

# Edinburgh Cyclists' Tram Injuries

## Prof Chris Oliver

 @CyclingSurgeon

CyclingSurgeon.Bike

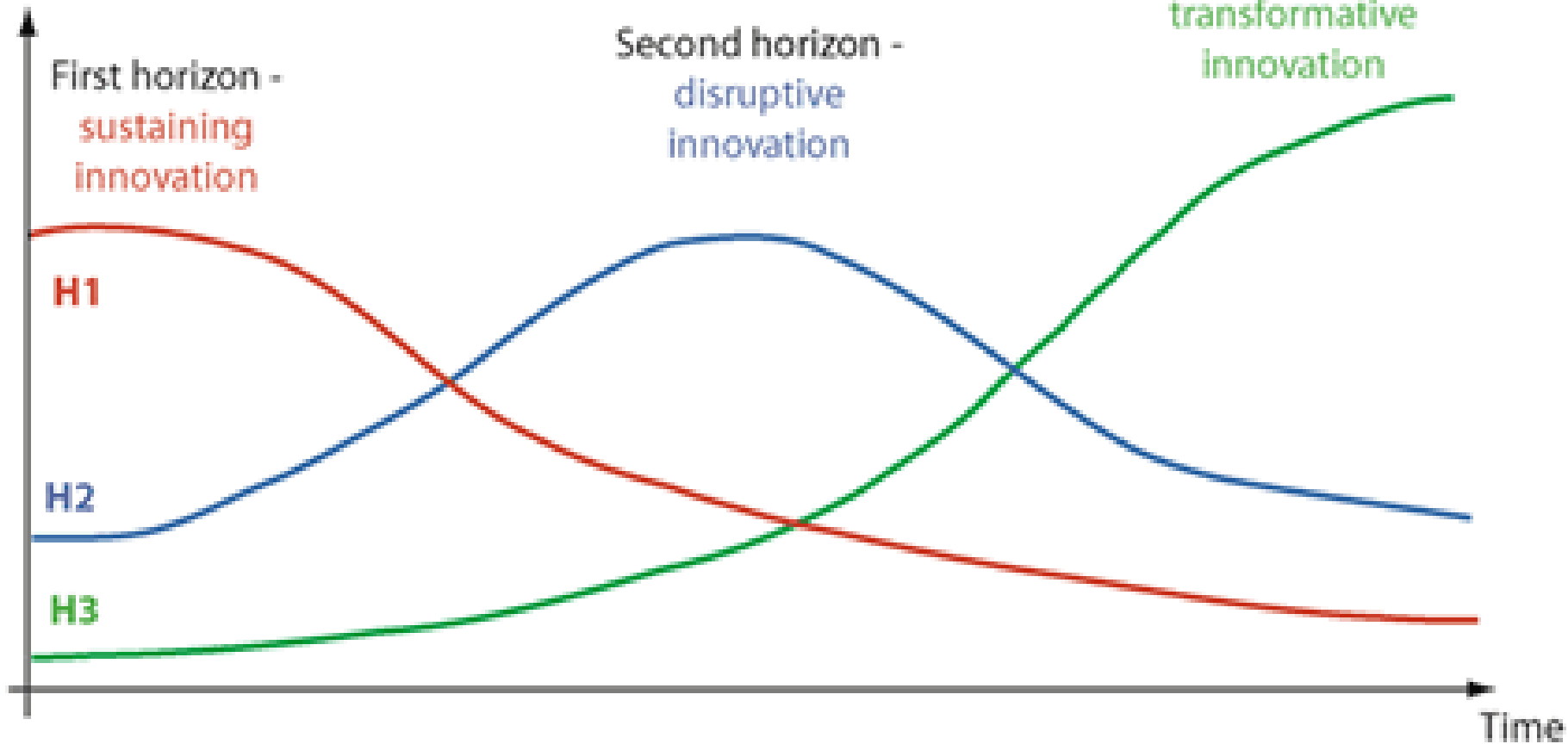
Julian Maepel, Paul Stirling, C McCann, Sam Mackenzie, Tim White, Chris Oliver  
Edinburgh Orthopaedic Trauma Unit, Royal Infirmary of Edinburgh





## IFF Three Horizons Model: three forms of innovation

Prevalence



# Edinburgh Orthopaedic Trauma Unit

- Serves 800k in Lothian
- Per year
  - A&E 120k+ RIE
- Trauma Orthopaedic
  - 7k inpatients
  - 6k operations
  - 42k outpatients
  - > 1,000 hip fractures
  - 12 consultants
- Regional & military training
- National Trauma Centre
- Academic program
- International Trauma Symposium



# Oxford Textbook of Fundamentals of Surgery

Edited by  
William E. G. Thomas  
Malcolm W. R. Reed  
Michael G. Wyatt



OXFORD

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Prof Chris Oliver  
Section Editor Trauma:

- Multiple injury
- Skin Loss
- Burns
- Skeletal injury
- Conflict & Military
- Head injury
- Chest injury
- Abdominal injury
- Vascular injury

OUP

ISBN: 9780199665549



<https://www.theguardian.com/environment/bike-blog/2013/jul/18/los-angeles-boston-united-states-rockies-bike-blog>

# Do 20mph speed limits reduce casualties and increase cycling, walking, and liveability in the general population?

- **National Institute Health Research – NIHR**
- **£890k grant**
- **Lead by**
  - Scottish Collaboration for Public Health Research & Policy
  - Physical Activity for Health Research Centre, The University of Edinburgh
  - Centre for Public Health, Queen's University Belfast
- **August 2020**
- **Prof Chris Oliver - Study Steering Committee Member**

