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Active Mobility – the New Health Trend in Smart Cities, or even More?

Sandra Wegener, Elisabeth Raser, Mailin Gaupp-Berghausen, Esther Anaya, Audrey de Nazelle, Ulf Eriksson, Regine Gerike, Ilonka Horvath, Francesco Iacorossi, Luc Int Panis, Sonja Kahlmeier, Mark Nieuwenhuijsen, Natalie Mueller, David Rojas Rueda, Julian Sanchez, Carsten Rothballer

(Dipl.-Ing. Dr. Sandra Wegener, University of Natural Resources and Life Sciences Vienna, Institute for Transport Studies, A-1190 Vienna Peter-Jordan-Strasse 82, Austria, sandra.wegener@boku.ac.at)
(Dipl.-Ing. Elisabeth Raser, University of Natural Resources and Life Sciences Vienna, Institute for Transport Studies, A-1190 Vienna Peter-Jordan-Strasse 82, Austria, elisabeth.raser@boku.ac.at)
(Dipl.-Ing. Mailin Gaupp-Berghausen, University of Natural Resources and Life Sciences Vienna, Institute for Transport Studies, A-1190 Vienna Peter-Jordan-Strasse 82, Austria, mailin.gaupp-berghausen@boku.ac.at)
(MS Esther Anaya, Imperial College of Science, Technology and Medicine, UK, e.anaya14@imperial.ac.uk)
(Dr. Audrey de Nazelle, Imperial College of Science, Technology and Medicine, UK, anazelle@imperial.ac.uk;
(Dr. Ulf Eriksson, Trivector Traffic AB, Sweden, ulf.eriksson@trivector.se)
(Prof. Dr.-Ing. Regine Gerike, Technische, Universität Dresden, Germany, regine.gerike@tu-dresden.de)
(Mag. Ilonka Horvath, Gesundheit Österreich GmbH, Austria, ilonka.horvath@goeg.at)
(Francesco Iacorossi, Roma Servizi per la Mobilita SRL, Italy, francesco.iacorossi@agenziamobilita.roma.it)
(Prof. Dr. Luc Int Panis, Vlaamse Instelling voor Technologisch Onderzoek N.V. (VITO), Belgium, luc.intpanis@vito.be)
(MSc PhD Sonja Kahlmeier, Universität Zürich, Switzerland, sonja.kahlmeier@uzh.ch)
(Prof. PhD Mark Nieuwenhuijsen, Institute for Global Health (ISGlobal), Spain, mark.nieuwenhuijsen@isglobal.org)
(MS Natalie Mueller, Institute for Global Health (ISGlobal), Spain, natalie.mueller@isglobal.org)
(Julian Sanchez, London Borough of Newham, UK, julian.sanchez@pasta-london.org.uk)
(Carsten Rothballer, ICLEI European Secretariat GmbH, Germany, carsten.rothballer@iclei.org)

1 ABSTRACT

Active mobility (AM), including walking and cycling as single trips or in combination with public transport, has recently been promoted by health professionals – with WHO leading the way – to tackle health problems caused by physical inactivity. In fact only 1/3 of the European population is estimated to meet the minimum recommended levels of physical activity by the WHO of 30 minutes of moderate-intensity activity 5 times per week. Being aware that we spend between 70 to 80 min per day travelling and that 50% of all car trips (in Europe) are shorter than 5 km, active mobility has an enormous potential to get people more active.

However, how is this knowledge of proven positive health effects of AM been taken into account – either by urban and transport planning authorities or by health administration? Is this „new health trend“ visible in strategies, cooperation or – what's even more important – in implemented measures in smart cities?

"Physical activity through sustainable transport approaches" (PASTA[1])" is a European project addressing and analyzing the promising link between transport and health. It pursues an interdisciplinary approach involving scientists and leading experts from a range of disciplines, including (among others) transport and urban planning, public health, environmental sciences, climate change and energy, and transport economics. The overall aim of the project is to generate knowledge about the effects of AM in consideration of health effects.

