Determination of Infectious Disease Transmission

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Each prospective urban health characteristic has the ability to influence infectious disease transmission. For starters, population density is unambiguously linked to the possibility of infectious illness; greater density increases the danger of transmission of disease, whether via sexual contact, fecal-oral dissemination, or respiratory spread. As a result, crowded cities may be predicted to have greater rates of infectious illness transmission. Second, accessible health and social resources may have a direct impact on infectious disease morbidity and death. Antiretroviral treatment, for example, has resulted in a substantial decrease in HIV-related mortality in North America. Less radically, widely accessible confidential sexually transmitted disease testing and treatment has the potential to minimize problems and transmission [1]–[3].

Finally, numerous characteristics of the urban social milieu either encourage or impede the spread of infectious illness. The previously described social learning theory offers a framework for analysing how people social networks impact their health risk behaviours. For example, the density and norms of ones social networks are linked to hazardous sexual activity and the use of injectable narcotics, both of which increase the likelihood of infectious disease transmission Latkin, Hua, and Forman, 2003. Lastly, various physical environment characteristics, such as the degree of deterioration, may influence infectious illness transmission Cohen and others, 2000. Deviant or high-risk conduct may be facilitated or even encouraged in neighbourhoods with significantly disadvantaged built surroundings. Water and sanitation infrastructure, on the other hand, are definitely components of a citys built environment that decrease illness and mortality, especially among children in less-developed nations Cutler and Miller, 2005. Building ventilation systems, which may house infectious illnesses such as Legionnaires disease, are another, maybe less evident, element of the urban built environment that may impact infectious disease transmission.

Again, urbanization the process of change might be crucial. With fast urbanisation, population density may skyrocket, putting a pressure on public health facilities. The inflow of mobile people may be accompanied by novel infectious agents, quickly changing social network structures, and deterioration of the built environment, all of which may increase infectious disease transmission above baseline levels. Nonetheless, as with injuries, urbanisation presents chances for infectious illness reduction. For example, in low-income countries, urbanisation is typically connected with increased education and, theoretically, more health knowledge and less risky behaviour.

Building Healthy Cities in an Urban Future

The present rate of urbanisation predicts that the environment of the twenty-first century will be markedly different from the one we know now. More than 5.5 billion people will live in cities by 2025, out of a total global population of 8.5 billion; this compares to a total world population of around 6 billion at the turn of the century. In emerging nations, 4.4 billion people will live in towns and cities, including 1 billion in China and 750 million in India. More over 80% of the population in most of the Americas will live in cities, but in Africa and Asia, degrees of urbanisation will vary greatly across nations. While there will

most likely be more than fifty megacities by 2025, the most of the worlds urban population will reside in smaller cities, with an increasing number of tiny less than a million people urban centres, especially in Africa and Asia. As the globe grows increasingly urbanised, the issue will be to secure the sustainability of population health in cities and, maybe, to use urbanisation to promote health [4], [5].

Cities are not static, and urban transformation is typically coupled with changes in the environment. in the field of urban health. The task is to comprehend the characteristics of cities that influence health, and to strengthen cities ability to defend their inhabitants health. Cities in less rich nations, without a question, have the greatest potential for influence. With existing resource constraint and expected urban expansion, significant social, ecological, or economic concerns may arise in many African and Asian cities. inevitable. The supply of services, particularly drinking water, is a significant problem in practically all less developed countries. nations Hardoy, Mitlin, and Satterthwaite, For instance, in cities such as

Less than half of all families in Bangkok, Dar es Salaam, and Kinshasa have access to piped water, while the majority depend on water from private water connections. vendors. Similar issues affect garbage collection and sewage disposal. Most African cities lack sewers, and the current sewage systems are inadequate. Only the wealthy live in these cities. Nevertheless, these issues do not always imply that the future urbanised world is doomed to disaster. There is a lengthy list There is a long history of doomsaying in academic literature, much of which is related to population expansion, and most social, economic, and technical improvements have succeeded. prevented the looming calamities. This implies that with the right action, we may use Urbanization trends are expected to result in significant improvements in population health. What are the most effective techniques for developing cities and safeguarding people's health? What about urban populations? The typical public health approach identifying risk factors based on data, acting to disrupt the risk factors, assessing the outcomes, and repeating the process6and altering course as neededcan be shown by two examples to Opportunity for Equitable Housing, a US-based effort, and the World The World Health Organizations global Healthy Cities initiative.