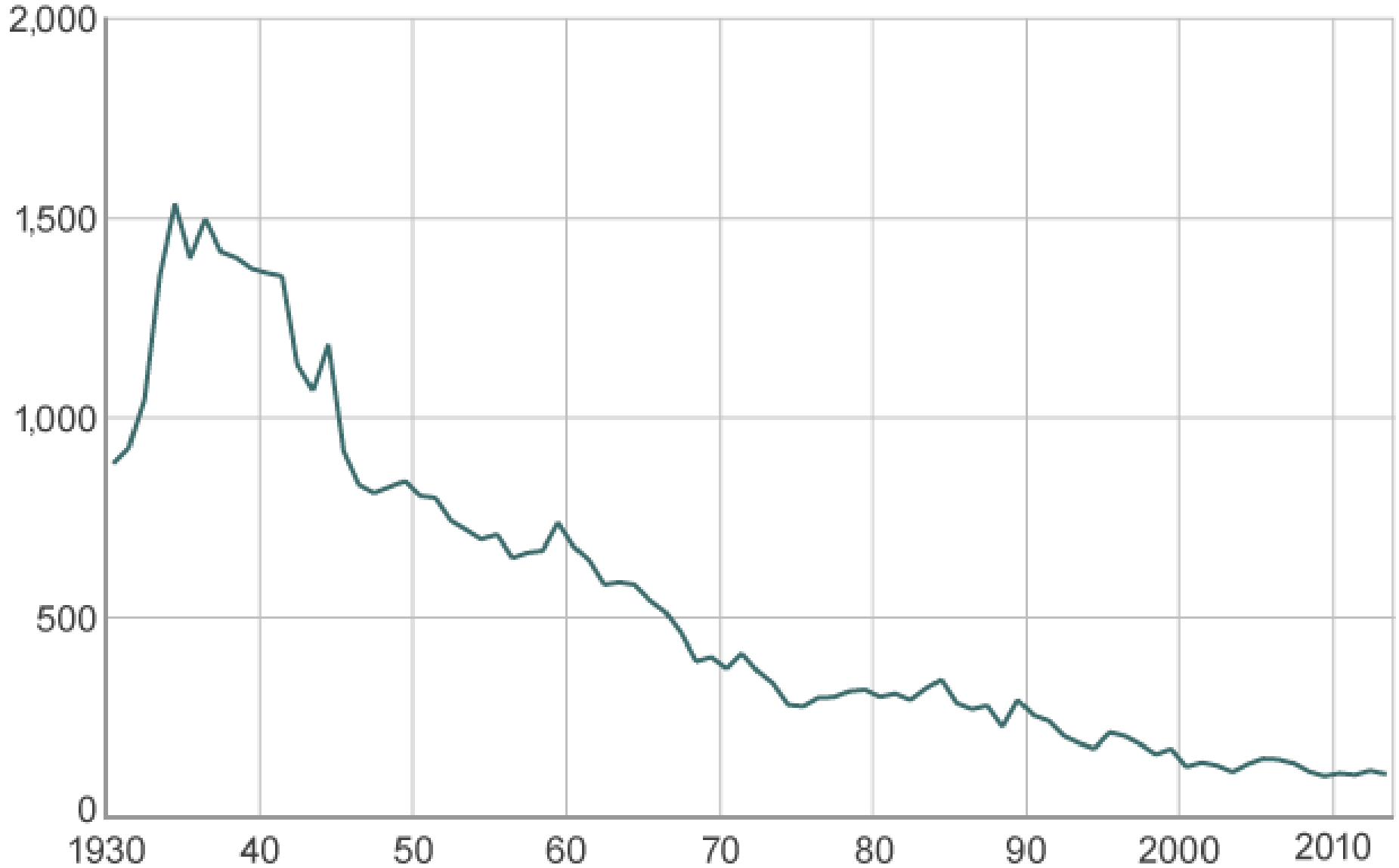


# Some Cycling Safety Facts

- Life years gained due to the health & fitness benefits of cycling in Britain outweigh life-years lost through injuries by a factor of around 20:1
- 2011-2015, one cyclist was killed on Britain's roads for every 29 million miles travelled by cycle = 1,000 times around the world
- Unlikely to be killed cycling as walking
- UK has a good road safety record
- Cycle safety in is one of the poorest in Europe

