

Health impact assessment and urban transport policy: E bike – silent killer or new urban transport ipod?

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The growth in Asia of motorised vehicles poses a major public health threat in terms of the health effects of emissions, road safety and climate change. Future transport policy needs to come to terms with these issues and at the same time address the growing social and economic needs of cities to provide transport systems which are both economically viable and meet communities' needs for access and mobility. Our rapidly urbanising community's demand for greater mobility has the potential to lead to poorly considered transport policy lest we ensure that the environment and health impacts of new transport technologies and policies are fully assessed. The rapid and currently largely unregulated emergence of the electric 'bicycle' (E Bike) in China, now extending globally, serves to illustrate the case for more extensive transport policy research.

Ambient air pollution has been recently identified as the 9th leading risk factor for global disease burden accounting for 3.2 million deaths and 76 million DALYs. Developing Asia was found to contribute over two-thirds of the air pollution-attributable burden of disease due to regional increases in both pollution levels and rising rates of cardiovascular disease: stroke and ischemic heart disease. In China it is estimated to be the 4th leading risk factor.¹ As most will be aware, there is compelling evidence linking motor vehicles to air pollution and serious health effects. There is now even greater amounts of research not only confirming the adverse health effects of tail pipe emissions but also non- exhaust emissions with levels of ultra-fine particles including black carbon, CO and NO₂ found to be elevated near roads and attributed to the many non- emission sources such as tyre, brake wear and road abrasion and this in turn has been found to increase health effects.²

An arguably even greater public health issue is the mounting death and injury toll associated with road crashes. Now a population health problem worldwide, it is projected to become the 5th leading cause of global mortality by 2030.³ The recent release of the Global Status Report on Road Safety determined for 2010

that 1.24 million deaths were caused by road crashes. There are large scale disparities between developed and developing countries with middle-income countries recording the highest annual road traffic fatality rates, at 20.1 per 100 000, while the rate in high-income countries is lowest, at 8.7 per 100 000. Motor-vehicle ownership, particularly large 'high end cars' is seen by many in emerging economies as a *rite of passage* to the 'developed world' and this is often accompanied by governments' reluctance to challenge growing social norms related to both ownership and driver behaviour. Many solutions are well known but require strong political will to enact necessary legislation and enforcement.

By somewhat of a contrast, there is a worldwide commitment to address climate change and develop mitigation strategies from within many policy arenas including transport. The fourth Intergovernmental Panel on Climate Change Assessment Report highlighted to governments the need to focus on not only fuel efficiency and type but to support greater use of public transport and non-motorised transport as a means to reduce CO₂ emissions. The potential to develop low carbon transport options has been seen as an opportunity by many international agencies such as WHO, to propose policies which have health co benefits and thus serve to address many of the transport related health and environment health impacts experienced in our growing urban settings. However in the search for low carbon "win – win" transport solutions there is a need for systematic environment and health impact assessment lest we end up with added unmanaged risk factors – the emergence of the E Bike may well be a case in point.

The E Bike Solution?

China like other major countries in the Region is rapidly urbanising. Increased commuting distances, changing social norms and the need for mobility and accessibility has led to an explosion of car ownership and in many cities a decline in public transport participation rates.

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In decline is also the use of one transport option; the two-wheeled bicycle, with its proven health benefits and low carbon footprint. However, the longer distances and now relatively slow travel speeds are leading to greater rider vulnerability. While in many counties the motor cycle has replaced the bicycle, local restrictions on the use of motor cycle due to pollution and safety concerns in urban areas in China has provided a market opportunity for recent breakthroughs in E Bike technology. The E Bike, seen as a low carbon urban transport option has rapidly become a dominant part of the traffic mix in many of China's cities.

