***Mary Ward Essay Competition***

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**Sláinte agus Rothaíocht: The potential, or lack thereof, for cycling to offer independence to those medically unfit to drive**

**Introduction**

The role of the ‘Sláinte agus Tiomáint’ Medical Fitness to Drive Guidelines includes ‘promoting mobility consistent with safety on our roads’. However, despite the ever increasing presence of cyclists on Irish roads, and the ever increasing evidence for its advantages 1,2, there are no such relevant guidelines for cyclists. Thus, for an individual deemed unfit to drive, in specific situations could cycling help maintain some of their independence? In fact, in the long run, could the health benefits of cycling help *prevent* some of the conditions that cause drivers to be unfit to drive in the first place? For example cardiovascular disorders, insulin-treated Diabetes and stroke/TIA. These are interesting questions, and to answer them the exact benefits and risks of cycling, along with existing and potential infrastructure to protect them, will require further exploration. Throughout this essay, I hope to discuss the above and gain a better insight into the current situation regarding cycling in Ireland and its potential advantages for certain patients deemed unfit to drive.

Before going any further, it is important to specify that a large amount of individuals who are deemed unfit to drive could potentially endanger themselves by cycling, for the same or similar reasons that it is unsafe for them to drive. Thus, the promotion of cycling to individuals should potentially be approached on a case by case basis, in the same way that medical fitness to drive is.

In the 10-year period between 2006 and 2016, the number of cyclists commuting to work, school or college in Ireland increased by 52% (53,960 in 2006 to 82,123 in 2016)4. Thus, it is clear that the popularity of not just cycling, but specifically cycling as a commuting option, has increased significantly. However, this should not come as a surprise to anyone involved in traffic management or transport infrastructure, or even members of the Irish public for that matter. Given the many proven advantages of cycling as a commuting option, the Irish Government has persistently promoted its use over the last 10-20 years. The HSE, National Transport Authorityand the Environmental Protection Agency have all been involved in promoting it to the Irish public throughout the 21st century 5,6. It is integral part of the Ireland’s Climate Action Plan 2021, the most comprehensive and detailed plan ever published by the State in the area of climate change7.However perhaps the single largest, Government initiative aimed at promoting cycling is the Cycle to Work Scheme, introduced by the then Government in 2009, which offers a financial incentive to facilitate bike ownership for the purpose of cycle-commuting8. Thus despite the risk of injury associated with cycling, the evidence for promoting its use is strong and will be outlined in the following section.

**Benefits of cycling**

The health benefits of cycling are substantial, and evidence for their existence is strong throughout the literature. A 2011 systematic review of the health impacts of cycling specifically concluded that there is a clear positive dose-response relationship between the amount of cycling and positive health outcomes1. In summary, it found that ‘fitness improvement reduces risk of all-cause mortality, CVD and colon cancer morbidity’. The incidence of overweight and obesity were also found to decrease with increased amount of daily cycling. As a result, it is logical that cycling has repeatedly been identified as an important potential way to promote public health 9,10.

Cycling has also been identified as an approach to reducing the ever-increasing urban congestion on Irish roads. Between 1995 and 2008, the Irish economy was subject to unprecedented growth11, which resulted in a huge increase in the number of cars on Irish roads and energy use and emissions in the transport sector12. In the last 10 years, the Government has outlined that without increased capacity, or without large sections of the population switching to alternatives such as cycling, this increased demand will have a detrimental effect on not just economic performance, but the wellbeing of the Irish population and society in general11. In Dublin specifically, traffic congestion increased from 44% in 2017 to 48% in 201913. Aside from the economic impact of excessive urban congestion, associations have also been identified between increased time commuting and negative health outcomes14,15, 16. Specifically, a long or stressful commute has been linked to sleep disturbance16,17,18, everyday stress17, exhaustion19 and low self-rated health21. At the very least there is clearly a complicated relationship between commuting and health20. By reducing urban congestion, increasing the number of cyclists on Irish roads can increase not just the wellbeing and quality of life of individuals themselves21, 22, but potentially the productivity of society overall23.

