NSW Health

NSW Active Transport Health Model

A best-practice method for valuing the health and economic benefits of active transport initiatives

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NSW GOVERNMENT

We acknowledge the Traditional Owners of the land on which we meet and work, and pay our respects to Elders past, present and emerging.

Ancestral Lines by Jeremy Morgan Worrall | 2025 National NAIDOC Poster

'Jeremy's work honours the knowledge, care and cultural strength passed down through generations — from Ancestors Lucy, Enoch and Nonie Wright to his Nanna Audrie and his mother Vanessa. The artwork is set beneath the swirling clouds and moonlit skies of Tenterfield, where the next generation gathers around the fire — to listen, to learn, and to lead.'

NSW Active Transport Health Model

Aim

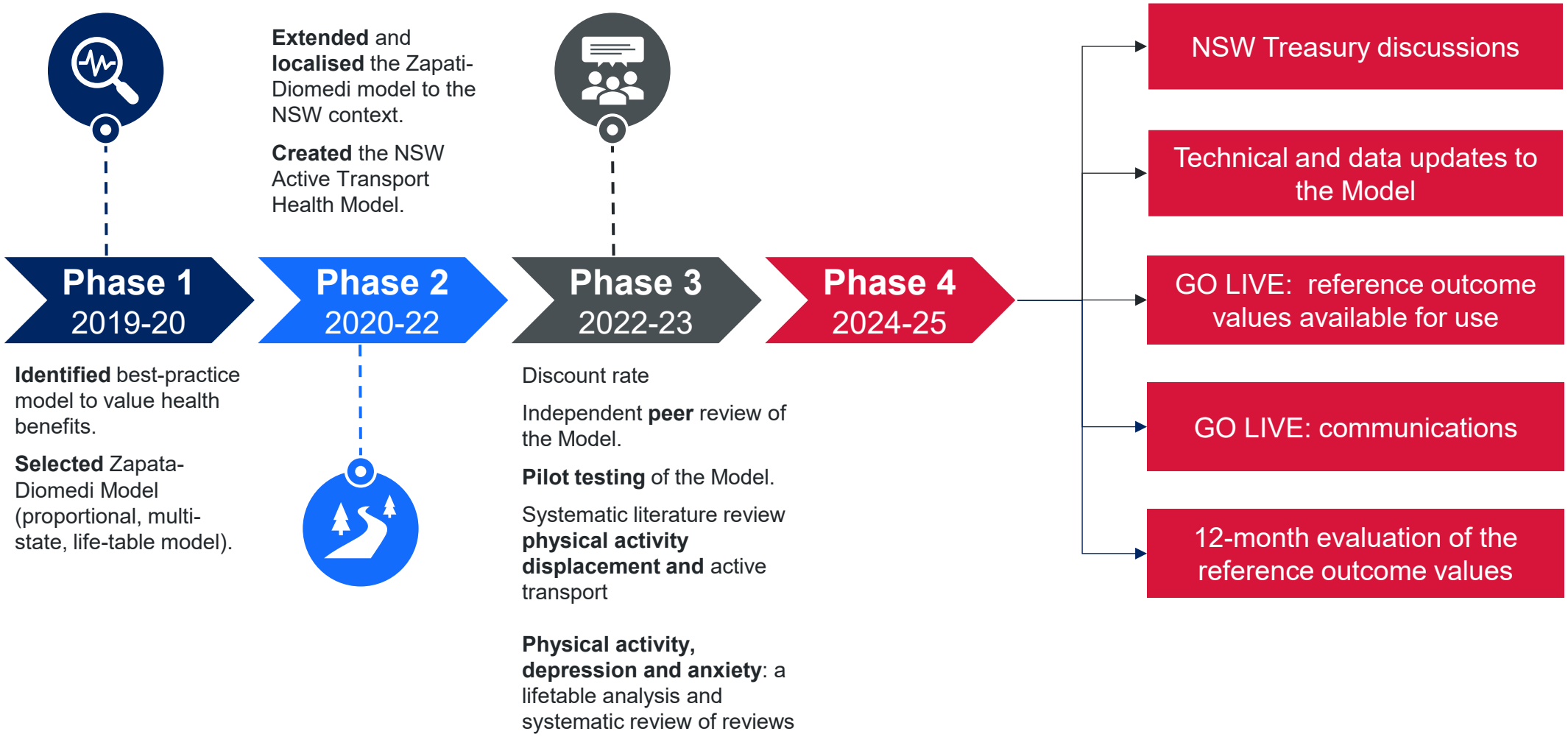
To establish a **best practice** method **across government** for calculating and **valuing** the **health impacts** of **active transport** from increased physical activity, lower air pollution and reduced road trauma using a multi-state lifetable approach.