This paper reveals backgrounds and relationships between transport and health work in seven European case study cities (Antwerp, Barcelona, London, Örebro, Rome, Vienna and Zurich) based on workshops and stakeholder interviews conducted in PASTA. Considering cities‘ framework conditions (strategies and policies, infrastructure and other measures promoting AM etc.) and comparing stakeholders‘ perspectives bring out that cities have to struggle with similar barriers and challenges. Otherwise they take promising approaches and efforts towards sustainable and healthy urban development; increasing synergies between the health and transport sector seems to be one of the missing links between transport and health. Good practices and new ideas for transport planners and health experts are provided aiding to create livable conditions through well-planned infrastructure, a safe environment and attractive public space, awareness-raising activities and various broader policies – including the health policy. After all AM should not just be an ephemeral health trend, but common (health) practice.

Keywords: Transport planning, strategies & Policy, health effects, health promotion, active mobility

[1] PASTA – Physical Activity through sustainable transport approaches. (2013 – 2017)
Project funded by the EC under FP7-HEALTH-2013-INNOVATION-1; Project team: BOKU, UZH, VITO, ISGlobal, TRIV, ICL, LBN, RSM, UOXF, DSHS Cologne, GÖG FP, POLIS, ICLEI, WHO, TUD

2 INTRODUCTION

Planners and policy makers all over the world are putting their efforts to transform cities and urban areas into more livable places. The challenges they have to deal with are wide spread and they are often faced with diverging demands. A balanced and integrated development of all transport modes is a main characteristic of Sustainable Urban Mobility Plans (SUMP) (Wefering et al. (2014)) and a key goal in the strategic EU policy documents (EC (2007a), EC (2011), EC (2013)). Increasing sustainable and active mobility (AM), like walking, cycling and the use of public transport, reduces the consumption of space for motorized transport infrastructure, energy use, air pollution and noise, and improves overall quality of urban life (Jones (2009), Wee et al. (2013), Woodcock et al. (2009), Brand et al. (2013)).

At the same time overweight related diseases caused by sedentary behavior, physical inactivity and high-calorie diets are on the rise. Only one-third of the European population is estimated to meet the minimum recommended levels of physical activity (PA), which for adults correspond to at least 150 min of moderate-intensity aerobic PA throughout the week (Hallal et al. (2012), WHO (2007), WHO (2010a)). Globally, physical inactivity is a major cause of non-communicable diseases and a relevant risk factor for mortality (Forouzanfar et al. (2015), WHO (2009), WHO (2010b)). Reducing sedentary behavior and increasing the level of PA in the population is a key goal of WHO (WHO (2007)) and EU Strategies (EC (2007b)), but in contrast to these policy goals, levels of PA are decreasing (EC et al. (2014), Hallal et al. (2012)).

Increasing AM not only serves transport planning goals but supports public health objectives equally. Nevertheless this coherence is rarely explicitly considered in transport strategies and SUMPs. Practitioners in both public health and transport planning departments search for ways to raise AM; however, they usually do not collaborate and thus they do not benefit from possible synergies of integrated approach.

Walking and cycling for transport solely or in combination with public transport (all three modes comprised as AM), are well suited to bring more PA into everyday life considering that a mobile person in Europe spends between 70 to 80 min per day travelling and that 50% of all car trips are shorter than 5 km (Herry et al. (2011), Follmer et al. (2010), Transport (2015)). In contrast to sports or exercise, AM requires less time and motivation; it is convenient as a mode of transport and as a form of exercise, and it is economically affordable. Hence, AM has the potential to reach parts of the population who may be less receptive to appeal to participate in sports and exercise, or cannot afford doing these in terms of finance or time (Sahlqvist et al. (2012)). Especially for physically inactive people, such as sedentary working, obese and elderly people, it is easier to start with AM as a moderate form of regular PA than with sports or other types of vigorous PA (Warburton et al. (2006)).

PASTA “Physical activity trough sustainable transport approaches” is a project funded by the EC under FP7-HEALTH-2013-INNOVATION-1 carried out from 2013-2017, which is addressing and analyzing the promising link between transport and health. It pursues an interdisciplinary approach involving scientists and leading experts from a range of disciplines, including (among others) transport and urban planning, public health, environmental sciences, climate change and energy, and transport economics.

3 OBJECTIVES

In PASTA a mixed-method and multilevel design is applied in seven case study cities (CSCs) Antwerp, Barcelona, London, Örebro, Rome, Vienna and Zurich aiming for a better understanding of the interrelation between travel behavior and health. The main objectives are to examine key determinants of AM behavior, how AM relates to PA and the effectiveness of measures to promote AM. A detailed protocol of the study can be found in Gerike et al. (2016).