# Cycling deaths in Great Britain

deaths/year



Source: Department for Transport



# Pedal cyclist casualties by severity and road type, 2013

■ Seriously injured   ■ Killed

## Urban areas

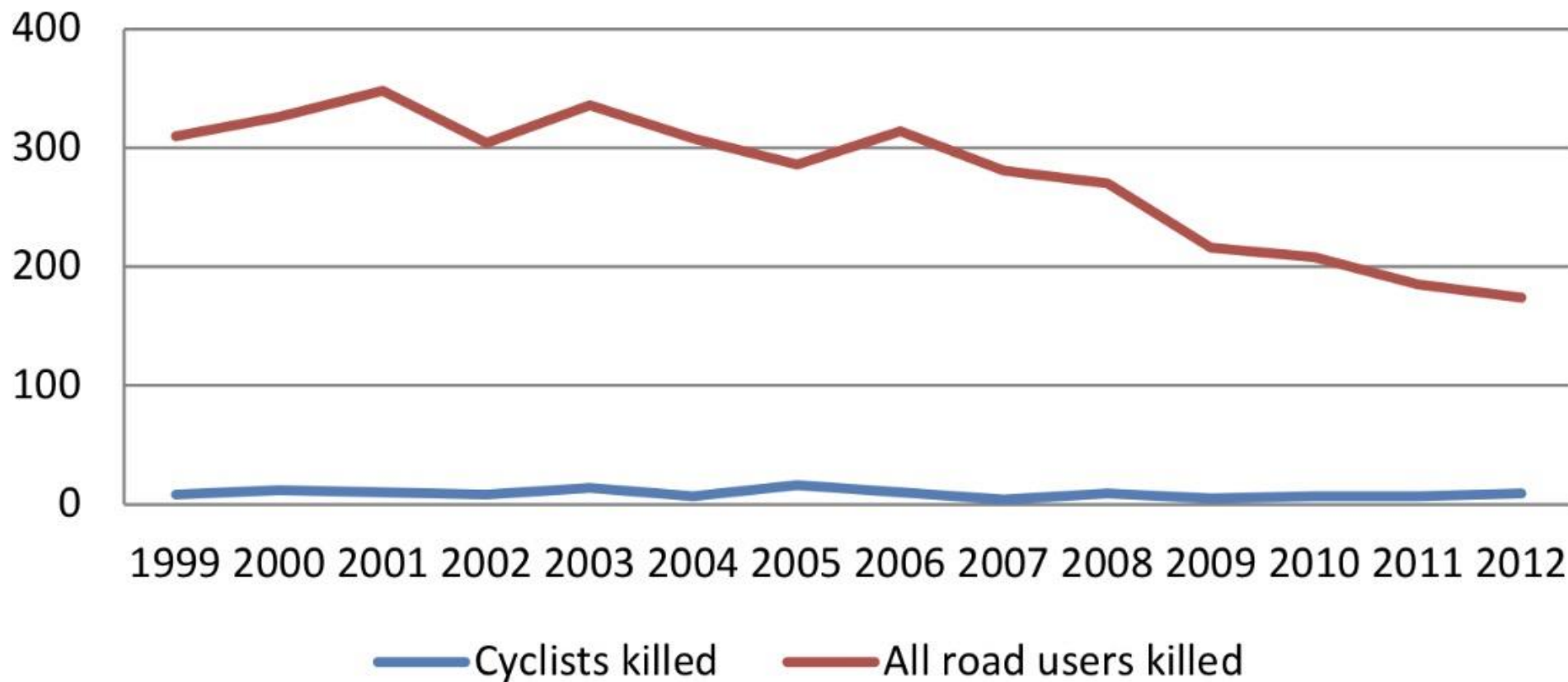


## Rural areas

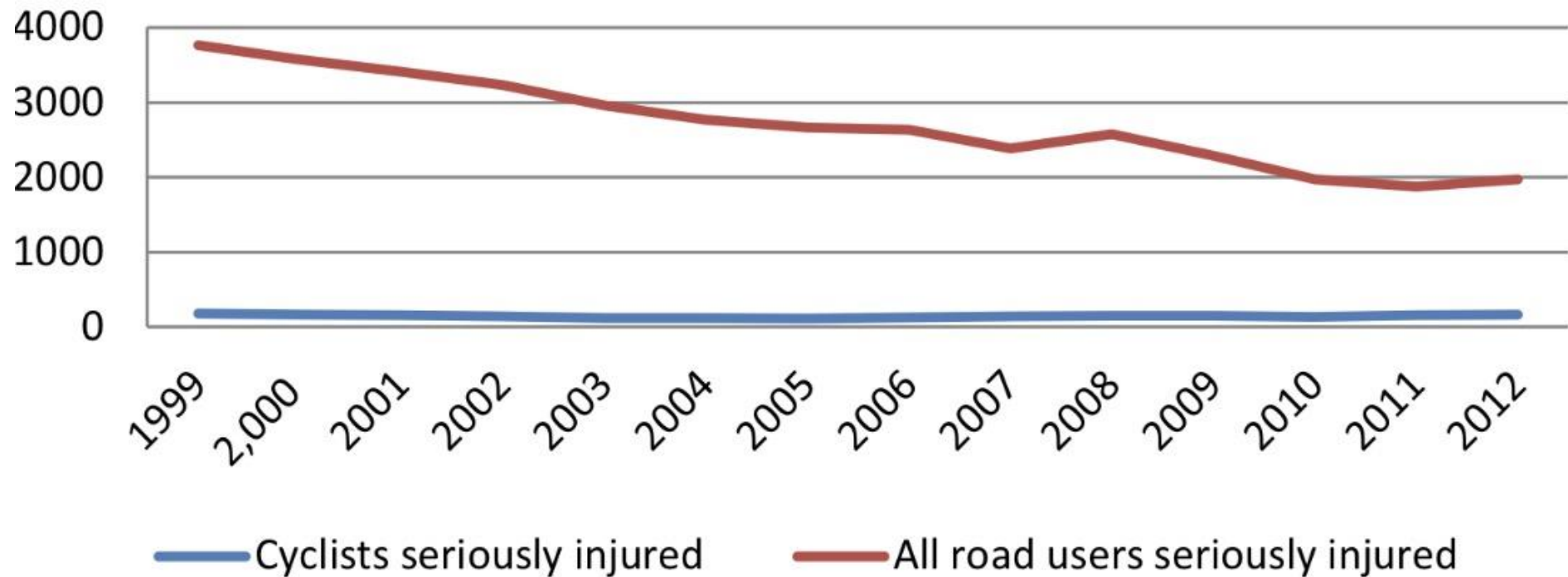


Source: Department for Transport

# Chart 10: Annual number of cyclists and all road users killed in Scotland

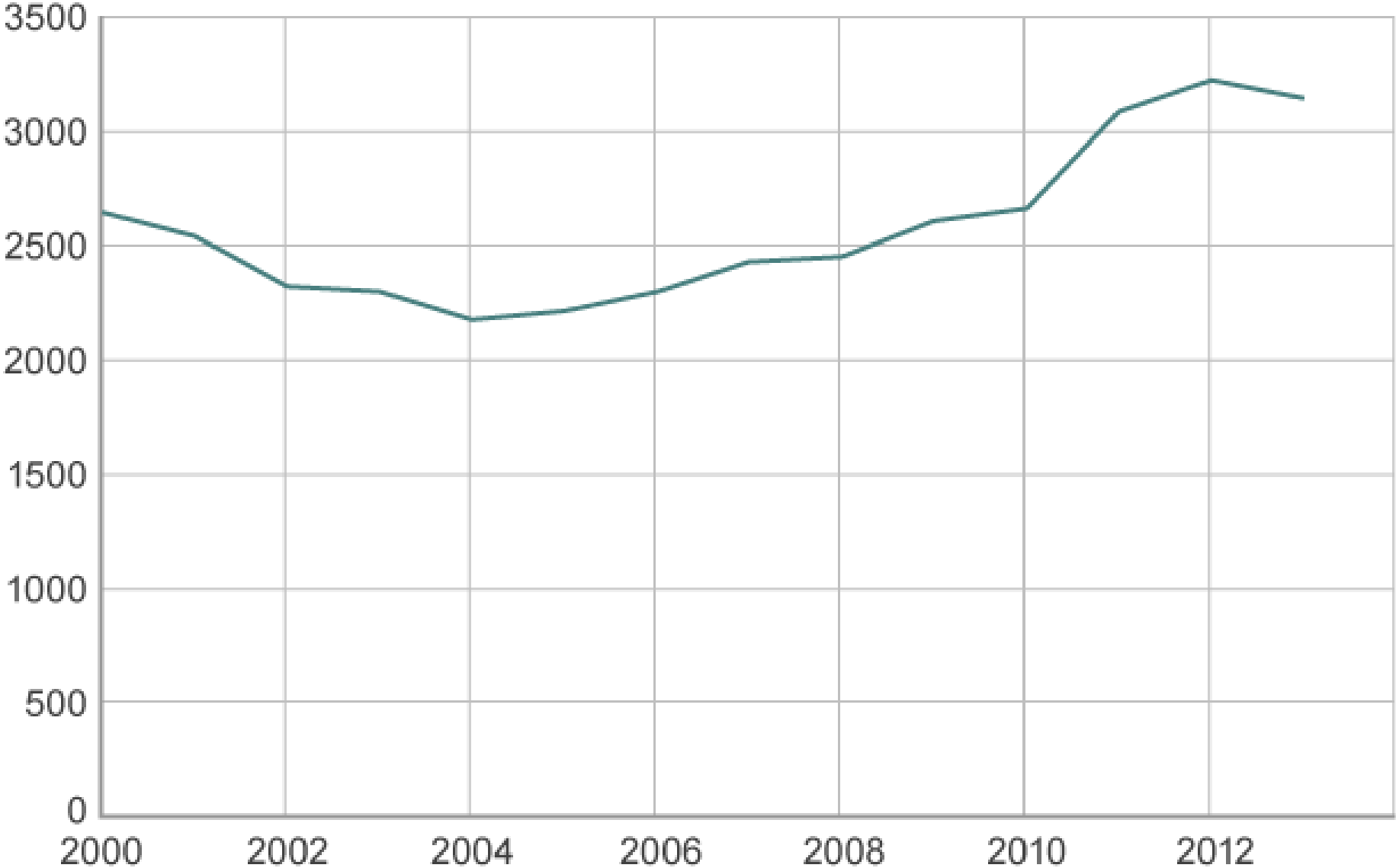


# Chart 11: Annual number of cyclists/ all road users seriously injured in Scotland



# Cyclists seriously injured in Great Britain

injuries/year



Source: Department for Transport

# All Cycling injuries in Lothian PreTram

Cycling accounted for 11% of sports fractures (n=104).

- Mountain Biking 73, Road 25, BMX 6

Mean Age: 31 years. 88% ♂ : 12% ♀

Upper Limb 91%: Lower Limb 8%: Axial 1%.