Goals

To help inform **strategic business cases** and **guide evidence-based planning and evaluation** of active transport infrastructure in NSW.

The NSW Active Transport Health Model

Project timeline



The NSW Active Transport Health Model

Publications

Does active transport displace other physical activity? A systematic review of the evidence

- Active transport can increase overall levels of physical activity.
- The evidence suggests that active transport related physical activity is not offset by lower levels of physical activity in other domains (except perhaps in older people).

https://doi.org/10.1016/j.jth.2023.101631

Physical Activity and Depression and Anxiety Disorders in Australia: A Lifetable Analysis

- Physical activity may reduce the incidence of anxiety and depression.
- If all Australians adhered to the recommended minimum physical activity levels, in 25 years' time, the burden of anxiety could be reduced by up to 6.4 % and the burden of depression by 4.4%.
- Over the lifetime of the 2019 Australian population, health care cost savings of AUD 5.4 billion for anxiety and AUD 5.8 billion for depression.

https://doi.org/10.1016/j.focus.2022.100030

Physical Activity and Depression and Anxiety Disorders: A Systematic Review of Reviews and Assessment of Causality

- Our findings provide empirical support for the consideration of physical activity in strategies for the prevention of mental ill health.
- Physical activity is inversely related to incident depression and anxiety.
- Depression and anxiety are probably causally related to physical inactivity.

https://doi.org/10.1016/j.focus.2023.100074

Active transport-related physical activity matters

- **Any level** of physical activity **can provide health benefits** - there is **no minimum** threshold
- **Benefits are cumulative** - some is good, more is better
- **Lower risk of some chronic and/or non-communicable diseases** & **improved mental health**
- **Inactive** or **older adults** can gain **major health benefits** by moving from sedentary behaviour to **light or moderate physical activity**

People who walk 30 mins a day lower their risk of heart disease, stroke and type 2 diabetes by 30 – 40%

If all Australians adhered to the recommended minimum physical activity levels, in 25 years' time**, health care costs** could be **reduced** by **$5.4 billion** for **anxiety** and **$5.8 billion** for **depression.**