The focus of this paper is on one part of the project: the analysis of the framework conditions affecting the successful implementation of measures and strategies to increase AM (thereafter referred to as AM measures) and the link of transport and health on a strategic level. The cities’ framework as well as policies and AM measures were gathered by means of workshops and interviews with local stakeholders and experts from public health, transport and urban planning in the CSCs, and completed by a review and analysis of city indicators. Enabling factors for active mobility (comprising strategies, visions and policies driven by politics), barriers and challenges perceived by stakeholders as well as their impressions of the cooperation of the health and transport planning area were collected. Out of this compilation the question raised how active and healthy the cities are.

4 ACTIVE AND HEALTHY CITIES?

4.1 City profiles of PASTA case study cities

Various indicators have been collected in each of the seven PASTA CSCs, which are quite different in their characteristics (size, area, transport supply etc.) and therefore difficult to compare and to generalize.

Nevertheless, some hypothesis can be derived from the compiled indicators: Correlations between a high inhabitants' density and compact city structures, which are a precondition for short trip distances that easily can be covered by bike or on foot (Pucher et al. (2010)), are evident; this argument has been proven by a correlation of density and walking share in the CSCs (e.g. high density and high walking share in Barcelona). Motorization or car ownership rates (cars/1,000 inhabitants) are to a large extent linked to the amount of motorized traffic. Rome's high car ownership rate with 696 cars per 1,000 inhabitants together with the large street network are a possible explanation for the high car rate of 54%, however culture also plays a role (emphasized by Rome's interviewed stakeholders) (Table 1, Table 2 and Figure 1). The low car ownership rate in London Newham can be explained by the relatively young and low income population (PASTA-Consortium, 2016). London is the only (in PASTA examined) city with road pricing (London congestion charge) in the inner city with the explicit and successful goal to reduce motorized traffic for the benefit of AM (London, 2003). A green environment, here indicated by the percentage of green space in a city, can favor walking and cycling (Brownson et al., 2009), however this relationship could not be proved in the CSCs. The indicated length of the cycling network in the CSCs is quite inhomogeneous (Table 2), as the official figures of the cities are varying (partly including not only cycle lanes and cycle paths but cycling routes and traffic calmed areas), and doesn't allow conclusions on the cycling share.

City profile factors together with enabling factors build up the framework for transport and mobility supply and demand and the role of AM in a city.

Indicator (n.s. = not specified)	Antwerp* (2012)	Barcelona (2012)	London Newham (2011)	Örebro (2012)	Rome* (2012)	Vienna (2012)	Zurich (2012)
Inhabitants [number]	506,000	1,620,943	308,000	138,952	2,683,842	1,741,246	398,575
Density [Inhabitants/km²]	2,458	15,891	8,556	101	2,088	4,196	4,332
Area [km²]	205	102	36	1,373	1,285	415	92
Green space [%]	19%	29%	50%	n.s.	33%	46%	35%
Cars/ 1,000 inhabitants	383	361	198	450	696	390	343

Table 1: Selected Indicators in the CSCs: City profile factors; References: (Barcelona, 2013a, Barcelona, 2014, Carreno et al., 2013, MA23, 2015, Zürich, 2013b, UK-Census, 2011) *Figures from our city partners without reference

Indicator (n.s. = not specified)	Antwerp * (2012)	Barcelona (2012)	London Newham (2011)	Örebro (2012)	Rome* (2012)	Vienna (2012)	Zurich (2012)
Road network [km]	1,649	1,362	n.s.	3,604	8,770	2,763	n.s.
Parking regulations [y/n/p][2]	y	y	y	y	y	y	y
Road pricing [y/n/p]	n	n	y	n	p	p	n
PT network [km]	n.s.	1,747	n.s.	n.s.	2,323	794	280
PT annual ticket [price in €]	249	n.s.	1,820	n.s.	250	365	665
Cycling network [km]	n.s.	187	n.s.	215	254	1,223	340

Table 2: Selected Indicators in the CSCs: Transport system and services; References: (Barcelona, 2013b, London, 2012, Carreno et al., 2013, MA23, 2015, Zürich, 2013b) *Figures from our city partners without reference

