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Case Study Non-collision cycling injuries: 2nd edition (December 2017)

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Delivering accident prevention at local level in the new public health system

Accident prevention in practice

Part 2 RS3

(2nd Edition
December
2017)

CASE STUDY: Non-collision cycling injuries (NCIs)

*This case study is an update to a paper published for the first time by ROSPA and Public Health England in 2013 as part of: Delivering Accident Prevention at local level in the new public health system: Part 2 Accident Prevention in practice. The case study was titled 'Non-collision injuries in Bristol'*¹

In 2009, NHS Bristol recognised the significance of non-collision incidents as a leading cause of harm to cyclists. As there was so little useable data on the contributory causes, a survey² was undertaken. This showed that ice is a significant cause of these incidents. Loss of control on ice causes more serious casualties among cyclists than many other better known contributory factors.

Since then, the interest in non-collision cycling injuries as a leading cause of serious road traffic injuries has continued to grow.

This case study presents an analysis of the latest hospital statistics and subsequent work to encourage improved communication and accuracy of weather forecasts - which could play a role in reducing injuries. One of the ambitions set out by the Government in the Cycling and Walking Investment Strategy³ is 'better safety'. This paper contributes to understanding the underlying performance and gives examples where spending decisions have already been made that take into account this analysis. Priorities for future investments are highlighted.

The need to reduce NCIs

The health, economic and social benefits of cycling are significant, and the public health profession is supporting the government in strongly advocating a move to more active and less carbon intensive forms of travel. In 2016/2017, cyclists suffered more serious injuries than any other road users. Reducing the injuries is a necessary part of work to encourage more active travel.

The prevalence of NCIs may be adding to the (exaggerated) public perception of cycling being hazardous. 70% of NCIs sustained by adults responding to the NHS Bristol survey caused no injury requiring medical attention, but we speculate that for some cyclists, experience of even a

Injury data

The two largest and most detailed sources of data on traffic related injury are:

- STATS19 which is a record of personal injury incidents which become known to the police, and
- Hospital Episode Statistics which include records of patients admitted to NHS hospitals.

The Department of Transport has commented as follows:

'While STATS19 provides the most useful single source of data on road accidents and form the basis for published statistics, it has long been known that they provide an incomplete record and that a considerable proportion of non-fatal road accidents do not become known to police'

'Excluding non-collision pedal cycle accidents, the proportion of admitted casualties linked to STATS19 is similar across the main road user groups. A very low proportion of pedal cyclists injured in non-collision accidents become known to police' (and therefore recorded in STATS19)⁴.

According to Hospital Episode Statistics⁵ (HES), cycling non-collision Incidents (NCI's) (i.e. incidents in which no other road user was involved) accounted for 10,737 admissions⁶ to hospital during 2016/2017. This represents 64% of all injury-related admissions of cyclists. It is estimated that only 4% of non-collision incidents are known by the police⁷ and recorded in STATS19⁸, diminishing the value of STATS19 as a guide to the circumstances of NC injuries. But the information HES can provide lacks detail about the causes and circumstances as well, and it is not on its own sufficient to identify causes and design interventions. HES captures more information about injuries and the patient. Further investigation of the causes is necessary.

non-injurious NCI may discourage them from continuing to cycle. By addressing the root causes of non-collision incidents, we can make cycling easier and more enjoyable as well as reducing the burden on hospital beds and emergency services.

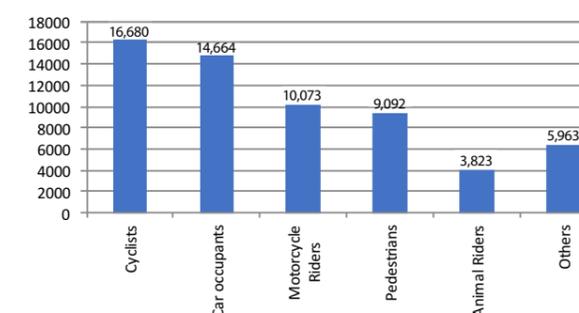
Hospital Episode Statistics (HES) show that cyclists suffered a greater number of serious injuries than other road users in 2016/2017. Please note that data presented here is only of people 'formally admitted to a hospital bed'.

Source: Hospital Episode Statistics, Department of Health⁵.