Over the same time period as the so-called ‘Celtic Tiger’, Ireland also saw a huge increase in greenhouse gas emissions. The transport sector recorded a 137% increase in emissions between 1990 and 2019, the largest increase observed in any sector12. In fact, the transport sector accounts for 20.4% of Ireland’s greenhouse emissions24, with cars generating over 10% of the country’s total25. In terms of direct impact on health, increased air pollution has been shown to increase both morbidity and mortality, particularly from cardiopulmonary causes26. While for the direct toxicological effects of air pollution is still accumulating, but cardiovascular effects have also been observed27. In terms of climate change itself, current rates of greenhouse gas production will result in increased temperatures, extreme weather events, rising sea levels and drought. Such events will be detrimental not only to human health, but the health of the planet itself.

**Risks of cycling**

Given the reasons outlined above, one could be forgiven for celebrating the rise in the number of cyclists on Irish roads over the last 15 years. However, as the numbers cycling have increased, so too have the number of cyclist injuries and average number of cyclist fatalities per year on Irish roads4. Soberingly, the average number of cyclist fatalities on Irish roads increased by 8% between 2010 and 2018, the largest increase of any country in Europe over the same period28. In 2006, 211 cyclists were injured on Irish roads and by 2016, this number had increased to 97129. This this could in part be attributed to the increased numbers cycling in general and changes in how an Garda Síochána reports collisions28. However, the 52% increase in numbers cycling between 2006 and 2016 pales in comparison with the >400% increase in injuries over a similar time period. Furthermore, the share of cyclist injuries as a proportion of the total number of injuries among all road user types has also increased28. In 2007, cyclist injuries represented 3% of the total injuries sustained on Irish roads, but by 2017/18, this figure had increased to 14%30.

Although cycling injuries are clearly becoming more common, they remain equally serious. The pattern of injuries suffered by cyclists can be notoriously severe, if not fatal,. A recent study showed a 200% increase in the number of referrals for bicycle-related trauma to the Irish National Spine Treatment Centre29.  The most common severe cycling injuries were traumatic brain injury, spinal injury and pelvic/acetabular injury30 and the most common demographic to suffer such injuries are middle aged men, most likely due to their greater participant numbers30. Over 2016-17 , there was a 90% increase in cycling-related acetabular and pelvic fracture referrals. In fact, this study, along with others 29, has noted that cycling-related injuries have begun to account for a larger percentage of referrals than even motorbike-related injuries.

However, for determining the most common pattern of injuries sustained while cycling, data from the Netherlands can offer a useful insight, given the large sample size available. The Netherlands is noted internationally for its high number of cyclists, with cycling rooted in Dutch culture and over 1 million bicycles sold there every year32. A Dutch study in 2020 indicated that 73% of those injured while cycling sustained a fracture31. Of those who suffered multiple traumas, a head or neck injury was the most common (83.7% of cycling injury patients). The other most common injuries included thoracic trauma (39%), spinal injuries (10%) and abdominal injuries (10%). Even in cases where only minor trauma was sustained, head or neck was still the single most common category of injury (64%).

For context, while the number of cyclist injuries was increasing over the last 10 years, the average number of road fatalities overall was in fact decreasing33. Cyclists, along with pedestrians, are among the most vulnerable users of Irish roads28 and while reasons for this may appear obvious, the topic does warrant further exploration. Most interventions in road safety over the last 20 years were introduced to the benefits of all road users, for example reduced speeding, drink and drug driving, fatigue and driver distraction34. However, there are a number of other measures introduced in the 21st century, such as seat belts, air bags and safer car interior design, that did not directly increase the safety of cyclists. Indeed, the safety of a cyclist is almost entirely dependent on external conditions and how other road users behave. It could even be argued that the ongoing emphasis put on safety for drivers could in fact be to the detriment of cyclists, with modifications such as larger and heavier vehicles and bull bars potentially increasing the risk of severe injury35. Perhaps most worryingly, there is also the possibility that as people feel safer in their cars driving standards can decline36, a worrying thought for anyone on a bicycle.