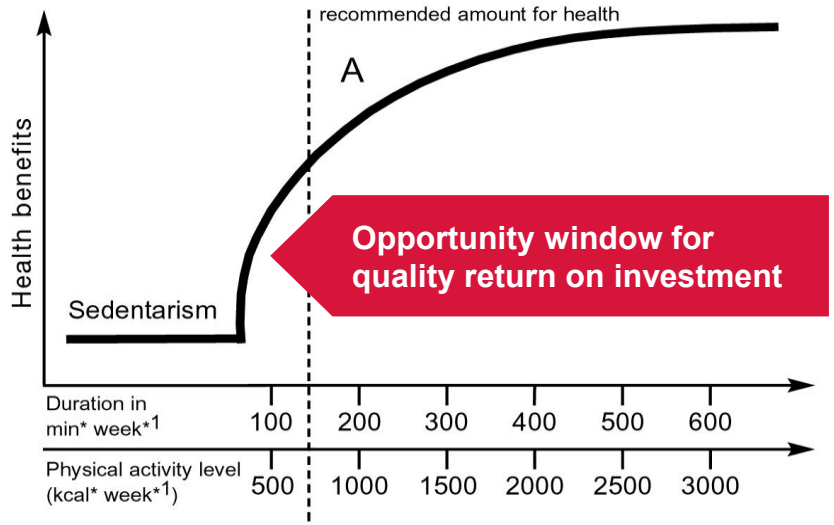
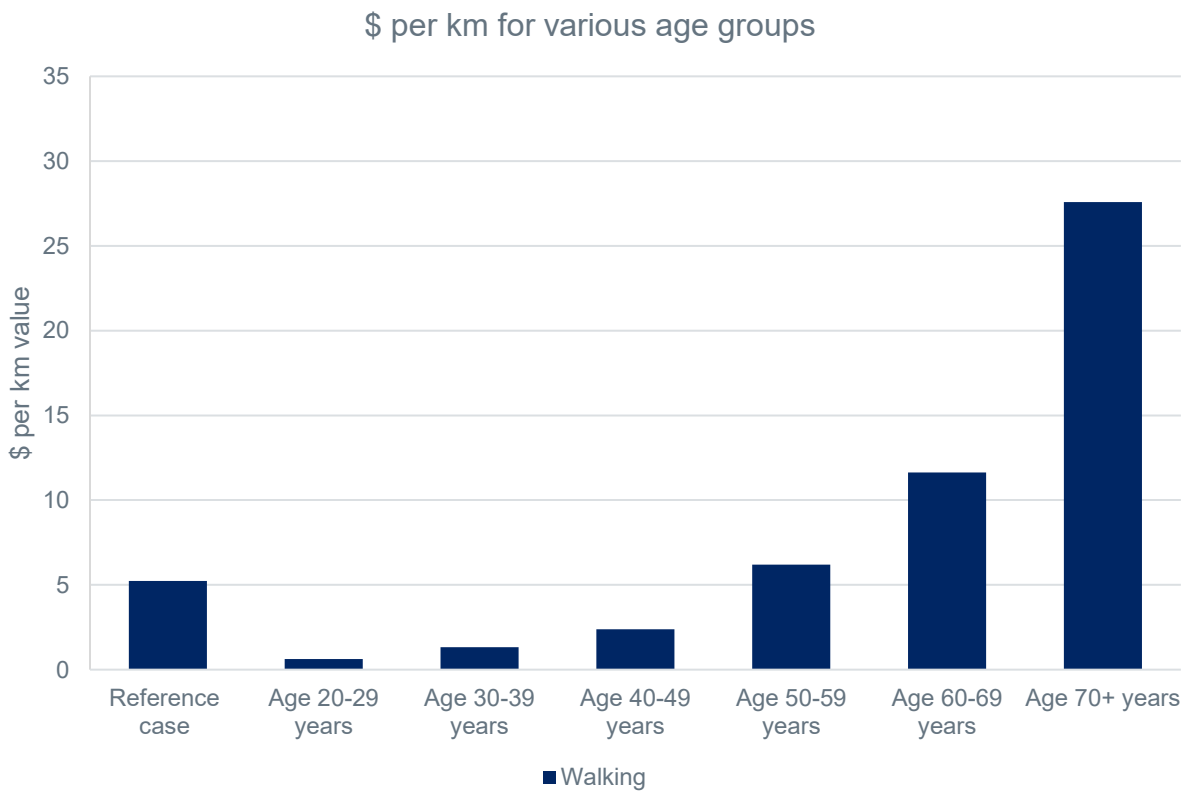


Figure source: Bouchard C. Physical activity and health: introduction to the dose-response symposium. Medicine and Science in Sports and Exercise 2001; 33: S347-350