A significant injury burden

We compared the numbers of non-collision incidents caused by different factors with the numbers of admissions resulting from collisions with cars, pick-up trucks or vans and collisions with fixed or stationary objects. HES data does not differentiate between the causes of cycling non-collision incidents and aggregates them together as a single figure, but separate secondary diagnosis codes are used to differentiate between collisions with vehicles and collisions with stationary objects. HES records admission numbers for these causes independently. We apportioned the total number of non-collision admissions to the individual causes of NCIs using results from the survey. For example, 17% of

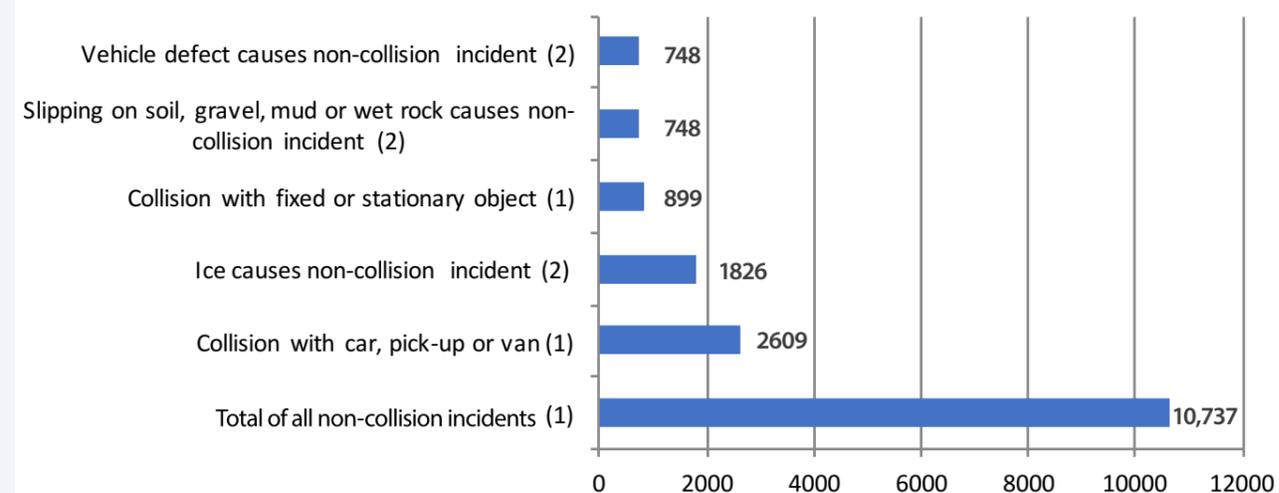
Number of admissions by mode in England (2016/17)



admission reports in the survey resulted from contact with ice; applied to the national figure for all NCI admissions in 2016/17 (10,737), 17% produces a figure of 1,826. When the individual causes of NCIs are taken into account NCIs caused by ice are the second highest single reason for hospital admission after collisions with cars, pick-up trucks or vans.

In total, all non-collision incidents cause more than 4 times the number of admissions caused by collisions with cars, pick-up trucks and vans.

Leading causes of cyclist admissions to English hospitals, (2016/17).



Sources:

1 Hospital Episode Statistics (HES), external causes produced by the Department of Health⁵

2 Results from the survey of cycling non-collision incidents applied to the HES data

Contributory factors to NCIs incurred by cyclists

NHS Bristol identified the need to reduce the risk of NCIs in 2009. At that time only one UK study had shed light on the issue⁹, and none had specifically researched the causes and circumstances of NCIs. It is still true to say that research on single-bicycle crashes is still in its infancy¹⁰. In partnership with Bristol Cycling City, NHS Bristol designed a web-survey form and circulated the URL across the UK. More than 1000 cyclists recorded the details of their non-collision incidents, giving a good sample for analysis. But the methods used created biases in the response and the results are most applicable to working-age cyclists. The causes of NCIs will vary between adult commuter cyclists and children aged under 18. Further research is required, especially relating to the risk factors for childhood cycling injuries.

