



Promoting mental health through cycling and walking: a win-win approach for health and sustainability

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Abstract

Addressing the triple challenge of physical inactivity, the growing need for healthy and sustainable mobility, and for intersectoral action on mental health, this brief presents the first overview of review studies and the growing body of evidence on the impacts of active mobility across the life course and a wide range of mental health conditions. It also collates evidence-based practical tips and project examples to promote further investments into active mobility and research on its effects on mental health, to help address the heavy burden of mental ill-health and physical inactivity in the WHO European Region.

Overall, the findings are encouraging and support investments in safe active mobility, which can help enhance mental health and well-being for people of all ages, along with physical health and sustainability.

Keywords

MENTAL HEALTH, WALKING, BICYCLING, BIOLOGICAL TRANSPORT, ACTIVE – Active Transport, SUSTAINABLE DEVELOPMENT

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About this policy brief

In 2021, Member States of the WHO Regional Office for Europe and the United Nations Economic Commission for Europe adopted the Vienna Declaration (1), which features key political decisions on transport, mobility, the environment and human health, and acknowledges their interdependence: the Declaration promotes active mobility as a means to prevent noncommunicable diseases (NCDs) and reduce air pollution, noise and greenhouse gas emissions, among other benefits.

As part of this Declaration, Member States adopted the Pan-European Master Plan for Cycling Promotion (2), which includes the goal to double cycling across the Region by 2030, followed by the Master Plan on Walking (3) in 2024.

This policy brief, developed under the Transport, Health and Environment Pan-European Programme, addresses the growing need for healthy and sustainable mobility. It presents evidence on the impacts of active mobility on mental health and provides tips and recommendations on interventions that support both health and environmental objectives as well as recommended actions and conclusion for policy-makers and practitioners, with a special focus on the mental health benefits of walking and cycling.

Why focus on mental health and active mobility?

Mental health is increasingly recognized as a fundamental component of overall health and well-being. Yet, mental health conditions represent a major disease burden: in 2025, one in six people in the WHO European Region lived with a mental health condition (4). At the same time, insufficient physical activity remains a leading risk factor for NCDs, posing a substantial public health challenge worldwide and in the European Region.

One WHO study estimated that between 2020 and 2030, nearly 500 million new cases of preventable NCDs (including mental health conditions) will occur globally due to physical inactivity, with over 80 million of these expected in the European Region (5). Mental health conditions account for a substantial proportion of the related burden: globally, 43% of new cases of NCDs are from depression and anxiety, and an additional 3% from dementia. Direct health-care costs are estimated globally to amount to approximately US\$ 300 billion, with a sizable share (32%) expected to be borne by the WHO European Region. Mental health conditions pose a high burden on health-care systems: although dementia accounts for only 3% of preventable new cases, the disease accounted for 22% of total direct health-care costs.

Addressing the dual challenge of physical inactivity and the growing need for intersectoral action on mental health (6) is unlikely to be achieved through conventional health promotion approaches alone – such as organized sports or leisure-time exercise – both because of convenience (e.g. these activities need to be given dedicated time in weekly routines) and feasibility costs because of the very large numbers of people that would need to be engaged.

Promoting cycling and walking offers a promising way to encourage physical activity, since it can be more easily integrated into people's daily routines. For individuals with mild to moderate mental health conditions, walking and cycling are often more feasible and affordable than traditional forms of sport or structured exercise.

The benefits of physical activity on health and mental well-being have been well established, and there is solid evidence on the physical health benefits of active mobility. However, the specific effects of active mobility on mental health have only recently received more attention. This policy brief breaks new grounds, by providing the first to date overview of review studies and the growing body of evidence across a wide range of mental health conditions in all age groups.

This brief provides decision-makers and practitioners with a solid background about the links between mental health and active mobility. It also collates evidence-based, practical tips and good project examples to promote further investments into active mobility as well as research into its effects on mental health, to help address the dramatic burden of mental ill-health and physical inactivity across Europe.

What does the evidence say?

Recent literature (presented in the Annex) highlights a range of mental health benefits from active travel across a variety of outcomes, as summarized below.