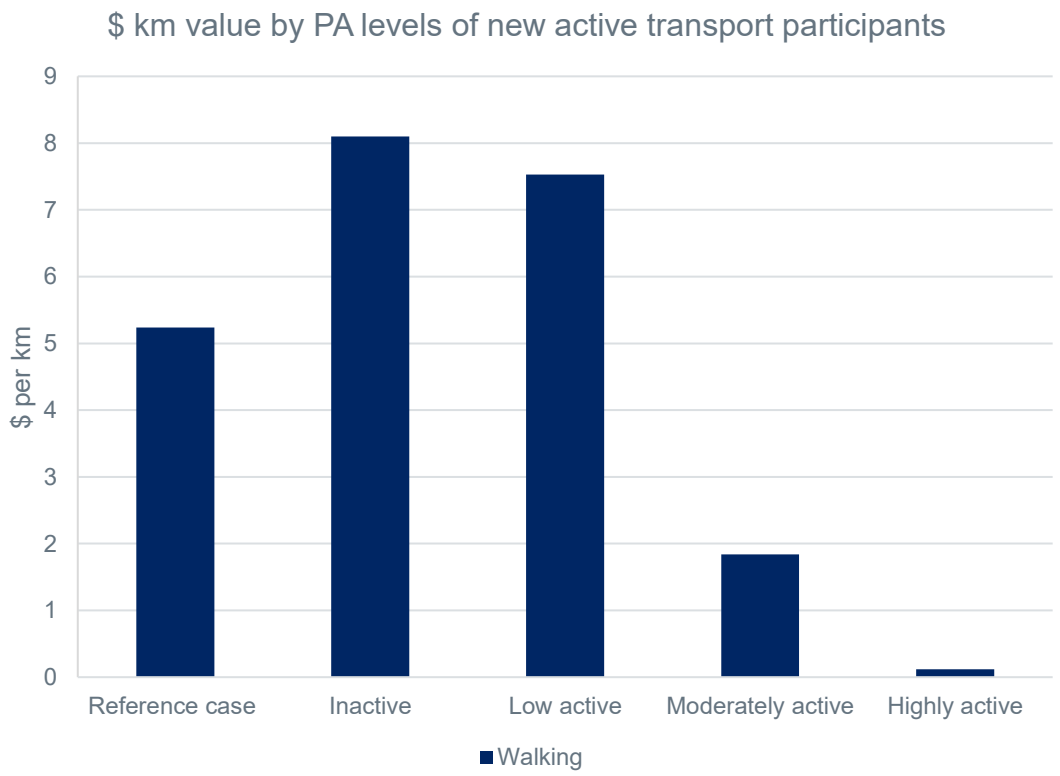
Sources: World Health Organization and the U.S. Centres for Disease Control and Prevention