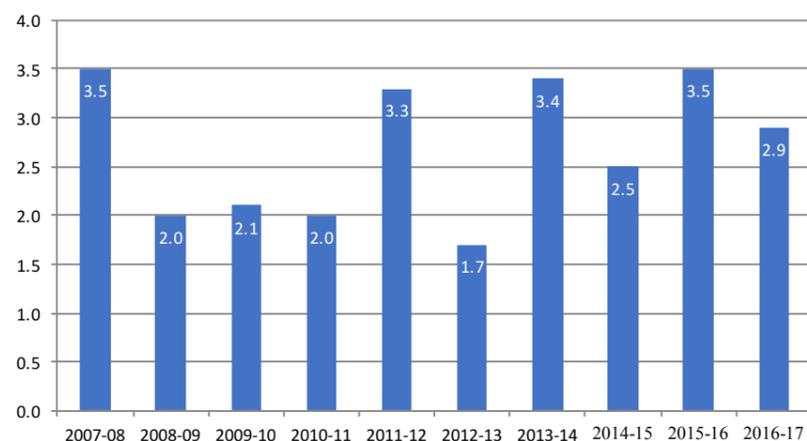
The survey showed that 26% of all reported non-collision incidents (including 17% of those that resulted in admission) happened as a result of slipping on ice, and that 35% of all incidents reported in the survey occur in the months of December, January and February. Slipping on ice was by far the single largest reported cause, followed by slipping on wet roads (8%) and slipping on 'soil, gravel, mud, wet rock, etc', (6%).

The rest of this report focuses on the leading cause – slipping on ice.

Gritting Actions

A 'gritting action' occurs when all or part of a Local Authority gritting fleet is deployed. On some nights more than one gritting action takes place. If the ice-risk is localised, the whole gritting network is not treated. The gritting network only covers principal routes.

Average number of gritting actions per week (i.e. ice forecasted) between Nov - Mar, 2007-2017.



Source: Freedom of Information requests¹²

The risk of sliding on ice and the frequency of freezing conditions

The British Cycling web site contains the following advice:

'Icy conditions are unpredictable and in most cases, no amount of riding skill will help you keep upright.'¹¹

The percentage of non-collision incidents caused by slipping on ice (26%) may appear surprising to some, given that fewer people cycle in inclement weather, but it supports the hypothesis that the hazard of ice is underestimated.

Evidence of the actual frequency of ice is not readily available to the public. However, the Public Weather Service Customer Group (PWSCG), which holds the MET Office to account on behalf of the public recognises that the frequency of gritter deployment is a 'proxy' indicator for ice forecasts¹².

The authors of this paper conducted a survey of the gritting frequency of 12 local authorities in England during the winter months. The sample covered a wide geographical spread of both urban and rural authorities but was not randomised. Leeds City Council was the most northerly authority surveyed.

The average number of times a week that gritting takes place was found to be 2.7¹². Over a 10-year period, the authorities in our sample gritted roads on average 58 times between November and March each year i.e. 2.7 times per week. The frequency of the prediction of ice (as indicated by gritting activity) may help to explain the number of injuries that are linked to ice. Due to the relatively small sample size, and the fact that gritting takes place as a result of ice being forecast rather than ice forming, further checking on the precision of the average weekly estimate would be advisable. However, an occurrence of ice of just once per week on average would be recognised as significant by most cyclists.

The role of ice-forecasting in avoiding injury

The clarity of the conclusions from their survey led NHS Bristol to commission the Think TwICE campaign from local charity Lifecycle¹³. This sought to encourage employers to help cyclists plan ahead and get information about bus routes, car-share opportunities or the employer's perspective on working from home, aiming to reduce the pressure to cycle to work in frozen conditions because there are no other options.

But the ability to plan ahead is dependent on cyclists receiving reliable forecasts of icy conditions which are relevant to them, and concerns about the accuracy, localisation and relevance to cyclists of ice-weather-forecasts' have been identified.

The MET Office does not routinely evaluate the accuracy of ice forecasts unless they reach the level of an amber or red Severe Weather Warnings, and there are questions about the accuracy of MET Office Public Weather Forecast ice forecasts¹⁴. A snapshot survey in November and December 2016 found that on 9 occasions on which gritters were deployed by local authorities the MET Office forecast freezing conditions on only one occasion¹⁵. It should be noted that the local authorities may not use the MET Office Public Weather Forecasts to inform their gritting decisions. Instead, they undertake competitive tenders, using the MET Office among several providers for this service. These local authority forecasts provide an appropriate level of granularity for gritting decisions. Improvements could be made in the Public Weather Service ice forecasts without attaining the level of detail of these local authority forecasts, improving the ability of cyclists to make informed decisions about their mode and time of travel.

The definition of the area covered by a MET Office ice forecast usually takes the form of a general statement such as 'ice is forecast in Dorset and Wiltshire' or 'there is a risk of icy patches in South West England', for example. It is not usual for specific times to be given when the ice is expected to form or to clear. In contrast, the MET Office produces hourly weather predictions 36 hours ahead for 7,500 locations covering conditions such as rain, visibility, UV levels, wind and cloud. Ice is not included in these location forecasts.