**Measures to improve cyclist safety in Ireland**

Given the reality outlined above, what measures have been taken in Ireland to combat the current situation? ‘Smarter Travel – A Sustainable Transport Future’ was published by the Irish Government in 2009, outlining the Irish Government’s proposed answers to the unsustainable transport trends unfolding in the country12. One action outlined by the policy was the publication, and more importantly implementation, of the National Cycle Policy Framework, with the aim of creating a ‘strong cycling culture in Ireland’. Parallel to the increased numbers cycling to work, was the plan to develop physical cycling infrastructure to cater for these numbers. In particular, the Framework aimed that ‘urban road infrastructure (excluding motorways) should be designed/retrofitted to be cyclist-friendly and that traffic management measure are also cyclist-friendly’.

By 2013, the National Transport Authority had published a survey of the cycling infrastructure in the greater Dublin area at the time37. It was found that the cycling infrastructure was well below the standard advised by the Irish National Cycle Manual, and that the targets of the National Cycle Policy Framework and the Greater Dublin Area Cycle Network plan had only been partially fulfilled38. Some of the key objectives yet to be achieved include providing cycle-friendly surfaces that are well lit and maintained to a high standard. Other unfulfilled targets included cycling routes to all schools and ensuring that urban road infrastructure is designed/retrofitted to be cycle-friendly.

However, some progress has been made in the last number of years. Other recent Government policy includes a new law to combat dangerous overtaking of cyclists, introduced in 2019. Drivers overtaking cyclists leaving a gap of less than one metre (in locations limited to < 50km/h) or less than 1.5 metre in locations limited to > 50km/h will face a fixed fine of € 120 and three penalty points24. Initiatives by the Road Safety Authority such as ‘Overtaking Cyclists’, ‘Vulnerable Road Users’ and ‘Cyclists – We all share the road’39 are also steps in the right direction. Dublin City Council’s Transportation Department intended to introduce 30 km/h speed limits in all residential areas by the end of 202140 and Minister Eamon Ryan recently announced plans to spend 289 million euro on walking and cycling infrastructure in 202241.

Most recently, the Government published the Road Safety Strategy 2021-2030 as part of the broader plan to eliminate all road deaths and serious injuries on Irish roads by 205042. Its first phase outlines a number of key areas which will help protect cyclists on Irish roads, including segregated infrastructure for cyclists and pedestrians and reducing the amount of motor vehicle traffic. The Strategy admitted to a ‘lack of progress in reducing cyclist and pedestrian deaths’ thus far and recognised the difficulty in simultaneously promoting walking and cycling to commuters, while also ensuring their safety42. Between 2021-2025, its targets include:

* Constructing 1,000km of segregated walking and cycling facilities
* Developing a National Cycle Network Plan for interurban and rural cycling and walking
* Conducting a review of road traffic policy and legislation to prioritise the safety of walking and cycling
* Implementing lower speed limits (30km/h in urban areas)

Thus, although there are changes being made, a comparison with countries across Europe shows there is room for a lot more improvement.

**Existing strategies and interventions across Europe**

EU policy on cycling safety promotes similar interventions to those planned in Ireland27. Specifically, it outlines that infrastructure can play a key role in reducing speeds and separating cyclists from motorised vehicles, thus increasing their safety. In 2019, a study by RCSI compared the cycling infrastructure in Dublin with that of Copenhagen. In Dublin, the percentage of the whole commuting population commuting by bike was 6.3% in the 2016 census43. The equivalent figure for the same time period in the Greater Copenhagen area was 41%44. However, this comparison is not as far-fetched as one might suspect. For Ireland to reach its target of 10% of the working population commuting by bike, up to 31.5% of those commuting to work in Dublin would have to do so by bike to compensate for rural areas6. The study found that as of 2019 in Dublin, 16.1% of commuter routes had cycle track compared with 77.2% of commuter routes in Copenhagen 45. If anything, the study only seems to highlight the discrepancy between the bold targets being quoted in this country and the lack of infrastructure that is required for those targets to be met safely.