[2] [y=yes; n=no; p=partly]

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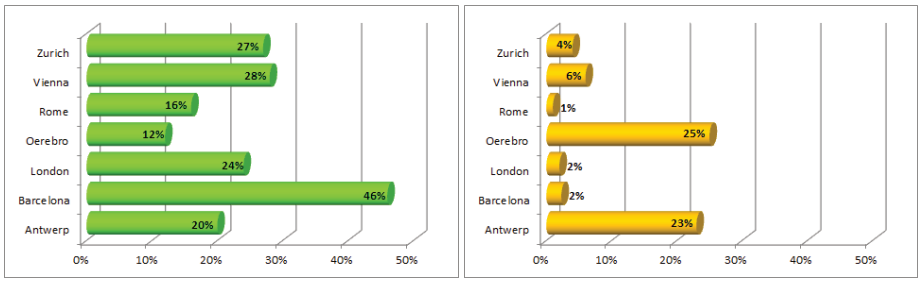
4.2 Active Mobility in the case study cities

Irrespective of the size and area of each city the modal split is the most interesting mobility indicator and provides a concise view of the mobility demand. With regard to cyclists, pedestrians and public transport (PT) users it gives a glimpse on "how active" a city is (Figure 1).

Antwerp (23%) and Örebro (25%) have the highest share of cyclists, but on the other hand they have a large amount of car traffic (Antwerp: 41%, Örebro: 54%), together with Rome (54%), which also corresponds with the high car ownership rate especially in Rome and Örebro (Table 1). In London (42%), Zurich (39%) and Vienna (39%) the proportion of public transport is very high. Looking at their relatively low share of cycling trips, it can be asssumed that PT and cycling are competing – addressing similar targets and user groups, but with higher investment and supply for PT; this theory has been confirmed by stakeholders during the PASTA workshops.

Barcelona (46%) has an outstanding high amount of pedestrians, which might be due to the southern warm climate, density (compare chapter 4.1) and walking infrastructure. In Vienna, Zurich, London and Antwerp walking trips are between 20% and 30% of all trips, and much less in Rome (16%) and Örebro (12%).

The modal split is after all a result of framework conditions, various measures and policies. The sum of measures and interventions contributes to and influences residents' mobility behavior (= transport demand).



Walking share in PASTA CSCs, Cycling share in PASTA CSCs

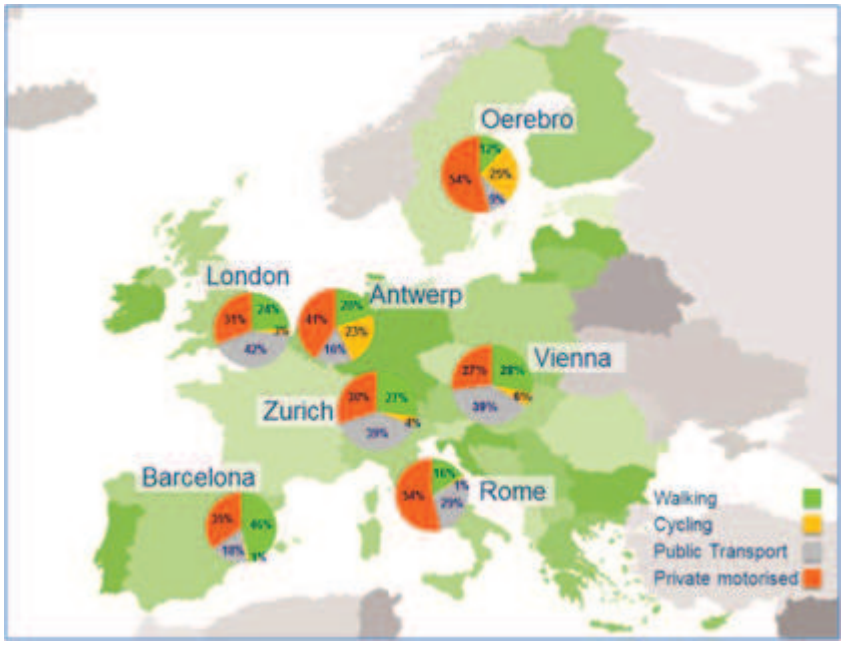


Figure 1: Modal Split in the PASTA CSCs (figure by PASTA consortium) [Antwerp (2010) figures from city partner; Oerebro (2011) Mobility data from city survey, Zurich (2010) (Zürich, 2013a), Vienna (2012) (Wien, 2014), Barcelona (2012) (Barcelona, 2013b), London (2012) (London, 2013), Rome (2012) Mobility data from city survey]

A vast collection of measures and interventions promoting AM in the seven case study cities has been undertaken (Figure 2). It is an outcome of interviews with stakeholders and experts in the CSCs and reviews of urban development and mobility plans. There are a lot of efforts undertaken and measures implemented in the cities towards an increase of AM.