The NSW Active Transport Health Model

Sensitivity analyses



Reference case: 20 to 100 years

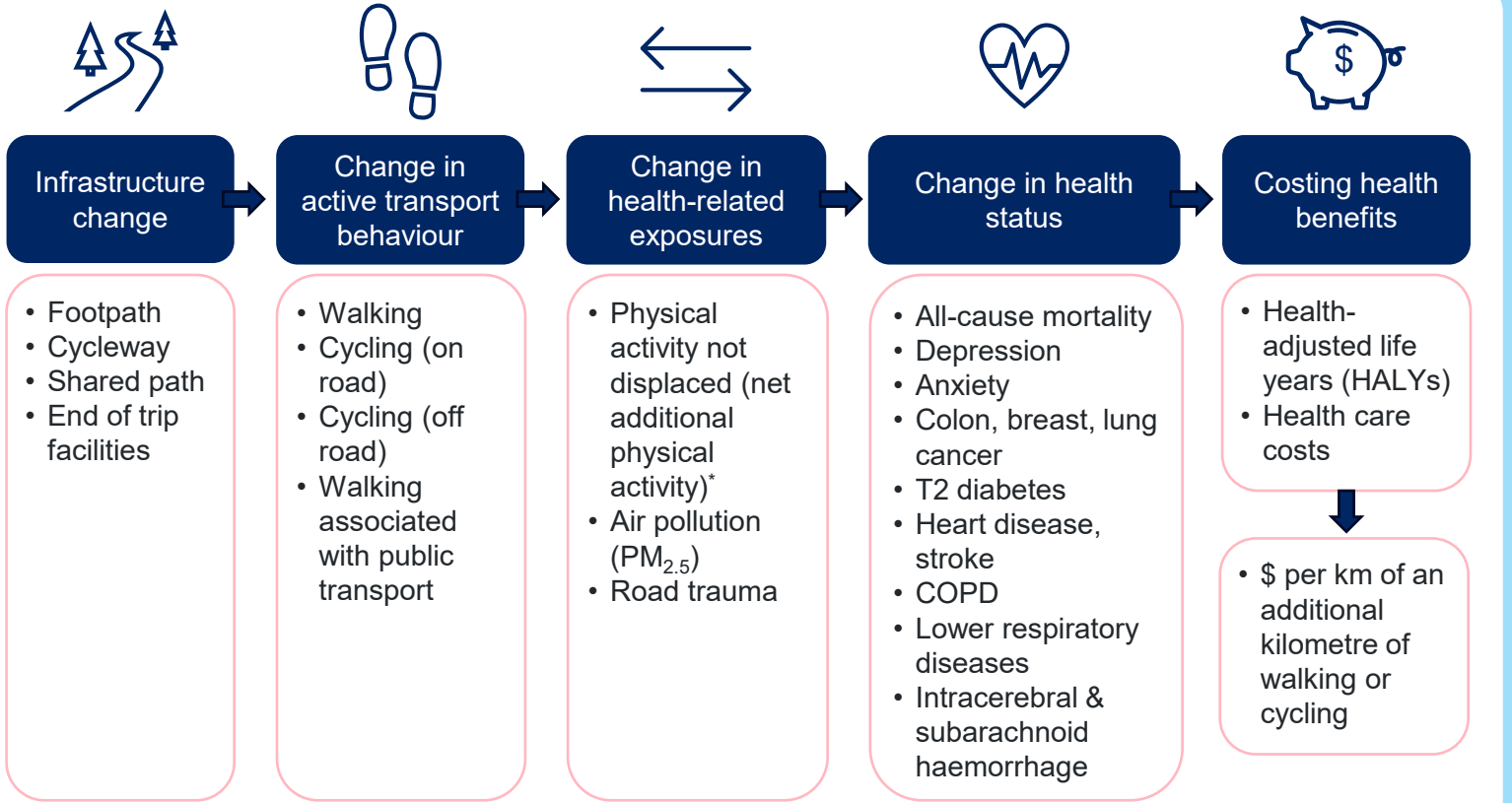


Reference case: All PA levels combined

Figures provided by Lennert Veerman, Professor of Public Health, Public Health & Economics Modelling group, School of Medicine and Dentistry, Griffith University

The NSW Active Transport Health Model

Valuing health benefits of increasing active transport-related physical activity



NSW Active Transport Health Model framework

** Assumes displacement of additional physical activity arises from active transport – a weighted figure of 12.45% physical activity displacement is part of the reference outcome values.*

Reference Outcome Values (health benefits)

$5.24/km	$2.95/km on road
$4.88/km	$2.97/km off road

Use-cases for the Model

- Using the $ values generated by the Model in SBCs and CBAs to support the case for change (investment) in active transport infrastructure and initiatives
- Inform precinct plans (across govt)
- Model outputs can support state-level, flagship policy outcomes and targets:
  - **Movement and Place** strategies (local plans)
  - **Towards Net Zero** – green & active travel plans (staff travel and carbon footprinting)
  - **Transport-oriented Development** – density done well
  - **Mode-shift** towards walking and cycling
  - **Increased physical activity** (with or without infrastructure)
  - **Safer cities** program
  - **Street activation** projects
  - Get NSW Active grant funding
  - NSW Active Transport Fund
  - ReVITALise – Public Transport Precinct Vibrancy Grants

GO LIVE: Release of the reference outcome values

- Initial release occurred in December 2024
- Focuses on providing standardised reference outcome values
- The Model has been approved by NSW Treasury
- Available to practitioners involved in planning and assessing active transport in NSW, including SBCs
- Information about the Model is available online via NSW Treasury and NSW Health websites
- Resource materials (user guide) available for download from the NSW Health website

Participate in the evaluation of the Model

The NSW Ministry of Health is evaluating how effectively the Model and reference outcome values meet user needs.

We are interested to learn more about:

- How feasible and useful are the reference outcome values are in supporting applications for grant funding, business cases, and for the planning and assessment of active transport initiatives.
- How the use of the Model and reference outcome values can be scaled.
- The extent our support and resources enable the adoption and use of the reference outcome values in the planning and assessment of active transport at a system-wide and local level.

Hypothetical cost-benefit analysis case study

Construction of a new 1.1km separated cycleway in Randwick NSW

Figure 21. Hypothetical cycling path, Alison Road/Avoca Street – North scenario, (Approx. 1.1 km, estimated 1,379 new cyclists)

Note: This example focuses on the health benefits of active transport only. Additional steps to account for non-health benefits are required for a full cost-benefit analysis (and are not shown here).