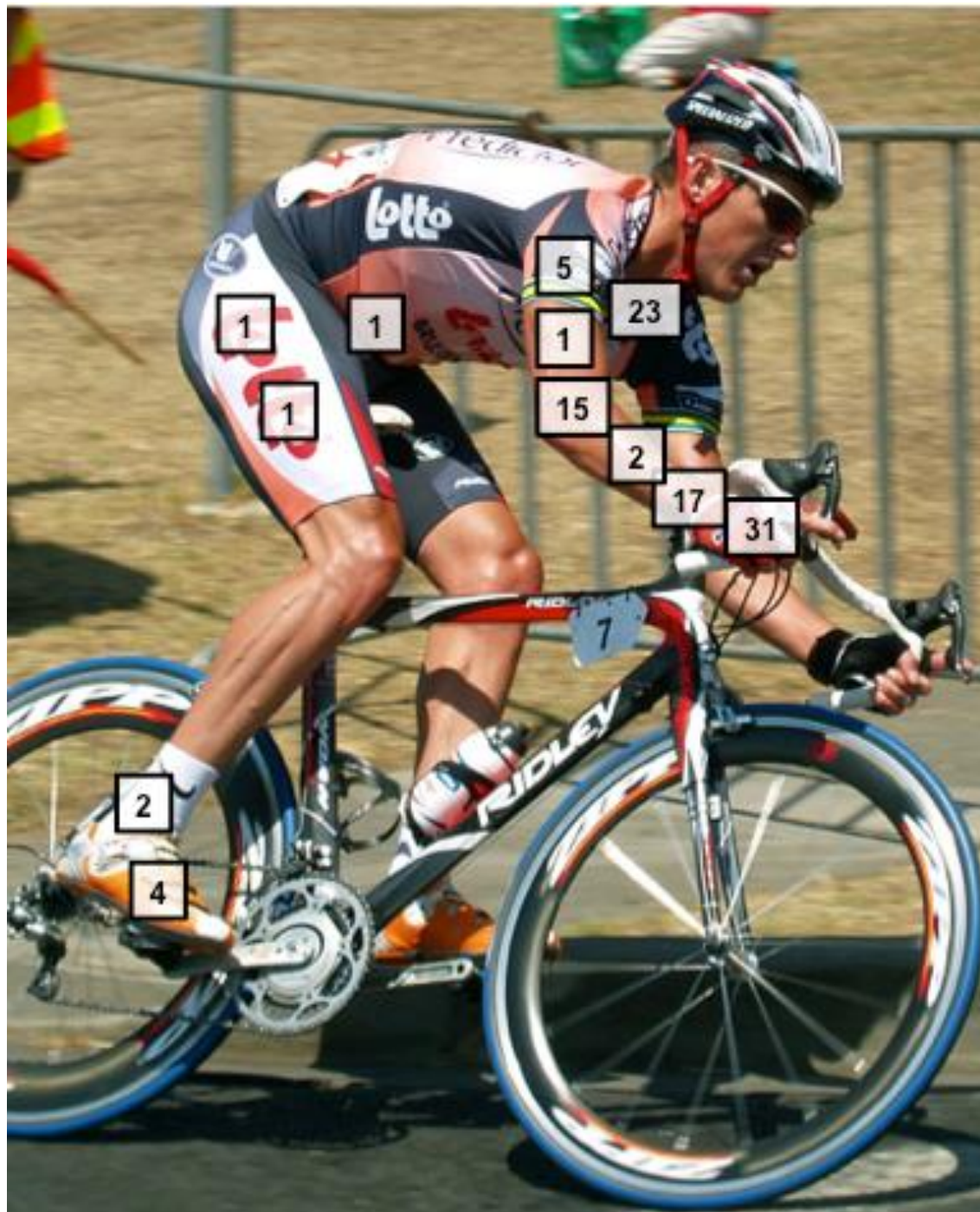
Commonest Upper Limb Fractures:

Clavicle (22%), Distal Radius (14%), Metacarpal (12%)

Proximal Radius (12%), Finger Phalanx (10%).

Commonest Lower Limb / Axial Fractures:

Toe Phalanx (2%), Ankle (1%), Pelvis (1%).



Greg Robertson EOTU

# Return Rates and Return Times to Sport for Middle-Third Clavicle Fractures



Clavicle fractures are most common in rugby, American football, cycling and soccer.

Important knowledge for management of these injuries in athletes.

Clavicle fractures are the **4<sup>th</sup>** most common sport-related fracture.

Of all sport-related fractures, clavicle fractures take the **3<sup>rd</sup>** longest time to return to sport.



All undisplaced middle-third fractures should be managed conservatively.

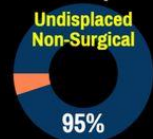


For displaced middle-third fractures, surgical management can offer improved return times to sport over conservative management.

The choice of surgical technique for middle-third fractures is guided by the fracture configuration; the optimal surgical technique remains to be defined.



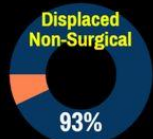
Return to Sport Rate



Return Time:  
11 weeks



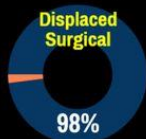
Return to Sport Rate



Return Time:  
22 weeks



Return to Sport Rate



Return Time:  
9 weeks

Robertson, G.A., Oliver, C.W. and Scott, H., 2017. Infographic: Return Rates and Return Times to Sport for Middle-Third Clavicle Fracture: Important knowledge for management of these injuries in athletes.

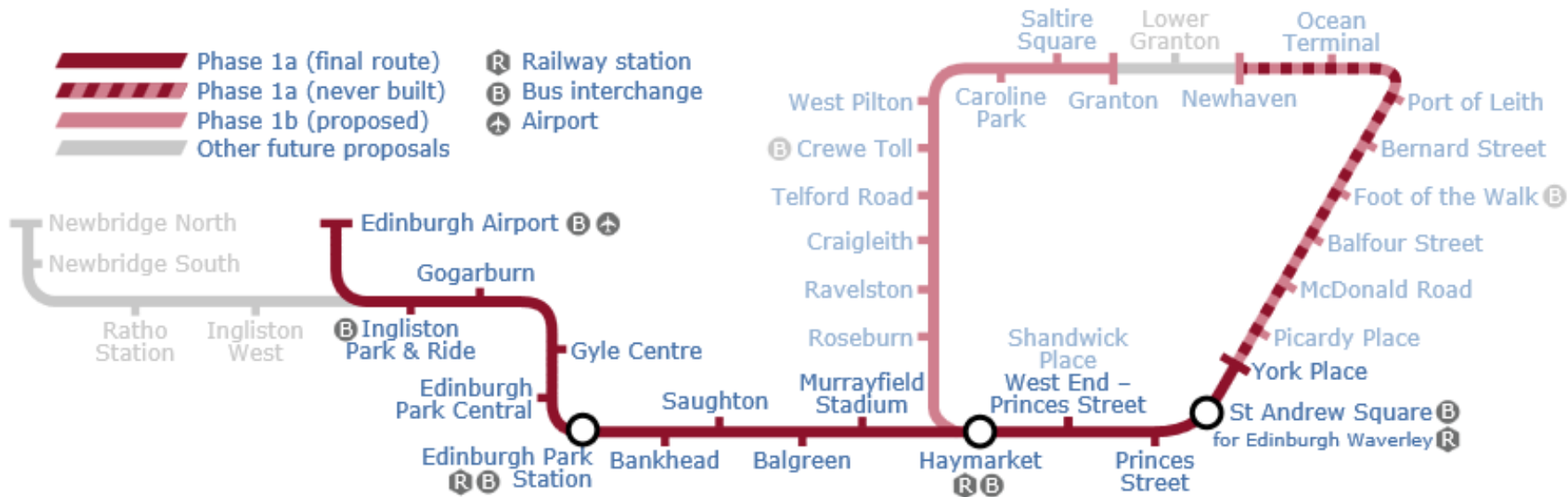
Greg Robertson, Hilary Scott,  
Chris Oliver