Moving to Opportunity for Fair Housing MTO is a ten-year research demonstration project supported by the US Department of Housing and Urban Development in five U.S. cities Baltimore, Boston, Chicago, Los Angeles, and New York City 1999. Its objectives are to create more effective techniques for improving housing for urban housing aid beneficiaries and to determine if improvements in families' physical surroundings, especially housing, would enhance family members health among other outcomes. This programme combines tenant-based rental assistance with housing counselling to assist extremely low-income families in transitioning from high-poverty urban regions to low-poverty communities. In each city, low-income families are chosen at random to obtain housing vouchers that must be utilised in regions with fewer than 10% poverty.

These families get rent assistance as well as housing counselling to assist them in finding and effectively using low-poverty housing. Control families are chosen and tracked in the same cities to assess the effectiveness of transferring families to better areas. The MTO programs early findings have been favorable. Parents who relocated to low-poverty areas reported much less distress than parents who stayed in high-poverty neighborhoods throughout the three-year follow-up at the New York site. Boys who relocated to less disadvantaged areas reported considerably less anxiety, despair, and dependence issues than those who remained in public housing, indicating that upgrading housing might have a considerable health benefit Notwithstanding the fact that this programme design is obviously unique and hard to duplicate on a broad scale, it gives compelling proof of the importance of innovation [4], [5].

Health should be promoted in cities. The programme is intended to provide national and local governments with strategies for dealing with the urban determinants of health discussed in this chapter, such as pollution, housing, transportation, and other physical environment aspects; social support and social environment features; and improved health and social resources. The Healthy Cities movement analyses the local urban health burden and makes health concerns relevant and clear to local agencies via analysis and policy advocacy as part of its engagement with local governments. A Municipal Health Plan is created as a framework for raising awareness of environmental and health issues in schools, workplaces,

and markets, as well as among health care providers and other groups, and it urges local governments to take action to address these health factors.

While the WHO financed Healthy City Projects HCPs in Coxs Bazar Bangladesh, Dar es Salaam Tanzania, Fayoum Egypt, Managua Nicaragua, and Quetta Pakistan from 1995 to 1999, the majority of the activity of the Healthy Cities movement has thus far occurred in higher-income nations Pakistan. There was evidence in the initial review of these initiatives that key stakeholders had a better grasp of the role of the urban environment in determining health, but there was a lack of political will to act on this awareness Harpham, Burton, and Blue, 2001. While the effectiveness of the Healthy Cities movement is difficult to quantify, it reflects a global effort to increase awareness among important decision makers about the role of cities in influencing health, perhaps paving the way for local initiatives like the MTO programme detailed earlier. Moreover, this programme illustrates the potential for collaboration across several sectors, such as public health agencies, environmental organisations, and municipal governments, which will eventually be critical to improving health in complicated metropolitan environments. In a rapidly urbanizing world, city characteristics that influence health may have a huge aggregate effect on vast numbers of individuals, even if their involvement is restricted. Identifying urban characteristics at several levels population, physical environment, social environment, and urban service provisionand determining how these qualities interact to effect health and illness is therefore very much a public health responsibility. Creating better cities has the potential to significantly enhance population health in the future century.

Transportation and Health

Probably no other element of contemporary society characterizes it more than mobility. No person could go faster than the wind on water or faster than another animal could carry them or her on land two hundred years ago. In the twenty-first century, an increasing number of people have access to transportation technologies that can transport them from continent to continent in a matter of hours, and they own personal vehicles that can travel long distances at speeds more than ten times faster than horse-drawn vehicles Great social advantages have resulted from enhanced speed and mobility. The increasing capacity to move commodities, people, and ideas has resulted in more prosperity and technical progress, while the increased ability to carry food has resulted in better protection against hunger and starvation. Nonetheless, there have been enormous environmental, public health, and quality of life consequences [6]–[8].