Road surface temperatures are not produced by the MET Office as part of the Public Weather Service¹⁵. As a substitute for a comprehensive forecast of road-ice, cyclists have to rely on the air-temperature forecasts as a rule of thumb, which can be misleading¹⁶. Road surface temperatures can be 4-5 degrees lower than air temperatures, meaning ice may form even when forecasts are of above freezing temperatures.¹⁷

The MET Office does not usually forecast ice except when it is a result of a combination sub-zero temperatures and precipitation. However, ice forms regularly in 'wet spots' e.g. from water run-off from fields. The only way a road user can judge whether there is an ice risk in these cases is from a forecast of road surface temperatures.

As a result of these and other considerations, in 2016 Sustrans, Cycling UK, British Cycling and British Triathlon called on the MET Office to make improvements in their forecasting of ice. Specific recommendations were put forward¹⁸. The MET Office is considering what improvements they plan to implement.

Other ways to reduce ice related injuries

This case study focusses on early steps in the movement to reduce injuries by improving the communication of the ice forecasts, but hazard mitigation - particularly gritting of cycle paths - is also worthy of further consideration.

A survey was made in 2016 of the extent of cycle path gritting in the South West¹⁹. Of the 11 authorities who responded, only two partially treated their cycle network in icy weather. This may lead to cycle paths being more icy than the main roads.

The survey conclusions, combined with other information including a cluster of complaints to Bristol City Council from cyclists that they had fallen off their bikes on ice informed the decision to treat the Bristol to Bath cycle path. After treatment started, there was no repeat of the complaints.

The Way Forward

Ice-related NCIs might be reduced by:

- Working with employers to help employees manage the risks of commuting journeys in freezing conditions
- Raising awareness
- Improving weather forecasting
- Gritting cycle paths

We advocate the following:

1. The government, NHS England, local authorities, cycling organisations, and the MET Office should coordinate campaigns to raise the awareness of cyclists to the hazards of cycling in freezing conditions, possibly along the lines of the Think TwICE campaign.
 - c) Ensuring that best practice is applied to treatment by means of an open exchange of experiences between all the local authorities.
2. Employers should adopt flexible working practices so that cyclists can choose to cycle when the risk of ice has passed rather than feeling pressurised to cycle to work at a fixed time.
3. The MET Office should:
 - a) Improve the detail and accuracy of ice forecasting to bring it in line with almost all other weather predictions such as rain, cloud, wind, UV levels and temperature. This should include hourly forecasts using individual locations and maps showing the hourly distribution of ice.
 - b) Publish accuracy targets for ice forecasting and performance against these targets to give cyclists confidence in the forecasts.
 - c) Publish road surface temperatures – to remove the public's confusion that 'temperature' forecasts are a reliable guide to ice risk.
 - d) Publish the ice forecasts as a MET Office mobile weather app.
4. Local authorities to carefully consider the treatment of cycle paths to mitigate the ice hazard by:
 - a) Recognising that when building cycle paths arrangements for effective drainage and treatment during icy conditions are to be taken into account;
 - b) Progressively considering treatment of existing cycle paths on a priority basis,
5. The government, local authorities, NHS England and cycling organisations should take into account the results of the survey², in which the extent of non-collision incidents caused by ice is emphasised, so that decisions on road safety priorities are informed accordingly.
6. Road Safety Officers should acknowledge ice and other cycle and motorcycle related NCIs as a significant and relevant road safety issue.
7. The government, local authorities and cycling organisations should use Hospital Episode Statistics alongside STATS19 data when making decisions about road safety priorities.
8. Further research into:
 - a) The risk factors that increase the risk of NCIs for under 18 year old people
 - b) The awareness of and attitude to NCI hazards, specifically frozen conditions, amongst cyclists.
9. Weather forecasters and mapping organisations should cooperate to produce a phone app that reliably forecasts weather along the route of any planned cycling journey. There should be emphasis on ice and other high-risk weather conditions. Repetitive journeys such as commuting should be able to be stored and recalled. There should be a function to overlay gritted routes. This app could use the data created for the MET Office ice forecast app referred to in 3d) above.

Conclusion

The Government Cycling and Walking Investment strategy calls for underlying performance of cycling injury and incident statistics to be understood. The analysis in this paper - which has identified the significance of the risk posed by ice - contributes to this objective. There are many ways for cyclists to manage the risks they choose to take, but improvements to the accuracy and relevance of forecasts of ice will assist informed decision making and tackle one of the leading causes of serious cycling injuries. This should help achieve the Government objective of reducing the injury rate among cyclists and increasing the number of cyclists and the frequency with which they ride.

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