Br J Sports Med 2017  
doi:10.1136/bjsports-2016-097445

**BJSM**







# Edinburgh Tram Inquiry

<http://www.edinburghtraminquiry.org/>

# Retrospective review Tram related Injuries

- 7 years
- 41.4 years +/- 16 years
- 24% weekends
- All to A&E in Lothian; RIE, SJH, WGH
- >1000 x-rays, 10 CT/MRI scans, blood tests
- 156 soft tissue injuries
- 64 fractures
- 29 operations
- Mean length of hospital stay 1.7days
- Economic impact unknown

# Mechanism of cycling tram injuries

- 143 wheels caught in tram track
- 32 wheels slipped on tram track
- 1 collision with tram
- Forced by other vehicle to change path and forced towards tram track
- Pedestrians



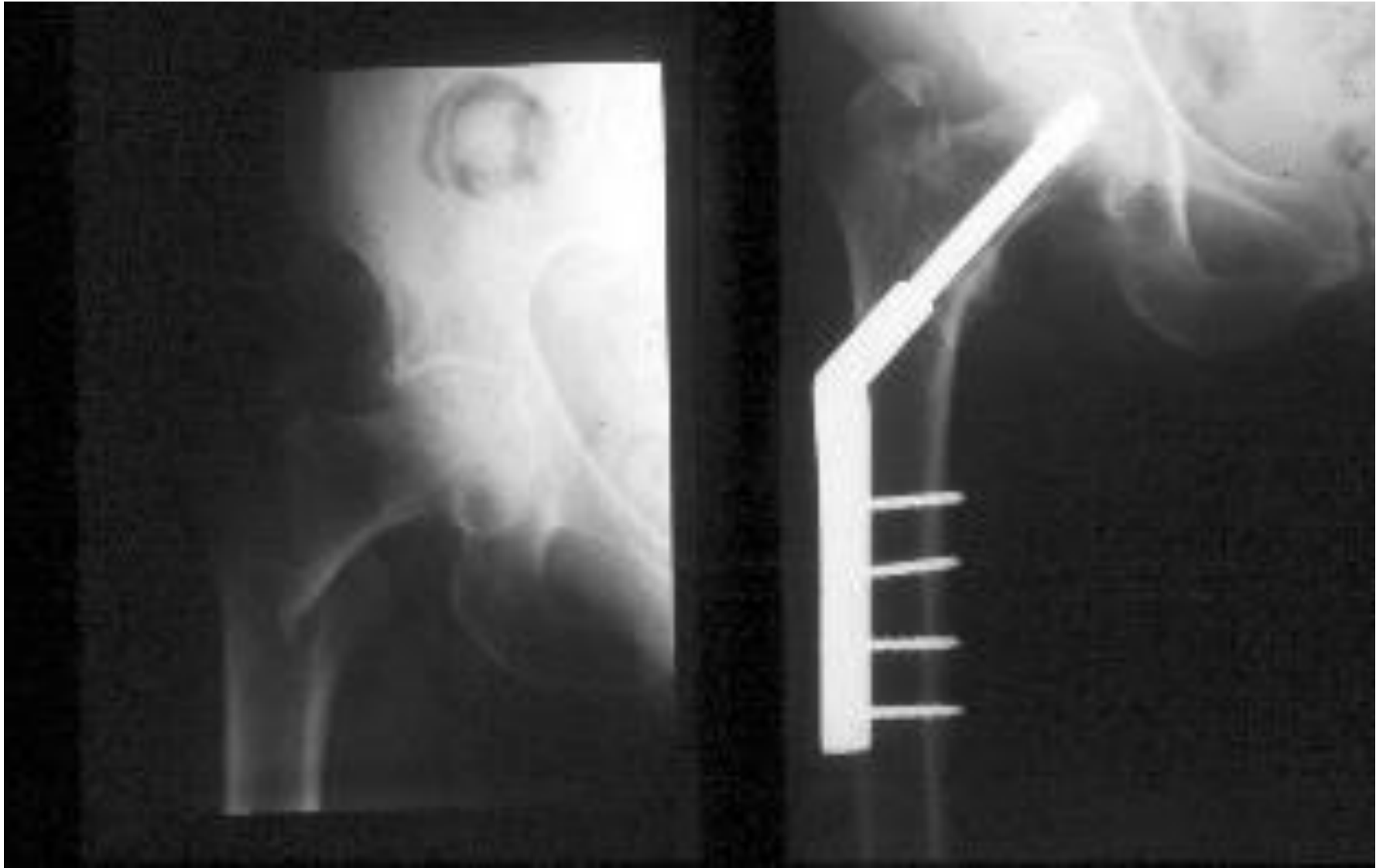
# Tram related injuries Lothian Post Tram

| <b>Anatomical region</b> | <b>Soft tissue injury</b> | <b>Fracture</b> |
|--------------------------|---------------------------|-----------------|
| Head injury - minor      | 33                        | 0               |
| Head injury - serious    | 0                         | 1               |
| Thorax                   | 5                         | 0               |
| Abdomen                  | 4                         | 0               |
| Clavicle                 | 0                         | 4               |
| Acromioclavicular joint  | 4                         | 0               |
| Proximal Humerus         | 15                        | 4               |
| Humeral shaft            | 0                         | 2               |
| Elbow                    | 15                        | 18              |
| Forearm                  | 2                         | 1               |
| Wrist                    | 26                        | 11              |
| Hand                     | 10                        | 7               |
| Finger                   | 5                         | 8               |
| Hip                      | 9                         | 2               |
| Thigh                    | 2                         | 0               |
| Knee                     | 21                        | 2               |
| Leg                      | 2                         | 0               |
| Ankle                    | 2                         | 1               |
| Foot                     | 1                         | 2               |
| Toe                      | 0                         | 1               |
| <b>Total</b>             | <b>156</b>                | <b>64</b>       |

