
EMAIL 1: FROM ME TO CYCLE SMART

Hi there, just picking up from this conversation:

https://twitter.com/cyclesmart_uk/status/540823538148868096

If you're happy to, then I'd quite like to ask a few questions and turn the conversation into a blog article. I know the readership of it would be generally anti-compulsion, so maybe it's a good chance to explain the specific issues of child casualties and flesh out your support for infrastructure etc...?

Anyway, sticking to the specific question we were already on, for now:

You're well-known for your promotion of helmet compulsion in some form. Legislation is a necessarily precise matter, so what are your precise definitions for each of these key entities?

- (a) the individuals who would be required to wear protective headgear,
- (b) the headgear they would be required to wear,
- (c) the locations or environments in which they would be required to wear it, and
- (d) the vehicles the use of which would require the user to wear it.

Many thanks for discussing this and helping us understand your policies more clearly.

Bez

EMAIL 2: FROM CYCLE SMART TO ME

Hi Bez

We are a small charity, started by a concerned individual on a single issue. Over the past decade and a half we have developed (as any institution would) to recognise that there are many ways and means beyond just helmet wearing that can be deployed in the safe guarding of child cyclists - this was ultimately the driving force in our recent renaming. I believe there is an unfair perception amongst certain groups and individuals as to the aims and motivations

of the charity. We are open to constructive criticism and comment particularly those ideas that are new and not just a repetition of the usual 'helmet wars' back and forth.

I will start by outlining the vulnerability of child cyclists before moving onto consider the ways in which we can help prevent child cycling injuries particularly those caused by non-collision incidents. Finally as you requested I will give in more detail specifically how and why we feel helmet legislation for children 14 and under would increase cycle safety.

The vulnerability of child cyclists

The most important step in preventing injuries amongst all cyclists is improvements in infrastructure that lead to segregation of cyclists and motor vehicles. Death rate and the severity of injuries that come about as a result of bicycle-motor vehicle collisions are unacceptably high. Finding significant space for cyclists is vital to reducing these incidents. However, there is also the need to consider non-collision incidents i.e. incidents that do not involve being hit by motor vehicles. In officially recorded police statistics these account for 69.7% (12301 incidents) of all serious injuries i.e. an injury that requires admission to hospital. Of those 12301 serious injuries, 4783 (38.9%) were sustained by the age group 0-14years old¹. It should also be noted that studies across Europe show a dramatic under reporting (to the police) of the true number of non-collision accidents that actually occur². One such study found that only 4% (out of a total 828) of non-collision accidents were reported to the police and therefore included in official incident figures. While many of these non-collision incidents involved minor injuries not requiring hospital treatment, it was also discovered that 1 death, 2 admissions to intensive care and 42 admissions to a hospital bed had been excluded from official because they weren't reported to the police³.

In countries such as the Netherlands where cycle segregation and cycling numbers (another important factor in overall cycle safety) are far better than in the UK they are still reporting a significant number of non-collision cycle incidents leading to serious injury. A Dutch study found that over a 5 year period (2005-2009) there was an average of 7699 non-collision incidents per year in the Netherlands that were deemed to be serious injuries⁴- these figures must of course be taken into the context of the amount of cycling that is done in the Netherlands compared to the UK. The pro-cycling and segregation policies of the Dutch have clearly improved cycle safety but they have not managed to eradicate the risk of injury entirely, this is particularly true of young cyclists and head injuries. On average 1049 0-14 year olds are seriously injured during a non-collision incident every year in the Netherlands with 432 (41.18%) having suffered serious head or brain injuries⁴. Even with the good practices in infrastructure these are unacceptable rates of injury to child cyclists in a country that is deemed to be the safest in the world for cycling. As a result any safety campaign that is seeking to protect children and their families must consider measures beyond just improvements to cycle infrastructure. That is why our charity is committed to educating children and parents about cycle training, the importance of maintaining a bike, being seen and the wearing of cycle helmets all of which will help reduce non-collision incidents and/or the severity of the injuries sustained.

What can be done to improve the situation for Children?

As Chris Boardman recently stated "cycling is a skill for life" and children and parents require guidance about the schemes on offer such as bikeability. Such training programmes are especially important for young people who have not yet fully developed their risk assessment skills or balance and are less able to effectively judge speed and distance. Organisations such as British Cycling have made similar statements about the importance of cycle training and our charity would go as far as insisting that cycle training is enshrined as part of the national curriculum for schools in this country. This is an opportunity in which cycling can

be actively encouraged by schools with the aim of increasing the number of cyclists in this country as well as the skills of the individual cyclist.