General mental health

Active travel, such as cycling and walking, is positively associated with overall mental health. The evidence consistently shows that individuals who engage in active mobility tend to have better mental well-being than those who rely on motorized modes of transport (e.g. car, motorbike, bus). A relevant case study is presented in Box 1.

Depression and depressive symptoms

Walking has been shown to reduce depressive symptoms, with evidence suggesting that individuals already experiencing depression may benefit even more (9). Switching from motorized to active commuting also reduces the risk of being depressed.

The most recent meta-analysis (9) covering 75 randomized controlled trials confirmed that walking interventions significantly reduce depressive symptoms and that even moderate volumes of walking seem to show a protective effect against developing depressive symptoms, including in older adults. This finding is especially important, as this age group may face challenges engaging in high-intensity or high volumes of physical activity.

Conclusions on the effects of real-life active commuting (as opposed to those observed under study conditions) still remain limited due to a lack of studies on changes over time and inconsistent methodological approaches (10) (see the Annex).

Emerging evidence shows that adolescents who actively commute to school have 12% lower odds for depressive symptoms (11), compared to their peers who do not get to school in an active way.

Box 1. A multi-city case study on the effects of transport mode use on mental health

This case study draws on data from the Physical Activity through Sustainable Transport Approaches study, conducted over two years in seven European cities (Antwerp, Barcelona, London, Örebro, Rome, Vienna and Zurich).

Participants reported their mode of transport to and from destinations using an online survey platform. Mode use was assessed at baseline and again at the end of the study, with the average of the two used to reflect longer-term travel behaviour. In addition, the study assessed perceived stress, mental health, vitality and self-rated health using standardized scales. Over 3500 participants who completed both questionnaires (median age 38–41) were included in the analysis.

Bicycle use was associated with good self-rated health, lower perceived stress, better mental health and higher vitality. Walking was associated with higher vitality and with better self-rated health. All analyses were adjusted by age, sex, education, nationality, employment status and city.

These results are in line with previous studies that associated cycling with better mental health outcomes and contribute additional evidence on the benefits of walking on mental health.

The findings support the call for an integrated approach of urban design, transport planning and public health. Promoting active transport not only enhances mobility, but it is also a powerful lever to improve public health and population well-being.

Source: (7,8).

Anxiety

Randomized controlled trials have shown that walking reduces anxiety symptoms in adults. However, evidence on the impact of real-life active commuting – whether walking or cycling – remains limited, making it difficult to draw firm conclusions.

Psychological stress

Emerging evidence suggests that walking is associated with lower levels of psychological stress in adults. People who commute by cycling or walking tend to report lower stress levels compared to those using other modes of transport. Among children and adolescents, biking to school appears to have a protective effect against psychological health complaints. A related case study is presented in Box 2.

Well-being, vitality and mood

Adults who engage in active commuting report higher scores on mood-related aspects such as feeling “pleasant”, “excited” and “relaxed”. Active travel, including e-bike use, is also associated with better mood (positive affect)¹ during commuting, which supports recovery after a day of work.

Both walking and cycling have been linked to improved vitality, reflecting higher energy levels and reduced fatigue. Among people with disabilities, adaptive cycling has also been associated with greater enjoyment and enhanced overall well-being.

Box 2. Case study on active school travel and psychological well-being of children in lower Austria

Globally, 80% of children and adolescents do not meet the recommended levels of physical activity and psychological problems are on the rise in this age group. Active travel to school is therefore a promising route to improving both physical activity levels and mental health among children and adolescents.

This case study was carried out in the province of Lower Austria, to examine associations between school travel mode use, travel-related attitudes and emotional (affective) indicators of psychological well-being. It involved 152 third and fourth grade children (with a mean age of 9.6 years) in five primary schools. The data were collected directly via questionnaires from the children at school, using validated and adapted visual scales ranging from 1 (low well-being) to 5 (high well-being).

The questionnaires included items on travel mode used on that day, individual preferences for school and leisure trips, frequency of travel mode use and subjective psychological well-being. In addition, data were collected from a sub-sample of parents through a questionnaire and in-depth interviews, including the household’s mobility behaviour, availability of different travel modes, attitudes with regard to independent mobility and cycling (parent), physical activity levels (child), as well as physical and mental condition (child).