In PASTA AM measures are defined as follows: "An AM measure is an action undertaken in order to increase the level of active mobility (in a specified population). This ranges from changing urban infrastructure or introducing new policies to campaigns to change people's transport behavior".

These active mobility measures have been classified according to four categories: Strategic Policy, Social Environment, Physical Environment (Infrastructure) and Regulation & Legislation. The majority of the gathered AM measures come under physical as well as social environment (behavioral measures to change mobility culture and to raise awareness for the benefits of active mobility) as the most visible efforts undertaken to promote AM.

All PASTA CSCs have a more or less strong vision or plan to become a more sustainable and livable city. The implemented strategic policies aim to reduce motorised traffic and to increase the share of AM. However, having a strategic policy is still no guarantee for reaching the targets, when implementation fails e.g. due to changes in politics or lacking budget (noted by stakeholders in the PASTA workshops).

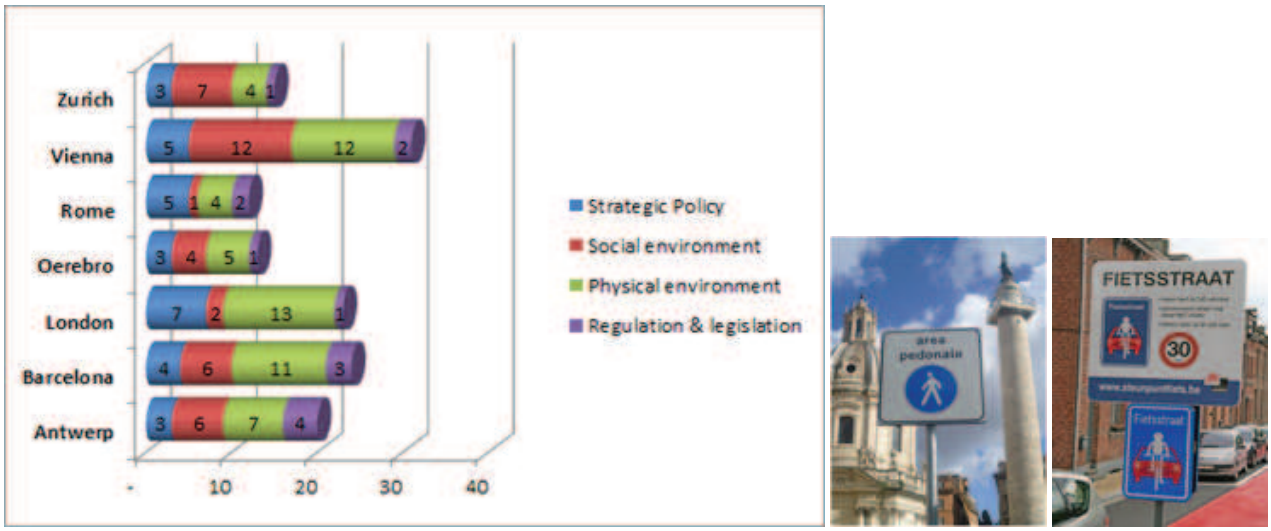


Figure 2: AM measures according to categories collected in PASTA Case Study Cities (not exhaustive); Pictures: Pedestrian zone in Rome and Bicycle Boulevard in Antwerp (both pictures © PASTA consortium)

Behavioral measures comprised under 'social environment' include projects and measures to change mobility culture and to raise awareness for the benefits of active mobility. Various activities (e.g. cycle training courses, educational programmes for kids), campaigns (e.g. Bike2work, 10,000 steps project) and initiatives are undertaken in the seven case study cities.