Furthermore, we recognize the importance of teaching children good practices in regards bike maintenance. Again this is both a life skill and a safety issue. How many incidents and injuries could be avoided if children had properly maintained brakes and adequately inflated tyres? How many more children could be out cycling if they were able to repair a puncture themselves or replace a slipped chain on their own rather than having to wait for a parent to do it for them?

As a charity we are also actively engaged in studying the effects that socio-economic background has on the likelihood of a child being injured cycling. Children from a poorer background are more likely to live in an urban environment with higher traffic volume which increases the risk of an incident with a motor vehicle. They are also less likely to have access to the above mentioned courses that can improve life skills and they often lack the financial resources to buy a good quality bike, maintain it properly and buy the relevant safety gear - reflectors, lights, helmets, etc.

The report : The Potential for Cycle Helmets to Prevent Injury : A review of the Evidence published by TRL on behalf of the DfT concluded that cycle helmets help reduce the number of head injuries and the severity of injuries sustained. These findings were based on a number of hospital admission studies into the effectiveness of helmets as well as laboratory tests⁵. The report also highlighted that helmets are most effective in non-collision accidents the type of which we have detailed above. As a society our understanding of the long term effects of receiving what are commonly referred to as 'minor' blows to the head are only just coming to light (these injuries are far more common than the serious injuries stated above). Recent studies show that even head injuries that we might have thought to be mild at the time of injury can cause permanent damage to the brain in the long term and have effects on the mental health and neurological development children and young people⁶. It is also worth noting that children's skulls are not as thick as adults and in the case of young children have yet to fully fuse once again making them more vulnerable to irreversible brain injuries.

The need for helmet legislation

The need for helmet laws is as much about the need to educate as it is to enforce compliance in much the same way that previous laws in this country (and much of the world) requiring seat belts, etc. have been used to inform the public about the necessity of using specific safety equipment. This need is particularly important for children when you consider that according to the DfT 17% of kids currently wear a helmet compared to 39% of adults. The lower number of children wearing helmets is both the result of a child's greater propensity towards risk taking as well as the issue of peer pressure i.e. It's not cool to wear a helmet. Studies on the effectiveness of helmet legislation show that post legislation, helmet wearing rates have improved.

The specifics of helmet legislation

The individuals - Our policy for helmet compulsion would include all children 14 and under. This would include individuals riding the bike as well as passengers on the bike. Exemptions would include any individual who due to a specific medical condition, physical feature or genuine religious custom would have difficulty wearing a helmet or fitting it correctly. A signed doctor's note would be needed for any medical exemption.

The headgear - Helmets that meet the standard BS EN 1078. Helmets that are designed and marked specifically as a toy, helmets that are designed solely as racing helmets and not for road use or any other form of PPE helmet for purposes other than cycling would be deemed inappropriate. The helmets would also need to be fitted correctly to the individual.

The locations - Any public route inc. roads, cycle lanes, paths or tracks. We would also strongly recommend that children wear helmets while in private gardens, private driveways, etc. although this is unlikely to be covered in legislation

The bikes - Any bike of 2 wheels or more propelled by pedal power as well as balance bikes for young children.

As you mentioned, it's unlikely that our call for helmet legislation for children is going to receive much support by the vast majority of readers/contributors to your blog. Most will say that we should focus our efforts on campaigning for space for cycling and that changes to the environment/infrastructure should be a priority. However, I'd like to ask the question - If we assume that the Dutch method of improving infrastructure and increasing the number of cyclists is the best way forward and something we should aim for, do we simply dismiss the 400+ a year serious head injuries (not to mention the countless minor injuries that could lead to long term problems) that are sustained by under 14s in the Netherlands as collateral damage? Shouldn't our cycle safety plan in the UK aim to reduce that number? And, If, helmet legislation isn't the way to reduce head/brain injuries how would you propose it is achieved?