# Tram related injuries Lothian Post Tram

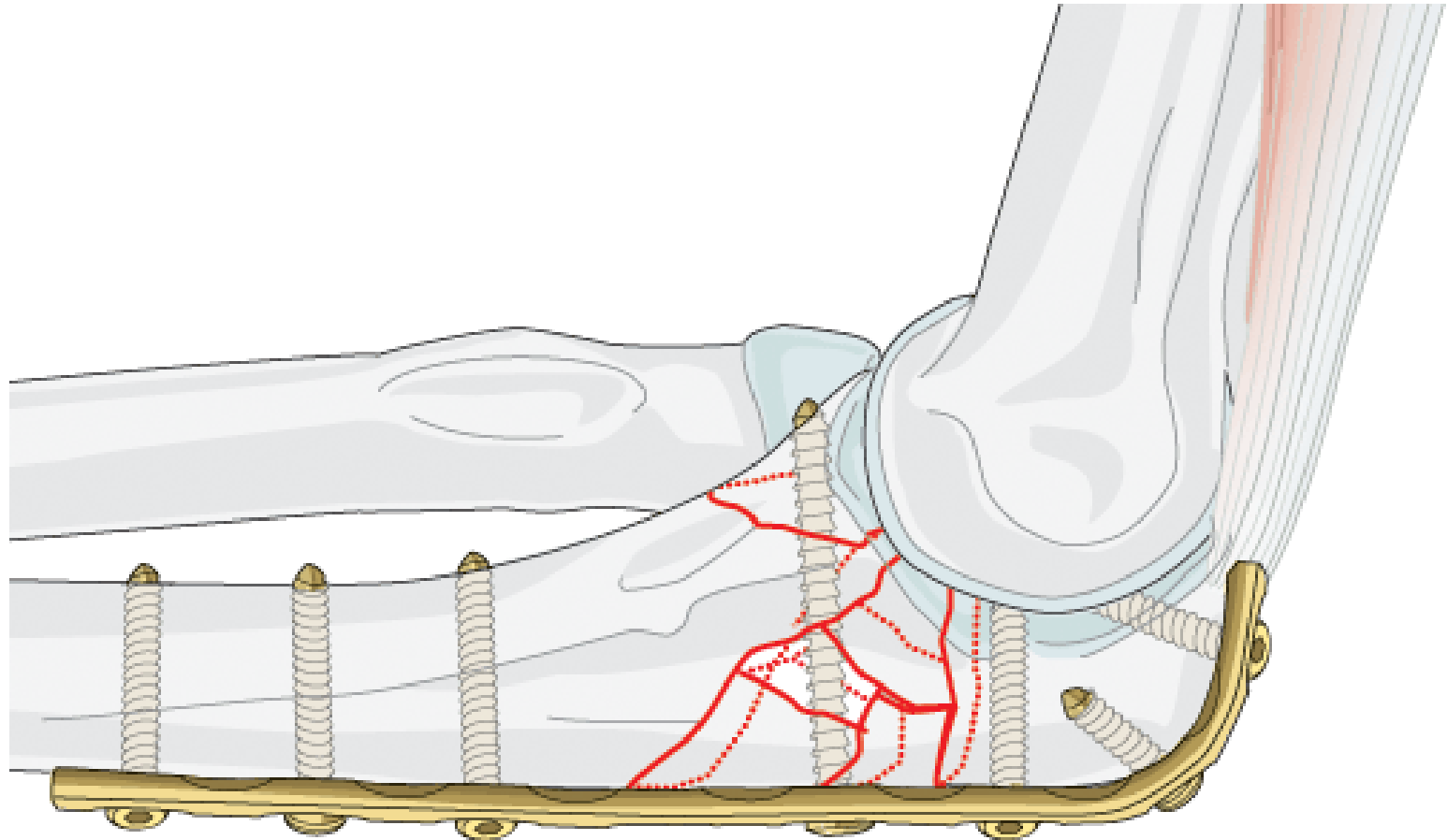
| Procedure                             | Number |
|---------------------------------------|--------|
| Dynamic Hip Screw                     | 1      |
| Cannulated Hip screws                 | 1      |
| Midfoot ORIF                          | 1      |
| Distal radius ORIF                    | 6      |
| Olecranon ORIF                        | 2      |
| Distal radius ex-fix                  | 1      |
| Phalanx ORIF                          | 1      |
| Distal Humerus ORIF                   | 1      |
| Emergency Carpal Tunnel Decompression | 1      |
| Rotator cuff repair                   | 1      |
| Nasal fracture MUA                    | 1      |
| Wound suturing in ED                  | 12     |
| Total                                 | 29     |