Physical environment and infrastructure – in combination with legislation and regulation (e.g. 30 km/h zones, contra-flow cycling) – is a precondition for travelling. However, it seems that in the last decades cycling and walking infrastructure has been a side product of road construction (noted by stakeholders in the PASTA workshops). The importance of cycling infrastructure (cycle path, routes, parking etc.) and attractive walking routes is well known among transport planners and researchers (Pucher et al., 2010) and forced and specified under cities' strategies and policies. Cycling highways, Quietways programme, pedestrian areas and traffic calming are some examples of the variety of efforts undertaken in the CSCs. One great challenge in this concern is the re-appropriation of space dedicated to car traffic (parking spaces and roads) for a fair allocation of public space among all road users (raised by various stakeholders in the CSCs).

4.3 Enabling factors, barriers and challenges

Enabling factors for active mobility comprise above all strategies, visions and policies driven by politics (Table 3). A clear political will and visions of a sustainable city often tied with a powerful politician, are the most important driving forces towards reduced car traffic and increased cycling and walking in those selected European cities (outcome of stakeholder interviews). Environmental targets improved road safety as well as awareness and knowledge of the benefits of active mobility for health are also strong arguments for promoting sustainable transport. Urban mobility plans, cycling concepts and all kinds of AM measures and interventions on the implementation level complete the active mobility puzzle.

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On the other hand promoting AM is in most cases a challenge with numerous barriers hindering the efforts towards sustainable cities (Table 4). Beside missing political will often resulting from a fear of losing car drivers votes, lack of budget, limited space dedicated to car traffic, missing collaborations between the different administrative departments (national or local government), different planning sectors (transport, health) and various stakeholders involved, were identified as key barriers to support and reform AM. Inadequate and lacking cycling infrastructure as well as cultural development lead to a "non-cycling" culture and a lack of public acceptance.

Antwerp	Barcelona	London Newham	Örebro	Rome	Vienna	Zurich
Active cycling policy	Urban Mobility Plan	Political leadership:Mayor's cycling vision	Transport Master Plan	New Traffic Masterplan	Urban Development Plan 2025	Urban Transport programme
Diversity and connectivity	Urban density, short distances	Mixture of policies and funding (TfL)	Culture leading to political will	Powerful politician	Clear political will	Masterplan Cycling
Cycling infrastructure	Promotion of PT, reduction of car use	Awareness of health issue	Cycling infrastructure	Need for "cultural evolution"	Representative for walking and cycling	Cycling department

Table 3: Enabling factors for active mobility in PASTA cities (non-exhaustive extract of stakeholder interviews and workshops)

Antwerp	Barcelona	London Newham	Örebro	Rome	Vienna	Zurich
Budget and political willingness	Lack of inter-sectoral collaborations	Reverse planning policies: supporting car infrastructure	Budget and economy issues	Economic issue, lack of budget	Scattered responsibility (decision – implementation)	Political will to act – a specific policy alone is not enough
Scattered responsibility	Obstructive top-down approaches	Lack of safe cycling infrastructure	Political will: Car votes vs. AM	Lack of cycling infrastructure	Political reasons: 'Votes of car drivers'	Allocation of space: cycling vs. car
Lack of public support for AM	Limited space for urban renewal	Cultural barriers and social norms	Deficiencies in cycling infrastructure	Cultural issue: favoring cars	Lack of cycling culture and tolerance	PT as a barrier for cycling promotion

Table 4: Barriers and challenges hindering active mobility in PASTA cities (non-exhaustive extract of stakeholder interviews and workshops)

5 TRANSPORT & HEALTH …

5.1 … the promising link

The relation between the policy fields transport and health is evident (Figure 3): Both aim at creating an environment and setting to influence people's behavior by operating with different measures and interventions (correspond to variable influencing factors). Urban and transport planning influence people's mobility behaviour, while health service focuses among others on promoting physical activity and increasing activity levels – in order to prevent non-communicable diseases. Active mobility is the interface between transport and health. The impacts and effects according to the (changed) mobility behaviour (shift from car traffic to AM) appear in the city or transport environment: less congestion, less air pollution, less noise, more social interaction, more space for walking and cycling, which makes a city more liveable etc. and in a healthier society. The positive health effects through active mobility arise from enhanced physical activity, and exceed the possible risks by air pollution or road accidents by far (Mueller et al. (2015)).