Another paper entitled ‘Make Cycling Irresistible: Lessons from the Netherlands, Denmark and Germany’ sets out seven categories of key policies and interventions used in Dutch, Danish and German cities to promote safe and convenient cycling46. Substantially lower cyclist fatality and injury rates in these countries have been attributed to better cycling infrastructure; national cycling education, skills and promotion programs; widespread traffic calming, including lower speed limits (30km/hr) in urban areas; and driver licensing and road safety systems that place greater responsibility on drivers for the safety of cyclists and pedestrians 46, 47.

Traffic/cyclist education and training for children while in school is a particularly important element of the road safety policy in these countries46. Comprehensive cycling training courses in safe and effective cycling techniques are given to school children as part of the regular school curriculum.. In Ireland, the equivalent is ‘Cycle Right’ the National Standard for Cycle Training. It provides ‘practical cycle safety and skills training to promote competent and confident cyclists’49. The training is the first defined standard of cyclist safety training in Ireland and in 2019, it planned to deliver training to 25,00 primary school children48. Further expansion is planned in the coming years, albeit hindered slightly by Covid-19. Although there is a future programme is still in development, there is no such training programme currently in development for adults49.

Other recent policy changes across individual European countries include a proposal to reduce the speed limit to 20 km/h in residential urban areas (Spain) and changes to cycling infrastructure (Poland)28. The UK, Finland and Germany have also all launched plans similar to Ireland’s Road Safety Strategy and National Cycle Policy Framework to increase those actively commuting, and committed to investing money towards the development of cycling infrastructure and the implementation of other safety measures.

**Conclusions**

At the time when Mary Ward was fatally killed in Ireland in 1859, cycling on Irish roads was not a new concept, so it is certainly not one in 20223. However, Traffic Medicine itself is a relatively new approach from the 21st century, and involves ‘embracing all disciplines, techniques and methods aimed at reducing the harm traffic crashes inflict on human beings’50. It is clear that there are risks to cycling, and that there is enormous room for improvement in protecting their safety. The intricacies of balancing the risks of cycling with its health benefits are all the more complicated for those deemed unfit to drive. Thus far, the focus in the literature has been on determining whether cycling is beneficial to individuals in general, with little research into some of those who have been deemed unfit to drive, who may be eligible to cycle if the infrastructure and environment was safe enough. It is notable that for the general population at least, the benefits outweigh the risks. The International Transport Forum report ‘Cycling, Health and Safety’ reviewed studies looking at the full spectrum of cyclist health impacts, from positive ones to air pollution and the crash-related injuries that the public says deters them from cycling in the first place. It concluded that the ‘estimated health benefits of cycling are several orders of magnitude higher than the potential health disadvantages of cycling’51. Similarly, a study in 2017 by the University of Glasgow found a similarly significant (42%) reduction in overall mortality risk52.

Perhaps it is time to put similar resources into researching whether some of those who are unfit to drive could be presented with cycling as an alternative. The enormous consequences of losing one’s driving licence can be extraordinarily difficult for patients, and any alternative that may hand them back even a fraction of their independence deserves to be explored in detail. Determining whether an individual is safe to cycle could potentially require a multidisciplinary healthcare approach, potentially even similar to the approach used to create the Medical Fitness to Drive Guidelines in general. However, a third and final multidisciplinary approach required in this scenario will have to come from a combination of the Road Safety Authority, Transport for Ireland and the National Office for Traffic Medicine to ensure those who are willing and able to cycle are safe when doing so.

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