In all, 26.1% of the children reported usually walking to school, 15.1% cycling and 16.2% using a scooter, while 23.5% were typically driven by car and 19.1% used public transport; reflecting relatively limited public transport availability in Lower Austria.

The comparison between active modes (walking, cycling and scooter) versus passive modes (car and public transport) showed that children using active modes reported statistically significant higher well-being (median = 4.5) than those using passive modes (median = 4.0). Parents also reported strong positive associations between their children’s well-being and the use of active travel modes.

This study highlights the importance of school and community investments in safe environments and supportive policies to promote active travel to school.

Source: (12).

¹ Affect refers to the outward display of emotion or mood.

Cognitive decline

In older adults, a slower or decreasing walking pace over time is associated with an increased risk of cognitive decline and dementia. Research shows that every 0.1 meter per second decrease in walking speed is associated with an increase in the risk of cognitive decline by 5% and in the risk of developing dementia by 13% (13). A case study on cycling promotion and mental well-being in older people is shown in Box 3.

Walking in nature

Nature-based walking interventions improve adults' moods, enhance optimism and support overall mental well-being by reducing stress, anxiety and negative rumination (i.e. persistent focus on negative thoughts). Compared to urban walking, nature-based walking interventions may bring greater benefits. Forest walks have also shown positive effects on depression and stress levels.

Box 3. Healthy mind and cycling safely: how CycleOn keeps seniors from the Netherlands (Kingdom of the) on their bikes

The CycleOn programme was initiated by the Ministry of Infrastructure and Water Management of the Netherlands (Kingdom of the), in 2018. The initial focus was to address the increasing number of injuries in older cyclists, while continuing to encourage people aged 55 and over to maintain their health-enhancing cycling habits.

However, the programme quickly evolved into a broader initiative of promoting cycling among older people as a means to improve their health, happiness, mental health and social inclusion, particularly in light of projections that loneliness will affect over 50% of people aged 75 and over by 2030.

CycleOn offers 10 intervention packages, including workshops, cycle groups, information services, safety campaigns, a network of safe and accessible cycle routes for older cyclists, e-bike training and educational materials. These activities help participants build knowledge, skills and confidence while enhancing their mental well-being. Group rides and local events help participants build new social networks and shared routines.

The programme has involved all levels of government: the national level develops the intervention packages, provinces coordinate and fund local implementation, and municipalities organize activities with local professionals and volunteers based on their own priorities and capacities. Currently, all 12 provinces, two regions and 85% of municipalities are participating in the CycleOn programme, reaching thousands of seniors each year.

CycleOn is also exploring specific target groups that are less active, including seniors with a migration background, who might be less experienced or confident cyclists. For example, the event "tricycle tryout days" aims to lower the threshold for seniors who might feel hesitant to switch to a tricycle when cycling on a two-wheeled bicycle gets too challenging.

Success stories illustrate the impact of the programme. For example, Cor (age 82) from Utrecht, who stopped cycling after his wife fell ill, found a weekly cycling group through CycleOn and regained both companionship and motivation for cycling. For many seniors, cycling fosters independence by keeping them mobile and self-reliant, and enabling them to participate actively in their communities.

The sense of contributing to their own road safety and taking control of personal mobility needs also enhances mental well-being among the elderly population. One inspiring example is Mrs Vink (age 95), who, thanks to the programme was able to cycle again on a tricycle. In a short video she described the experience as a "gift from God" (14).

Municipalities interested in replicating the programme should start with a small pilot to foster enthusiasm among local partners and the community, which should be action-focused and practical. The experience of CycleOn shows that elderly cyclists are happy to participate in simple, inclusive activities that offer opportunities for social interaction and enjoyment.

Source and further information: (15–17).