1. R.Benington, How can we get (and keep) Britain cycling? Reducing risk of non-collision incidents will help make cycling more enjoyable. All Party Parliamentary Cycling Group, 2012
2. European Transport Safety Council - Social and Economic Consequences of Road Traffic Injury in Europe, 2007
3. R.Benington, The causes and circumstances of non-collision cycling incidents, 2010
4. SWOV Institute for Road Safety Research Fact sheet - Bicycle Helmets, 2012
5. TRL Report PPR 446 The Potential for Cycle Helmets to Prevent Injury : A Review of the Evidence, 2009
6. R.Moore, C.Hillman, S.Brogolio, The Persistent Influence of Concussive Injuries on Cognitive Control and Neuroelectric Function, 2013

EMAIL 3: FROM ME TO CYCLE SMART

Hi,

Thanks very much for this thorough reply and I'm sorry for not getting back to you sooner: I missed it when it arrived and it only occurred to me today that we'd started a conversation and I needed to go back and look for it.

I confess I'm still slightly lost on the relevance of the first set of figures you quote, since they don't detail head injuries, but thank you for the detailed and thorough response. There are a couple of references I've not read before so I shall try to take a look through them.

Most of the points you make (that children's skulls offer less protection; that, when taken across a population, helmets offer some benefit even if it is rather difficult to quantify; that all head injuries are of course undesirable; and so on) are fairly indisputable.

I'd like to raise a couple of questions if I may, though:

Firstly, one common argument (perhaps the main one) against helmet compulsion for anyone is the risk of a negative effect on participation. There is, of course, plenty of debate as to how strong this effect is in both the short and long term, but hopefully we can agree that, all else being equal, this will occur. Naturally, reduced participation risks reduced activity, and whilst sports can displace one another easily, cycling is a mode of active travel and as such has the potential to reach more people and become a more regular part of their lives. People—children included—do of course suffer health disbenefits and reduced lifespans of varying degrees as a result of inactivity related disease, so how do you view such risk in the light of compulsion? Head injuries tend to be very visible and emotionally compelling; heart disease and diabetes less so, but with the latter alone forming 10% of NHS spend and rising, is this not the absolute priority in terms of a population health issue?

Secondly, (and here I should add that I do make my kids wear a helmet in many scenarios, but not all) I notice that your legislation would criminalise at least one cases where my personal consideration is that a helmet would actually add injury risk (a consideration that I base on an engineering/physics background rather than a medical one, but then trauma injury is perhaps arguably more physics than medicine). Specifically this: My son was (and daughter will be) introduced to cycling by riding a balance bike on a flat grassy surface. This involves moving at jogging pace over slightly soft ground, at the age of two. At this age, a helmet doubles the diameter of the head, which is held by a very weak-looking neck. A doubling of the diameter not only significantly increases the risk of the head coming into contact with anything, but—crucially, to my mind—doubles the torque applied to the top of the spine for any rotational forces when it does. Do you consider a helmet to have increased risk of injury in such cases?

Thirdly and finally, following on from the above: I have yet to meet a single person who would advocate the use of a helmet for a two year old moving on foot at jogging pace on a flat, grassy surface. Yet a fair number—including yourselves—would advocate one for cycling. Why is this? (Especially given that, anecdotally speaking, my observation is that falls seem to occur more often on foot than on a balance bike.) I have yet to see a single person advocate playground helmets—where children are excited, in close contact, and on tarmac—or indeed any other type of helmet for any everyday activity. It's always cycling; uniquely cycling. This is the aspect I understand least: yes, head injuries are bad, but why are people only ever compelled to campaign for cycling helmets?

Again, thanks for your previous reply. If you're kind enough to rely to this one too then I shall endeavour to be more thorough sifting through my email this time.

EMAIL 4: FROM CYCLE SMART TO ME

Hi Bez

No worries, it's a busy period of the year for everyone.

By the way our office email is back up and running so you can now contact us via info@cycle-smartfoundation.org

The point of the first set of figures was to demonstrate that cycling injuries don't just occur as a result of cycle-motor vehicle collisions. These incidents (as I noted in my original email) do tend to produce the most serious injuries and number of deaths - and therefore grab the most headlines. Improvements to infrastructure are essential but even with these improvements cycling related injuries will persist. Many of these in the case of head injuries would be preventable through the use of helmets. Other injuries (not just to the head) as a result of non-collision incidents could also be decreased by the other measures that I mentioned in my email and of course many non-collision incidents could also be avoided by improvements to infrastructure. In general we find that when people and organisations talk about cycling, the risks involved and the injuries sustained they do so on a general scale. We are focused on Children and the risks of non-collision accidents are far greater for them as a group than for cyclists in general.