Forecasting tools

- **Trip volumes:** University of NSW cycling infrastructure scenario builder tool
- **Average trip distance by mode:** Transport for NSW Household Travel Survey
- **Diversion rates:** Australian Transport Assessment and Planning (ATAP) M4 Active Travel guidelines
- **Proportion of cycling trips by e-bike:** Bicycle Network Super Tuesday Commuter Counts

Input assumptions

- Annual demand growth is assumed to be the same as NSW population growth projections
- Diversion rates for e-bikes are the same as bicycles
- Diversion from public transport and new trips results in the same health benefits as diverting from car (similar sedentary behaviour)
- No additional health benefits are assumed for trips using the same mode that are diverted from one route to another as the total level of physical activity is unchanged

Case Study Use Case Source: https://cityfutures.ada.unsw.edu.au/research/projects/scenario-planning-tool-improving-bikeability-our-cities/

Hypothetical cost-benefit analysis case study

Applying the NSW Active Transport Health Model – Inputs and assumptions

Project details	
Total facility length (km)	1.1
Facility type	Off-road cycleway

Estimated demand	**Opening year demand *trips/period***	**Opening year demand *trips/annum***	**Annual demand growth**	**Increase in trips *trips/annum***
Total cycling trips	*5,027*			
Trips by bicycle	4,248	220,886	1.1%	2,430
Trips by e-Bike	779	40,518	1.1%	446

Diversion rates *(from ATAP M4 Guidelines)*	
Proportion of trips by mode in the base case (%)	**Cycling**
From car	15%
From public transport	0%
From bicycle on-road	55%
From walking	0%
From walking associated from public transport	0%
New bicycle trips	30%

Appraisal settings		
Appraisal period (years)	30	*Economic life of a project*
Annual discount rate	5%	
Start year of evaluation	2025/26	
Annualization factor	52	*The factor that demand is multiplied by to get annual demand*
Demand ramp up period (years)	3	*Linear, ATAP M4*
Health benefits cycling off-road ($/km)	$2.97	*NSW ATHM Value*
Health benefits cycling on-road ($/km)	$2.95	*NSW ATHM Value*
Health benefits walking ($/km)	$5.24	*NSW ATHM Value*
Health benefits walking associated with public transport ($/km)	$4.88	*NSW ATHM Value*
Average distance of cycling	6.0	*TfNSW HTS 2022/23 Randwick LGA data*
Average distance of walking	1.0	*TfNSW HTS 2022/23 Randwick LGA data*
Average distance of walking associated with public transport	0.7	*TfNSW HTS 2022/23 Randwick LGA data*
Proportion of total cycling trips by e-bike	15.5%	*Super Tuesday Counts 2024 NSW data*
Proportion of the $/km health benefits applied for e-bikes	70%	*ATAP, M4*

Note: *The NSW ATHM per-km values represent the net present value (discounted) of future health benefits that follow from one year of extra physical activity due to travellers switching trips from car (sedentary behaviour) to active transport.*

– Health benefits of diverting cycling on-road to cycling off-road = (Health benefits cycling off-road - Health benefits cycling on-road) x Avg. distance of cycling

Hypothetical cost-benefit analysis case study

Applying the NSW Active Transport Health Model – Estimated health impacts

Estimated health benefits over project life

	Value	Present Value
	$62,845,476	**$30,973,965**
	$8,069,508	**$3,977,130**
Total	**$70,914,984**	**$34,951,095**

Note: *Present Value is a way of figuring out how much future benefits are worth today. We used a method called "discounting" to adjust future amounts so we can compare them fairly with today's money.*

Health benefits	**1**	**5**	**10**	**20**	**30**
	2026/27	**2030/31**	**2035/36**	**2045/46**	**2055/56**
Cycling off-road by bicycle					
Trips diverted from car	$590,429	$614,603	$649,158	$724,206	$807,929
Trips diverted from public transport	$0	$0	$0	$0	$0
Trips diverted from cycling on-road	$14,579	$15,175	$16,029	$17,882	$19,949
Trips diverted from walking	$0	$0	$0	$0	$0
Trips diverted from walking associated with PT	$0	$0	$0	$0	$0
New trips	$1,180,859	$1,229,206	$1,298,316	$1,448,411	$1,615,859
Total health benefits – bicycle trips	**$1,785,866**	**$1,858,984**	**$1,963,502**	**$2,190,499**	**$2,443,737**
Cycling off-road by e-bike					
Trips diverted from car	$75,813	$78,916	$83,353	$92,990	$103,740
Trips diverted from public transport	$0	$0	$0	$0	$0
Trips diverted from cycling on-road	$1,872	$1,949	$2,058	$2,296	$2,561
Trips diverted from walking	$0	$0	$0	$0	$0
Trips diverted from walking associated with PT	$0	$0	$0	$0	$0
New trips	$151,625	$157,833	$166,707	$185,979	$207,480
Total health benefits – e-bike trips	**$229,309**	**$238,698**	**$252,118**	**$281,265**	**$313,782**