Tips and options for decision-makers and practitioners

From the evidence and interventions reviewed, the following aspects emerge as important to consider when promoting walking and cycling for mental health:

- **Encourage active commuting and enhance transport infrastructure:** one effective way to promote regular walking or cycling is by encouraging it as a mode of commuting to work, school or university. Time spent on active commuting is positively associated with general mental health, as is switching from car use to active transport. Employers and communities investing in safe infrastructure and approaches that make active commuting attractive – such as secure bicycle parking, cycling or walking reward programmes, company bikes and walking challenges – can expect multiple benefits: reduced days of sick leave and, perhaps more importantly, a mentally healthier, fitter and happier work force and student population; reduced congestion, noise and air pollution; and decreased carbon-dependency. Thus, providing enhanced transport environments for everyone to ensure equitable access should be a policy priority.
- **Promote proximity:** to achieve the above-described plethora of positive outcomes, evidence shows that commuting distances should not be too long. This supports a concept of proximity in cities, where workplaces, health care, amenities, green spaces, universities and schools are located closer to residential areas, increasing the feasibility and convenience of active mobility to reach essential daily destinations. While easier to achieve in cities, this concept should be generally aspired to foster equity in access for everyone.
- **Urban planning:** this has a key role to play by providing public spaces and safe infrastructure to foster active mobility and social connections (6), particularly in cities where rapid urbanization and land use transformation are taking place, often with negative effects on urban structures and social fabric.
- **Promote walking interventions:** walking interventions across different frequencies, duration, locations (indoor or outdoor), formats (group or individual) and participant characteristics have shown beneficial effects on depressive symptoms in adults, regardless of whether participants were already experiencing depression (9).
- **Set achievable targets and provide supportive environments for older adults:** studies have suggested at least 120 minutes of walking per week at a moderate-to-vigorous intensity confers cognitive benefits in older adults (18); relatively unhealthy older people may obtain benefits with less time or a lower walking intensity and volume. Environments which support active mobility throughout the life-course are important to counteract slowing down or decreasing physical activity with age.
- **Focus on long-term adherence:** sustained participation is a key challenge for active mobility. Effective programmes need to

build on approaches that increase the likelihood of long-term adherence beyond supervised walking or cycling interventions, helping people integrate active mobility into daily life. Potential options could include applications for self-monitoring, setting smart goals, buddy systems or group activities supported by wider investments into safe parking facilities for bicycles at schools and workplaces; bicycle sharing systems; and safe, inviting and connected walking and cycling routes.

- **Support cycling among children and youth:** cycling is particularly beneficial for psychological well-being in children and adolescents. However, cycling is not common among studied countries, and it even declines with age, for example due to a longer commute following school changes (18). Policies that promote active travel stages into longer school commutes can help, such as bike-sharing schemes at public transport stops; bike parking facilities of sufficient size, quality and safety; convenient and safe pedestrian access; and well-connected public transport schedules (19).

- **Address gender gaps:** special attention should be given to promoting active school travel among girls, who tend to engage less in active commuting and to have lower levels of physical activity (18). In addition, girls and women are more affected by mental health problems (20).
- **Avoid the unintended consequences of affluence:** while raising incomes and reduced inequality generally improve health outcomes, they may lead to a decline in active commuting in some countries, including among children and youth. Actively promoting to maintain a culture of active travel to schools, shops, workplaces and leisure destinations brings multiple co-benefits and should remain a policy priority even in increasingly affluent societies.

More tips and policy options are available from a recently issued WHO toolkit to promote walking and cycling (21).



Key messages and recommended actions for decision-makers and practitioners

Walking and cycling are effective, low-cost ways to improve mental health for all age groups. Evidence shows they reduce symptoms of depression and anxiety, lower stress, improve mood and vitality and help maintain cognitive health in older adults. Among children and adolescents, active travel to school is linked to higher well-being, fewer psychological complaints and better emotional balance.

Integrating active mobility into daily routines supports sustained participation with lasting mental health benefits. Walking and cycling are accessible, equitable and feasible for large populations, provided that safe and inviting infrastructure is made available.

Recommended actions include the following:

- **Policy integration:** include mental health benefits in national and local walking and cycling strategies and align actions with the Pan-European Masterplans on Cycling and on Walking (2,3). Foster collaboration between the health, transport, environment and urban planning sectors to ensure that health considerations are integrated into relevant policies and planning processes.
- **Infrastructure investment:** work across sectors to develop safe, well-connected and inclusive walking and cycling networks that are accessible to all, including children, older adults and people with disabilities. Such investments lead to reduced NCD burden, lower sick leave at schools and workplaces and better mental well-being for all. They thus benefit every sector, fostering healthier, more sustainable, livable cities, and more connected and resilient communities that encourage active mobility.
- **Programmes and practice:** encourage the integration of walking and cycling into mental-health and NCD-prevention programmes, as well as into school, workplace and community initiatives. Public health professionals should actively promote safe walking and cycling for people of all ages, advising patients, families and communities on the physical and mental-health benefits and other co-benefits of regular active mobility.
- **Research and evidence:** encourage and support investments into research to deepen the understanding of how walking and cycling influence mental health, including different forms and doses of activity as well as gender and life-course perspectives (see the Annex).