Large groups of indigenous peoples have succumbed to unfamiliar diseases brought by travellers from other cultures, transportation systems pollute the air and make large amounts of land unfit for habitat or other natural purposes, and the speed and heavy machinery of transportation contribute to nearly a million deaths around the world each year due to crashes.

Transportation

The English name and public health concept of quarantine is based on the Italian practice of separating ships coming from places with severe illnesses for forty days quadrant giorni in Italian, reduced to quarantine quadrant gitorin in Italian, shortened to quarantine. What was evident, even even before the discovery of bacteria and viruses, was that greater travel and interaction among people from far-flung locations resulted in the transmission and spread of devastating diseases. Here are several examples: Smallpox transmitted by European explorers destroyed New World populations in places like Santo Domingo and Mexico, killing one-third to one-half of the people in the earliest outbreaks.

Plague, carried for centuries along trading posts in the Old World, reached California at the start of the twentieth century, where it caused an epidemic, became established among rodents in the area, and persists today as an endemic zoonotic focus. Disease-carrying mosquitoes constantly hitch rides in long-distance vessels. The Aedes albopictus mosquito, a competent vector of numerous illnesses, including West Nile virus and dengue, arrived in the United States with a cargo of old tyres and has since established

itself in twenty-one states. Mosquitoes are also regular freeloaders on international aircraft flights: one study discovered live mosquitoes in twelve of sixty-seven aeroplanes coming from tropical nations.

Benefits of Transportation

Before getting to health hazards related with mobility, we will first outline the public health advantages associated with todays developments in transportation infrastructure and amenities. The existing transportation system, which depends primarily on polluting motorised cars and uses vast quantities of energy, has been built to suit human wants and desires. Others have hypothesized that people perceive travel as a goal in itself, but more fundamental human needs, such as access to food, job, education, and medical services, are also more successfully addressed via better mobility. In addition to carrying persons to and from important resources, mobility systems have been created to move goods over great distances. Our global economy has grown reliant on long-distance transport of meals, raw resources, and manufactured commodities.

One of the effects of a highly developed transportation infrastructure in the United States is the extensive distribution of food. This offers access to fresh fruits and vegetables in regions that otherwise would be lacking these health promoting products. The widespread distribution of food also leads to more efficient production of foods, as those regions best suited to growing certain types of foods are able to deliver their produce to a larger market and to benefit from economies of scale U.S. Department of Agriculture [USDA], Agricultural Marketing Service, 2004. U.S. Department of Agriculture [USDA], Agricultural Marketing Service, 2004. The relationship between food production and transportation is far from minor; in the United States agriculture accounts for nearly one-third of all freight transport USDA, Agricultural Marketing Service, 2004. USDA, Agricultural Marketing Service, 2004. Trucks are increasingly employed for this purpose, accounting for 45 percent of any and all trips dedicated to transporting food. Another 32 percent of trips that transport food, typically heavy bulk products like grains, are carried by train.

In addition to supplying food to communities, transportation networks must bring people to sources of healthy food. This is particularly essential in places of poverty and disadvantage, where local food shops may provide limited options of healthy food and where individuals are more likely to depend on public transit for food shopping Kaufman, MacDonald, Lutz, and Smallwood, 1997. Kaufman, MacDonald, Lutz, and Smallwood, 1997. Studies have shown that people receiving food stamps cite transportation barriers as a reason for infrequent shopping trips and food insecurity Cohen and others, 1999 and that the absence of nearby sources of healthy foods results in diets lower in fruits and vegetables Morland and others, 2003. Morland and others, 2003. While the choices and costs of nutritious meals in impoverished regions may rely mostly on socioeconomic factors other than transit, access to accessible and safe public transit in these places may be a crucial element in peoples nutrition and health.

Sufficient transportation infrastructures enable individuals to access chances for employment; increased mobility gives greater flexibility in job options and places to dwell. However the capacity to travel longer distances also has led to disparities in access to jobs. As job development has migrated from the inner cities to outlying suburban regions, access to work has grown more and more reliant on automobile ownership. Fewer than 50 percent of occupations in large metropolitan areas are accessible by public transportation, although over half of employees with wages under $10,000 do not possess a vehicle Federal Transit Administration, 2002. Federal Transit Administration, 2002. The situation is even worse for persons with disabilities, who are disproportionately represented in low-income groups.