# Hip fracture after tram cycling injury - Dynamic Hip Screw

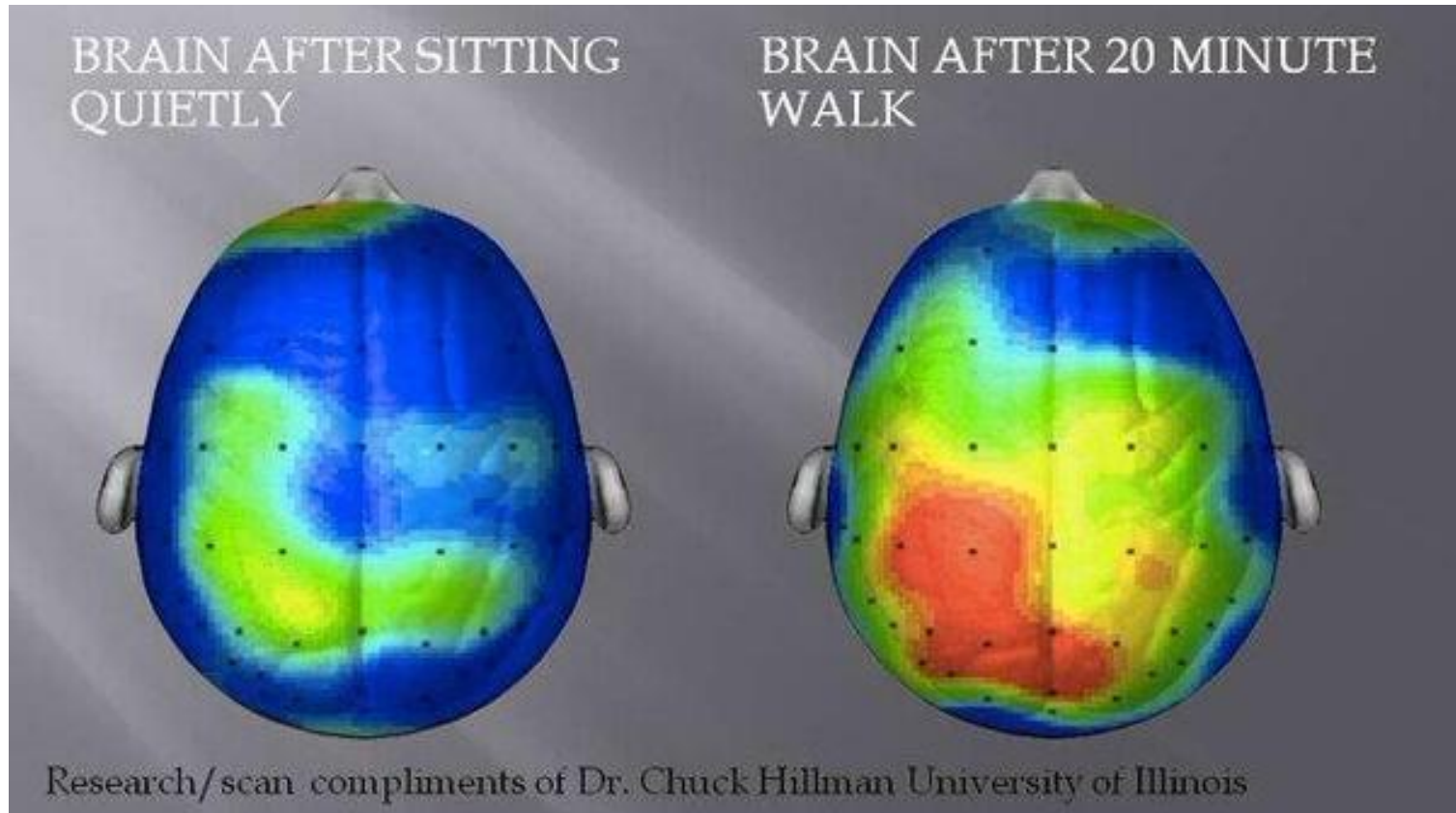


Representative images

# Tram Injury Cycling - Complex elbow injuries



# Professor Physical Activity for Health





**Sit Less**  
**Walk More**



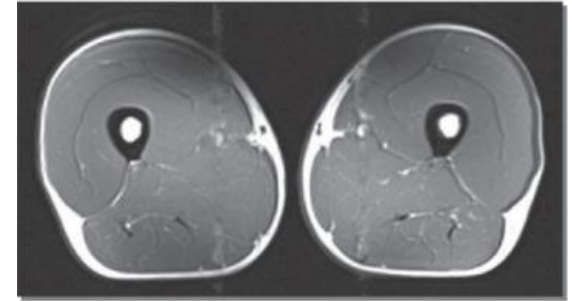
# MRI Cross Sectional Leg Scans

**40-year-old triathlete**

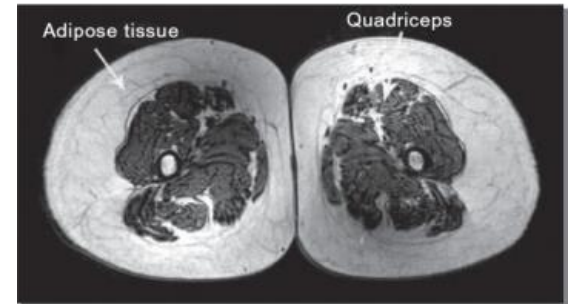
**74-year-old sedentary man**

**70-year-old triathlete**

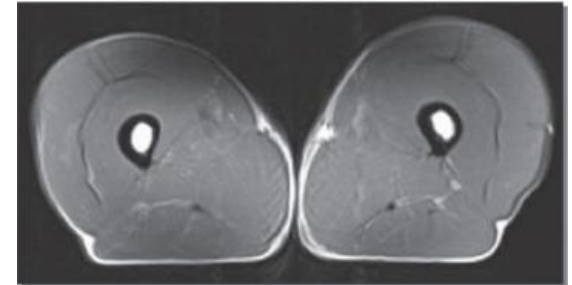
40-year-old triathlete



74-year-old sedentary man



70-year-old triathlete



# Risk reduction associated with physical activity

| <b>Chronic condition</b> | <b>Risk reduction</b> |
|--------------------------|-----------------------|
| All cause mortality      | 30% risk reduction    |
| CVD, stroke              | 20-35% reduction      |
| Diabetes                 | 30-40% reduction      |
| Hip fractures            | 36-68% reduction      |
| Colon cancer             | 30% reduction         |
| Breast cancer            | 20% reduction         |
| Loss of function         | 30% reduction         |
| Depression/dementia      | 20-30% reduction      |

# Best Investments for Physical Activity

Infographicalised by



## 1 Communication and public education

Consistent public education, including use of mass and social media



## 7 Sport and recreation

Sport systems and programs that promote "sport for all" and encourage participation across the life span



## 2 Transport and the environment

Transport policies and systems that prioritise walking, cycling and public transport



## 6 Community-wide programs

Work with communities to provide appropriate local solutions, aiming to mobilise large numbers of people



## 3 Urban design and infrastructure

Provide safe and equitable access for recreation and physical activity across the life course



## 5 Education

Make regular physical activity in schools and places of learning normal



## 4 Healthcare and health education

Ensure assessment and advice about physical activity is a routine part of healthcare services



We need action to achieve the goal of 10% increase in participation by 2025

**Work together to make it happen**

Global Advocacy Council for Physical Activity (GAPA) the Advocacy Council of the International Society for Physical Activity and Health (ISPAH), NCD Prevention: Investments that Work for Physical Activity. Br J Sports Med 2012;46:870 9- 7 12