Conclusion

The evidence clearly demonstrates the strong potential of walking and cycling to promote mental well-being, alongside physical health and sustainability. Building on this evidence, this brief highlights practical ways for actors within and outside governments to integrate mental health considerations into walking and cycling policies. The tips and case studies provide decision-makers and practitioners with guidance and ideas for

effective projects and policies. This supports the implementation of existing blueprints, such as the pan-European masterplans on cycling and walking (2,3). While the evidence base is rapidly growing, further research is needed to explore how different forms and levels of active mobility affect mental health, helping to maximize their benefits across all population groups.



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Annex

Additional aspects to consider and research gaps

The studies behind this policy brief were predominantly conducted in Europe and North America. More information is needed on challenges in countries where active travel is less common, often due to limited infrastructure, safety concerns and lower levels of societal acceptance. In addition, in these societies, engaging in walking or cycling is not necessarily always self-selected but could represent a form of transport exclusion, associated with social exclusion, which might increment potential mental health problems such as depression. In addition, neighbourhood socioeconomic level and built-environment characteristics could play a role. However, a “healthy commuter effect” postulated in early studies as a selection bias (whereby unhealthy people are less keen on commuting actively) has been debunked by a more recent longitudinal study in adults (1), showing that active travel significantly impacts mental health and not vice versa.

The influence of gender also needs further investigation, as some studies indicated more positive mental health outcomes for men (who also often travel more frequently, including in some places by walking and cycling); whether this is a true effect, or the result of participation bias and/or reverse causality is not yet entirely clear.

Definitions of “commuting” and “active transport” varied between studies, as did the categorization and definition of mental health outcomes; exposures or outcomes were often self-reported and seldomly were baseline levels of physical activity included. Studies also rarely considered both how much and how often people walk or cycle. Not enough is known on the exact magnitude of the effect of walking or cycling on specific mental health outcomes like depression or anxiety. To get clearer answers, studies are needed that use devices (such as activity trackers) to more accurately measure how much walking and cycling people actually do.

Methodology of the purposive literature survey

The rapid literature review was carried out in November–December 2024 by a structured search on PubMed (2) and PsycNet (3), using different combinations of relevant search terms. Studies had to specifically address mental health aspects and cycling, walking or active travel (not distinguishing between active modes), not only physical activity in general. Preference was given to systematic, narrative or scoping reviews. In addition, a search was carried out on Semantic Scholar (4). Pertinent reviews were uploaded to Research Rabbit (5) to identify further review papers or reports.

A full PDF file and a methods description had to be available for each study or report to be included into the literature overview. Single studies were only included if they added interesting additional aspects, such as e-biking or a longitudinal analysis. After summarizing 44 initial studies of interest with SciSpace (6), four were excluded as they were superseded by more recent reviews; one book chapter was a duplicate of a scientific paper; 18 studies were excluded due to the lack of a described review methodology or for not being a review; two reviews lacked a focus on specific aspects of mental health; and four lacked a focus on active mobility, cycling or walking. Ultimately, the following reviews were included: on adults generally, three systematic reviews, three scoping reviews and one narrative review; on older people, one systematic review; on young people, one systematic review and two large multicentre studies; two systematic reviews on nature-based walking; and two systematic reviews on walking interventions. Key content of each publication was collated into a data extraction sheet, including title, author and year, type of review, search strategy, quality assurance, analysis tools used and the number of studies identified, followed by mental health related results by outcome, as presented in the papers, for active travel, walking or cycling. Mental health outcomes were grouped into categories through an iterative deductive and inductive process following categorizations used by the studies included.

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³ All references were accessed 15 September 2025.

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