This promising link is also addressed in the WHO approach 'Health in All Policies', which is based on the cognition that health in population can only be achieved by bundled efforts and consideration in all policy fields (WHO (2015)). The main determinants of health cover individual lifestyle factors, social and community networks and general socioeconomic, cultural and environmental conditions. The latter includes urban and transport planning. According to this approach it is crucial to start thinking and acting cross-sectoral.

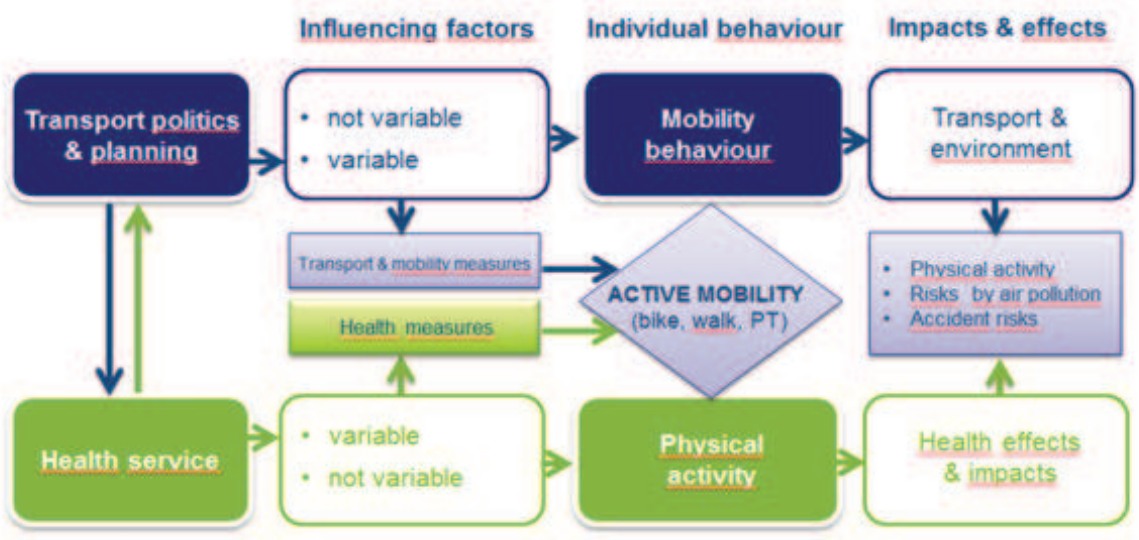

Figure 3: Relation between transport planning and health service (figure by PASTA consortium)

5.2 …the missing link

The importance of the interlinkage between health care with mobility planning issues gains awareness; however, it remains a major challenge. Stakeholders from both fields of action – urban/transport planning and health care – are very well aware of the favourable link and the mutual benefits. In all of the CSCs there is a similar tenor that the health benefit, in terms of boosting citizens' PA level, is not prioritised in the planning process, but a welcome side effect. The primary discussion is about reducing congestion (Antwerp) and emissions (Rome, London), increasing traffic safety (Zurich, Vienna) and providing infrastructure and accessibility.

Fortunately, there are already promising initiatives and approaches like the "Healthy Street Approach" in the UK or the integration of health objectives in transport plans (Wien, 2014) and mobility matters in health strategies (Rendi-Wagner, 2015, Angel, 2013) in Austria.

With HEAT[3] there is a proven economic assessment tool available to support politicians decisions by arguing that investing in walking and cycling projects means an investment in a healthy society.

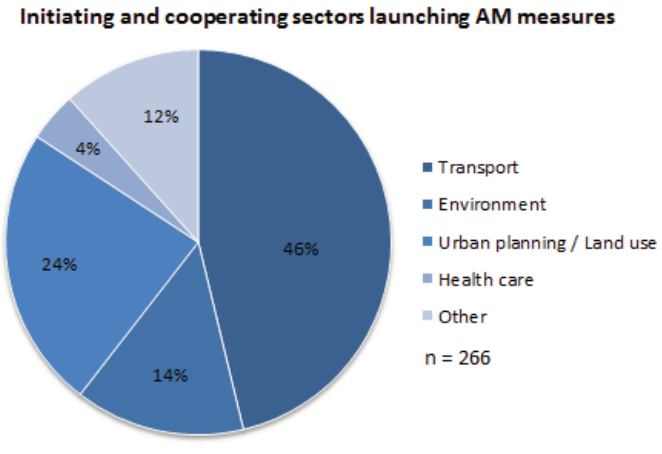

Figure 4: Initiating and cooperating sectors launching AM measures (Analysis of AM measures collection in PASTA CSCs); Picture: Health walk signs in Örebro (© PASTA consortium)