International Society for Physical Activity and Health

Designed by Chloe Schiphorst

British Journal of Sports Medicine 2016

C Schiphorst, A Murray, P Kelly,  
C Oliver, F Bull

Br J Sports Med  
doi:10.1136/bjsports-2016-  
096999

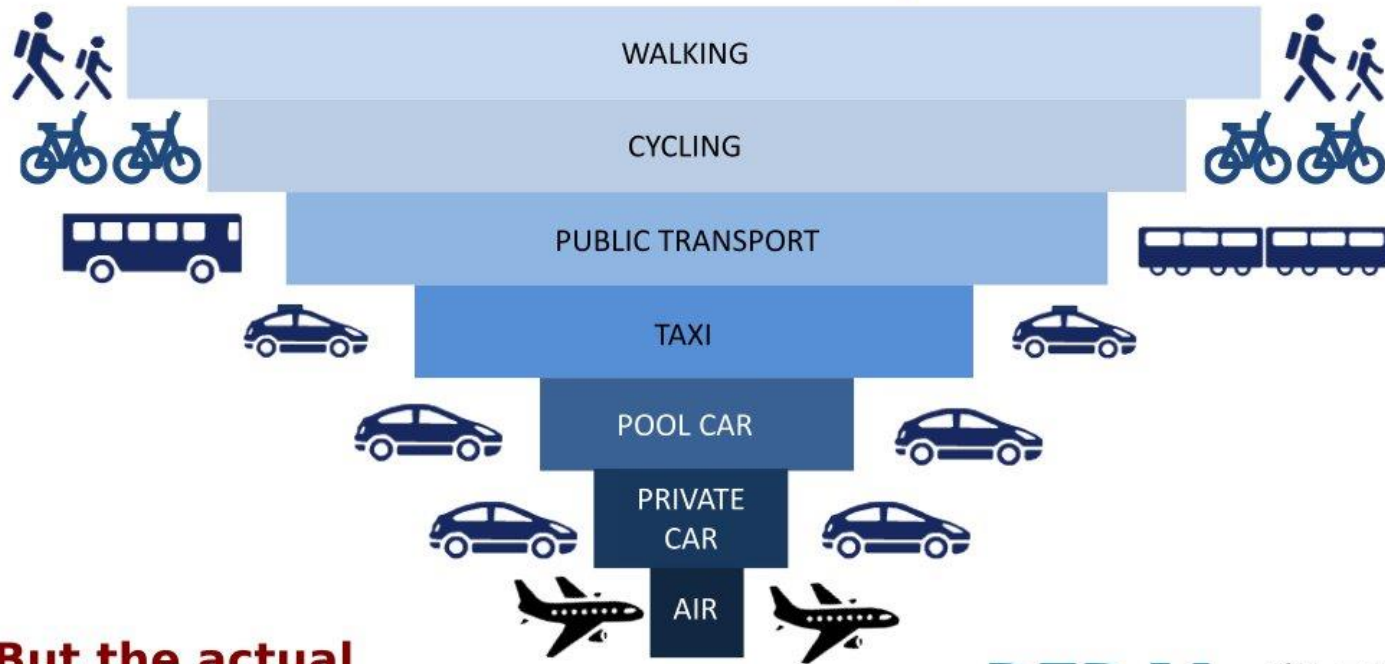
**BJSM**

 @PlayonPedals

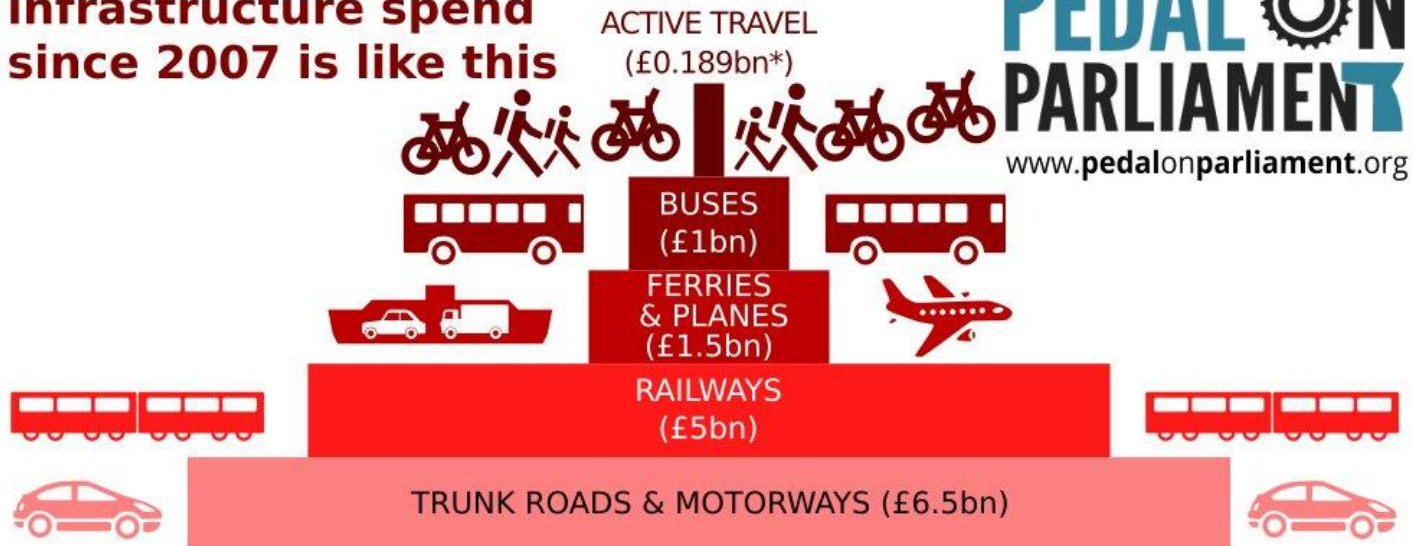
7k preschool riding in Glasgow



# The sustainable travel hierarchy looks like this



**But the actual infrastructure spend since 2007 is like this**



**PEDAL ON PARLIAMENT**  
[www.pedalonparliament.org](http://www.pedalonparliament.org)

Sustainable travel hierarchy graphic and infrastructure spend numbers from *Scottish Government National Transport Strategy*, January 2016

\* Active travel spend pro-rata for period 2011-15, which may be an over-estimate

# World Health Organisation to develop Global Action Plan to Promote Physical Activity





Cyclist blaming



# Cycling Action Plan for Scotland: 2017-2020 Transport Scotland

(... with added Zen :)



# What to do?

Policy change

Cycling Action Plan

New Active Travel

Infrastructure

Reverse engineer

Shims

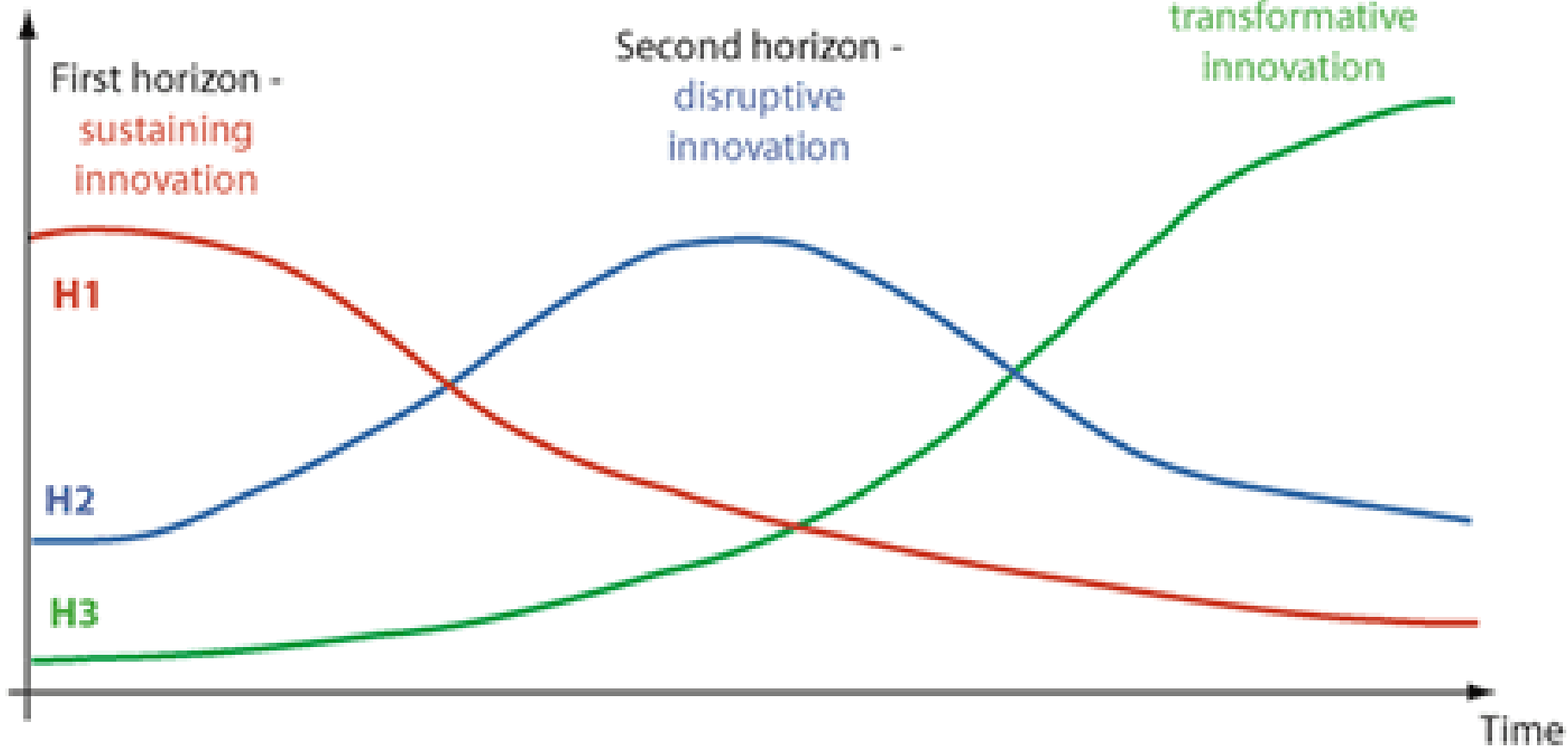






## IFF Three Horizons Model: three forms of innovation

Prevalence



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