safe for biking to work and the cars look out for cyclists?

AJ For the last 10 years they have made a lot of special paths for cyclists that has increased the safety for the people/cyclists who use it.

JH I think also that a lot of PR about to cars that they should be aware of cyclists when they're driving around. The most accidents between bike and car is when cars turn right and not see oncoming cyclist, and the other is a little bit strange, but it's when the car comes from in front and goes left, between they are not aware that a cycle can go relatively fast, or perhaps they only look out for cars and if there are no cars, they think, "There's no problem, I go" and then there come the cyclists. . .

DL I would think if there was a foreigner driving around, they would have no idea to look out for the cyclists, and that's all it would take to. . .

JH When I see a foreigner, I'm especially aware.

FM How do you see a foreigner?

JH From the plates.

FM Oh, yes, yes. I just was on a trip in London and I can compare the situation there with Copenhagen and I would say it's rather much more safe to ride bicycles in Copenhagen than in London, definitely. There they pay no whatever attention to bicycles.

DL Some people we've talked to both yesterday and back at home said that they don't wear a helmet, but they might feel safer if they did. Is that the case for anyone?

AJ It depends on where you are biking. If I was going to bike in the countryside, I think I would wear a helmet because the cars are going so fast, and there's not special path for the bikers.

DL So pretty much, wherever you feel like you can be in danger, then you would wear a helmet?

AJ Yes.

AH It's funny, because when I was living in the country, I never used the helmet.

AJ No?

AH But when I moved to Copenhagen, I buy a helmet but it's only in the. . .

AJ Rush hour.

AH Rush hour, late at night and Sunday I drive often without a helmet.

FM The Danes are aware in the countryside.

AH Yes, of course, some places in the countryside, I don't like to ride.

JH there is a lot of traffic between cities, and it's not good to cycle. There's a reason why the Danish Cyclist Forbund has established rules in the countryside [about these?] for small roads, low traffic, more dangerous, that's why DCF has rule.

FM I think you're perfectly right. On holidays, we always plan our routes from home and say no country roads because they're dangerous, but local routes, or even the old small routes between small towns are perfect. But country roads are reasonable traffic amount, they're dangerous to cyclists. We had a member from Jutland who came to our local Copenhagen department of DCF, and he said that it was such a nice thing to cycle in Copenhagen, much more safe than in Jutland.

DL That's all the questions that we have, unless anyone has any ideas that you'd like to bring up and discuss.

FM You asked before whether we would feel safer with a helmet or not. I don't pay much attention to whether or not, mostly because I wear one always, but I don't think of it – it's not in my mind.

DL If you don't wear a helmet, do you feel less safe maybe?

FM Maybe, could be. I haven't tried so even if I go around the corner to by some stuff, I always wear a helmet.

DL Yeah, because I bike at home and I know one person that bikes to work and that's pretty much one of the three in the US that bikes to work. . .

7.7 APPENDIX G

This appendix consists of data that was gathered from other DCF branches throughout Denmark.

Table 10: Helmet Count Conducted on 19 April, 2001			
Age Group	Cyclists Counted	# Wearing Helmets	Percentage
0-12	4	2*	50%
12-20	55	2	3.8%
20-50	252	3	1.2%
> 50	41	3	7.8%

*** - Those wearing helmets were children passengers; the parents were not wearing helmets**

Source: Flemming Moeller

Table 11: Helmet Count Conducted on 20 April, 2001			
Age	Cyclists Counted	# Wearing Helmets	Percentage
8	21	16	76.2%
9	6	5	83.3%
11	14	4	28.6%
12	19	7	36.8%
13	6	2	33.3%
14	20	0	0.0%

Source: Neils-Joern Gadeberg