Hypothetical cost-benefit analysis case study

Limitations and key takeaways

Figure 21. Hypothetical cycling path, Alison Road/Avoca Street – North scenario, (Approx. 1.1 km, estimated 1,379 new cyclists)

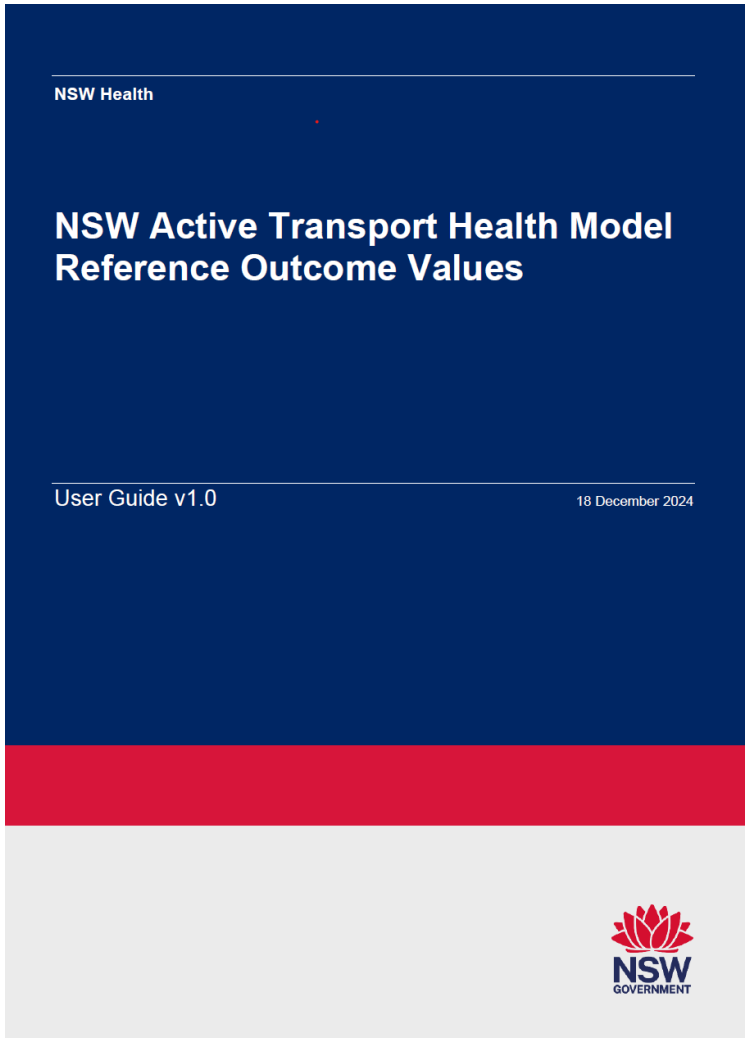
Limitations

- Mode shift and demand assumptions may not reflect local behaviour
- Trip volumes based on traffic counts and modelling are sensitive to data quality

Key takeaways

- Active transport delivers measurable health benefits
- Evidence supports future investment and integrated planning
- Emphasises co-benefits and the value of cross-sector collaboration

Thank you and questions?



You can download the *NSW Active Transport Health Model Reference Outcome Values User Guide* from:

https://www.health.nsw.gov.au/urbanhealth/Pages/active-transport.aspx

For more information contact the NSW Ministry of Health at:

moh-active.transport@health.nsw.gov.au

Acknowledgements – partner agencies and organisations

- NSW Treasury
- Transport for NSW
- Department of Planning, Housing and Infrastructure
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