In regards the question of the benefits of cycling vs the benefits of helmet wearing here are the conclusions of the TRL report PPR697 published in July this year

"Current evidence does not offer support for the assertion that cycle helmet legislation leads to large reductions in cycling participation that outweigh any potential injury reduction benefits through a corresponding reduction in health benefits. If reductions are observed they are likely to be small and short term"

Emphasis is often placed on the Australian experience of helmet legislation and cycling participation. Yet organisations like the Cycling Promotion Fund use Australian Bureau of Statistics figures to show that sales of bikes have been increasing year on year for well over a decade. The Queensland based centre for accident research and road safety says that bicycle sales in Australia are up 67% since 2001. If helmets put people off cycling for whatever reason why would they continue to spend their hard earned money on bicycles in a country with helmet legislation?

Our aim as a society should be to get more children cycling in order to improve health and safety (safety in numbers argument) while also giving them the protection that wearing a helmet affords. The key here must be education, which as I've stated before is what the vast majority of our charity's resources are aimed at doing. Through education we are able to inform children and parents about the benefits of cycling and why they should do it while also highlighting the risks involved and how they can better protect themselves from injury. Again, I would ask that if the best way to educate people doesn't involve legislation then what would

you propose we do to increase helmet wearing amongst children given that you can see the benefits of helmet wearing as an individual/parent as well as via published studies?

As for your observations about very young children and the potential for head injuries in everyday life I think you have to consider the following

Managing the environment and associated risks

With many everyday activities we minimize external risks by altering the environment that the child is in. For example parents remove unnecessary furniture e.g. coffee tables, footstalls etc. from their homes and where low/hard/sharp surfaces persist they cover them. Even within playgrounds there are a whole host of safety features built into the design including for example surfaces that meet requirements BS EN 1176/BS EN 1177 to be installed under any equipment, padding on bars, fencing/caging to prevent falling, etc. While there are many things we can do to improve the environment that cyclists ride in the sheer scale of that environment compared to a playground or your living room means that managing the risks of injury are far more difficult. Furthermore, where risks of falling are similar to those in cycling e.g. playing on a see-saw or rocking horse type equipment (also see below for mechanism of injury) there is a big difference in regards the proximity that a parent can keep with their child. You can stand and catch a child falling from playground equipment it's somewhat harder when they are moving on bicycle at speeds you may struggle to keep up with.

Mechanism for sustaining injury and types of injury

You've said from your own experience of watching your children that they tend to fall more often while walking/running. Therefore, you have probably noticed the way in which they fall - hands and knees out, falling forward. This is a reaction that children have evolved in order to naturally avoid injuring their head. Cycling puts the child in a different position. They are holding onto the handlebars which means they can't get their hands so easily into position to break the fall. They are sitting so they can't get their knees out from underneath them again to break the fall. They are far more likely to overbalance sideways or backwards while sitting on the bike than they would if they were standing on two feet. There is an object (a bicycle) in between them and the ground. Children are also likely to be falling from a higher height than if they were on two feet. Finally the potential speeds and subsequent forces are greater on a bike than they would be for most other activities a child is involved in on a day to day basis. I can hear some people saying - well why not make kids wear helmets in cars then? Again, you'd have to consider the mechanism and types of head injuries sustained in car crashes. These tend to be diffuse axonal injuries where the forces involved move the brain within the skull and pull brain tissues apart causing severe damage. Cycle helmets are scientifically proven to prevent against head trauma i.e. blows to the head as the result of a fall. They won't help you in a car crash. Arguing for their use in cars would be the same as arguing for the use of seatbelts on a bicycle - nonsensical!

The individuals who founded and run our charity are mainly made up of healthcare professionals from the fields of paediatrics, orthopaedics and child safe guarding. There are nationwide databases maintained by the NHS into the kinds of injuries that are generally suffered by children in falls and the way that those injuries are sustained. This is the empirical evidence we have that leads us to the conclusion that cycling as an activity for under 14s requires the wearing of a helmet where other activities do not.

In regards your son's specific case, I would say that if the helmet is doubling the size of his head then it is the wrong size or a poor design. I myself have a 2 year old son and his cycle helmet (at the widest point) increases the circumference of his head by 53%, at the

helmets smallest setting it would increase the circumference by 64% of any child wearing it. The helmet in question is good quality and provides excellent protection to the back of his head which is especially important for helmet designed for young children. Besides this I'm not aware of any study that shows that young children hit their heads more often when they fall of a bike with a helmet on compared to when they don't have one on. Furthermore, the TRL has stated in several reports that there is no evidence that helmets increase the risk of rotational injuries.