However, transport and health departments operate in most cases separtely and implementation of common projects is slow and tentative. This issue is also underpinned by an analysis of AM measures in the PASTA CSCs showing that the majority of projects was initiated by the transport sector. Health care was involved in 4% of the cases (Figure 4), which is a positive sign towards beginning interdisciplinary thinking and

[3] HEAT – Health economic assessment tool for walking and cycling http://heatwalkingcycling.org/

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cooperation. Whether it's about missing collaboration, the integration of health arguments in transport related decisions or about financial responsibilities, the statements of (transport as well as health) stakeholders in the case study cities are indeed very similar (Table 5). Increasing synergies and cooperation between the health and transport sector seems to be one of the missing links for a beneficial convergence.

TRANSPORT & HEALTH: Perspectives of stakeholders in PASTA cities						
Antwerp	**Barcelona**	**London Newham**	**Örebro**	**Rome**	**Vienna**	**Zurich**
Cooperation bet. mobility and health is not structural or a regular interchange.	Health issue is receiving less attention among politicians compared to environment.	Awareness of healthy urban planning is focused on access to greenspace and leisure facilities.	Little cooperation bet. health and transport; health issues neither considered nor communicated.	Traffic Masterplan: Improving life of citizens by impact of reduced car traffic.	Health issue is considered in Urban dev.plan; Mobility is considered in the Austrian's 'Health targets'	Collaboration between the transport and health sectors is quite limited.
Health in mobility often reduced to air pollution. Safety & PA rarely included.	"It would be important that public health & environmental departments find integrated approaches for co-benefits. "	Transport planners are far more aware of the health impacts than health experts are of transport issues.	Traffic is not a prioritized area on the public health agenda;	The Mayor is a doctor, so he is aware of the link health - transport and promotes AM.	Health benefits are a welcome side-effect; on administrative level: single projects; more potential for cooperation.	Health is used as an argument to promote cycling on canton level.
Health gains are long-term (national level) implementation, costs are local and immediate.	Need to raise awareness in civil society on health impacts of urban policies.	Public Health recently been devolved back to local authorities; idea of healthy urban streets.	Public health argument more related to safety perspective rather than AM and PA	"Mobility is not considered to be relevant for health"	"Investment by the transport department – cost savings in the health resort".	HEAT: "good economic situation in Switzerland therefore economic issues less prominent"

Table 5: Transport & health perspectives in PASTA cities (non-exhaustive extract of stakeholder interviews and workshops)

6 CONCLUSION

Ambitious goals to reduce motorized traffic and to increase the share of walking and cycling are defined in the strategic policies (urban development plans, transport concepts etc.) of the seven CSCs, clearly directed towards more sustainable and healthy cities. Political will, often tied with a powerful politician, is the most important driving force and a cornerstone for promoting AM; it needs courage and sensitivity to reduce car traffic ('fear to loose votes of car drivers') and collaborations between the different administrative departments, planning sectors and stakeholders, which is often missing and challenging.

Various measures and interventions to promote AM were implemented in the cities ranging from strategic policies (SUMP), social environment measures like promotion campaigns (e.g. bike2work), improving the physical environment and infrastructure for active transport modes (e.g. new cycling lanes) up to regulations restricting motorized traffic (e.g. 30 km/h zones). A shift towards more AM is a result of all measures and interventions implemented in the cities influencing residents' mobility behavior.

Active mobility as a remedy for a healthier life has recently been promoted by health experts. On the other side the importance of health benefits resulting from walking and cycling has to be raised among decision makers and stakeholders in cities' planning departments as well as among citizens. HEAT is one tool to monetize health benefits of an increased share of pedestrians and cyclists and to justify investments in walking and cycling measures and interventions. A tight cooperation between the health and the transport and city planning sector would be valuable and reasonable for both sectors and after all for the people.

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