The E bike, introduced in China in 1998, is legally classified as a *non-motor vehicle*, a classification which it continues to retain. Initially featuring usable pedals and light weight the vehicle retained its bicycle like features and as such shares existing bicycle lanes and other than the requirement in most cities for registration, riders do not need any form of training, licensing or insurance. Powered by a conveniently rechargeable battery the E bike enabled longer distance commuting and at around 200 USD, an affordable mobility option for many, including the huge urban internal migrant workforce. Numbers have quickly grown to an estimated 120 million and projected to become popular globally in a few years' time. The manufacture of the E Bike is itself a growth industry serving not only the growing domestic market but a fast emerging one in both Asia and Europe. As reported by the Asia Development Bank there is potential for E bikes to capture up to 40% of vehicles market share in Vietnam given technology improvements, increased gas prices and a supportive tax policy.⁴

The use of the technology itself has the potential to make a significant contribution to the goal of reducing greenhouse gas emissions, urban air pollution and noise pollution in general – in itself a major public health benefit. Compared to gasoline-powered motor bikes, E bikes have been shown to have the lowest CO₂ emission rates per km of any motorised mode. There are however a number of significant environmental health

issues with the use of the technology, not the least the reliance by most on lead batteries and associated significant loss of lead to the urban environment via the manufacture and recycling stages of a battery's life. The impact on greenhouse gas emissions is not as clear as first thought and needs to also be considered in the context of the sources of electricity (i.e. hydro or coal) used for the now large scale manufacture of millions of units and recharging the E Bikes using the coal fired power station electricity grid.

Not long after their introduction, E bike manufacturers began producing Bikes with much greater capacity increasing both total weight and maximum speed capacity far exceeding the established technical specifications which restricted both. Most now on China's roads have foregone the remnant pedals, being far too heavy to contemplate use of pedal power and have speed limiters, designed in such a way they can be easily removed.

The lack of comprehensive data from police or health agencies on E Bike related crashes continues to limit the capacity to conduct meaningful research on their impact. Large differences in the reporting data systems between these agencies have also meant conflicting information regarding the scale of impacts for road safety in general. The initial, albeit limited research, conducted at several local levels indicated that there were increased traffic crashes, deaths and injuries resulting from the use of E bikes and that these were increasing as a proportion of the road toll. There is also broader community level concern that the E Bike poses a high risk for pedestrians particularly at night as they are observed to travel both silently and commonly without the use of any head or tail lights. The E Bike is arguably better known colloquially as the "Silent Killer" and as some cities either ban or attempted to ban them they do so in a relative policy research vacuum and against an increasing tidal wave of E Bike owners many of whom see their bike as their transport *Ipod*; the first step to a four wheel future.

The UN Decade of Action for Road Safety commenced in 2011 and aims to stem the growing tide

of deaths and injuries due to traffic crashes. As part of this global effort many countries including China have recognised the need for more policy research into road traffic crashes. Funded by Bloomberg Philanthropies as part of the “*Global Road Safety Programme*”, numerous research initiatives are taking place in China with an E Bike focus. These initial studies have confirmed police and health agencies’ concern regarding impacts and emphasise the need for urgent legislative and enforcement action. For example, recent research conducted as part of the China program⁵ has demonstrated that in albeit one city hospitalised E-biker injuries accounted for 57% of road traffic hospitalisations. The head was the most common body region injured and more than one third of the hospitalised study population suffered traumatic brain injuries (i.e., skull fractures or intracranial injuries).

Similarly a parallel study⁶ showed the health impacts can be partly accounted for by poor on-road riding practice, poor understanding of road rules and lack of helmet use. Among the E-bikes and riders observed, over 60% of bikes did not comply with standards, and approximately a quarter of riders did not comply with the road rules. This study demonstrated common road rule violations and low helmet use among E-bikers as well as use of heavier and faster non-standard E Bikes and supports the urgent need to develop additional regulations and behavioural interventions to improve safety practice among E-bikers in China. The E-bike example serves to highlight the need for research and policy to keep pace with the market driven technological race for change otherwise we will pay a huge public health cost as the bicycle kingdom transforms into an E-bike kingdom.

In terms of transport policy there is a clear need to provide low cost alternatives to motor vehicles. However research which informs this type of policy

issue is often hindered by lack of good quality data. As with all environmental health policy research, data is key yet often very difficult to access, whether this is due to government policy, bureaucratic protectionism or poorly developed death and injury surveillance systems. The old but true adage ‘*you can’t manage what you can’t measure*’ is a constant reminder for the need for data accessibility, transparency and its use in policy research.

The E Bike phenomenon is already spreading with annual sales culminating to 382 million from 2012 to 2018⁷; however this is fraught with numerous challenges in terms of safety, environment and in terms of legal definition. These challenges need to be fully understood so that coherent road transport legislation can be developed in an environment where, as in this case, the market economy has raced ahead and filled the policy research vacuum.

Keywords: Road safety, E Bikes, Health Impact, Transport Policy, China

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