I hope you and your family have a good Christmas and enjoy the New Year

EMAIL 5: FROM ME TO CYCLE SMART

Hi there,

Me again :)

Sorry, delayed response, what with Christmas and everything. A couple of points to clarify and a couple more things to ask if I may, then at some point I may see if I can knock this into shape for a blog post. (Thanks for the replies so far, it seems reasonable and thoughtful stuff.)

1. Going back to the first set of figures, I still see nothing that gives a number for head injuries of any kind; just figures for all serious injuries. Have I missed something? Apologies if so.

2. On the "playground" note, I was thinking more of school playgrounds than play areas: these tend to be normal tarmac rather than sprung surfaces. I've not tried to locate any figures for head injuries in this environment, though.

3. Apologies about my "twice the size" point: this was shorthand and (consciously) a little hyperbolic; I hadn't measured anything. On inspection my boy's first helmet was around a 55% circumference increase. (That said, some of his friends had much larger helmets, so I'd guess for some at least the figure would be larger.)

4. On that note, you say that a much larger helmet would be a "bad design" but that nothing "shows that young children hit their heads more often when they fall of a bike with a helmet on" and "there is no evidence that helmets increase the risk of rotational injuries". Are these not contradictory? ie, if a larger helmet is a bad design, in what way is that the case if it's claimed that no helmet increases wither the rate of hitting or the rate/severity of rotational injury?

Thanks again, and a happy new year.

Bez

EMAIL 6: FROM CYCLE SMART TO ME

Hi Bez

No problem, we've only just come back to work ourselves and there is always that period of readjustment and trying to get back into the swing of the working week.

In regards your points below

1. You're right the first set of statistics didn't have a specific figure for head injuries. The Department for Transport (using the findings of the TRL and data from HES) states that 40% of cyclists admitted to hospital have suffered a head injury. Unfortunately this figure isn't broken down to consider the type of incident (collision or non-collision) or the severity of the head injury although we can assume that the overall injuries sustained by the individuals must have been serious for them to have been admitted to hospital. The Dutch report that I sent you does break down the figures to consider the type of incident and specifically details the number of serious head injuries by age range. Furthermore the German report "Head Injuries in Bicyclists and Associated Crash Characteristics" (A. Malczyk, K.Bauer, C.Juhra, S.Schick, 2014) noted that 54% of individuals involved in non-collision incidents had received a head injury. Of those that had received a head injury 39% had received soft tissue injuries to the head, 35% had suffered a concussion, 7% had suffered a skull fracture and 11% had received a brain injury (either intra or extra cerebral).

2. With the school playground example while the surface may not be specially designed in the ways in which I described in my previous example I do think you still have to consider the other points that I made in regards the mechanism for injury and the environment that the child is in. Schools and nurseries have guidelines in regards the ratio of staff to children so as to ensure that children are properly supervised at all times and not in danger. This kind of supervision would be very difficult to achieve outside a controlled environment. Besides which I personally believe that cycling should give young people (and old for that matter) an element of freedom. We retweeted a quote from the organisation Safe Kids Worldwide that I think sums it up quite nicely "It's a kid's job to be curious, explore and discover. It's our job to keep kids safe."

3 & 4. There is no doubt that the quality of design of a helmet and it's correct fitting are essential when considering it's effectiveness and this is something that I've stated previously. Perhaps I should reword my previous comment to state that there is no evidence to suggest that children who have a properly fitted helmet of the right size and designed to the proper safety specifications are at greater risk of receiving a head injury or rotational injury. Clearly if a child (or adult) is wearing a helmet that is not to the design standards or if that helmet impairs their vision or is falling off their head or not secured properly

using the straps then at the very least it will be ineffective at preventing head injury. This would be no different from the requirement by UK law to fit a booster seat for children under the age of 12 or height of 135cm. The seat is only effective if you are using the correct one - size, shape, forward facing/ backwards facing, etc. and if it has been installed properly. Failure to follow the guidelines will either make the device ineffective or indeed create further risks to injury.

As well as encouraging children to wear helmets much of our educational programme is based on getting them and their parents to fit the helmet correctly. For example, one of our education programmes for kids includes the five S's for better helmet wearing (standards, senses, snug fitting, squarely positioned, secure straps).

END