The final advantage to be examined is access to health care. Certainly, the ability to speed people fast over huge distances has saved innumerable lives via the creation of surface and air transportation systems for critically sick and wounded individuals. For less critical cases, however, the existence or lack of transportation options is a crucial factor of whether many individuals, especially those with disabilities or those unable to afford private autos, may obtain continued care for chronic ailments. One poll indicated that 9 percent of youngsters from households earning less than $50,000 missed doctors visits owing to lack of transportation. The issue was particularly acute for those with incomes below the poverty line and

those in rural regions Childrens Health Fund, 2001. Hence, even when governments give medical insurance to low-income families with children, access to health care may still be restricted owing to lack of suitable transportation [9]–[11].

Transportation and Injuries

One consequence of high speeds and heavy vehicles is that motor vehicle collisions involve massive transfers of energy, and human beings engaged in crashes are highly sensitive to severe injuries. Twenty-Five, motor vehicle crashes are the leading cause of death in people between the ages of one and thirty-four, and the rate of motor vehicle fatalities is highest among those first learning to drive young adults ages sixteen to twenty-four and the elderly those over seventy-four U.S. Department of Transportation [DOT], 2002a. Individuals may be killed or wounded as operators or passenger of motor vehicles; however, a large number of persons are also damaged as pedestrians or bicycles hit by motor vehicles

To a certain degree the participation of walkers and bicyclists in motor vehicle collisions is a consequence of how many pedestrians and bicycles are on or near the roadways compared to automobiles. The first reported motor vehicle crash in U.S. history happened in 1896 in New York City and involved a bicycle DOT, 2002b DOT, 2002b. Over the twentieth century, vehicles took over the streets, resulting to ever-increasing numbers of collisions and deaths, which peaked in the 1970s and 80s. The public health approach to minimising injuries and deaths due to motor vehicle collisions has evolved in complexity and efficacy over the last thirty years, helping to lessen the numbers of crashes and fatalities. Further information on this strategy come

Motor Vehicle Crashes

The weight of injuries and deaths from motor vehicle collisions is tremendous. In the United States in 2002, 42,815 individuals were killed and another 2,926,000 injured in motor vehicle collisions DOT, 2002a DOT, 2002a. According to the National Highway Traffic Safety Agency NHTSA, the economic cost of motor vehicle crashes in the United States in fiscal year 2000 was more than $230 billion NHTSA, 2001, which is 2.3 percent of the U.S. gross national product NHTSA, 2000. This amount covers not just medical expenditures but also costs stemming from lost productivity, legal fees, insurance bureaucracy, travel delay, property damage, and workplace losses.

While the existing public health and economic burdens from motor vehicle collisions are significant, they would be considerably bigger were it not for the concerted efforts of the transportation and global health sectors to make driving safer. With the use of the Haddon matrix see Chapter Twenty-Five, changes have been made to cars air bags, steel door guard beams, driver behaviours seat belt legislation, attempts to prevent drunken driving, and the driving environment improvements in road markings and designs improvements in road markings and designs. As a consequence the motor vehicle mortality rate has experienced a significant drop, from 5.50 deaths per 100 million miles driven in 1966 to 1.50 fatalities per 100 million miles travelled in 2002 DOT, 2002a DOT, 2002a. Comprehensive data on nonfatal collisions have been recorded only since 1988, however they indicate a small drop in the overall number of incidents and the fraction of crashes ending in injuries and deaths

Targeted efforts to decrease intoxicated driving have resulted to a considerable drop in rates of alcoholrelated deaths since 1988 DOT. For the last 10 years, however, modest gains in transportation safety have failed to alleviate the burden of traffic accidents. This is because the usage of automobiles measured as total vehicle miles travelled, or VMT has expanded faster than the mortality rate has fallen. From 1992 and 2002, for example, the rate of deaths per 100 million miles driven dropped from 1.75 to 1.5, yet the number of fatalities actually grew by nearly 3,000. During the same time range, VMT climbed by nearly 27 percent. It seems evident that further progress in lowering mortality from motor vehicle collisions will need either a new breakthrough in safety technology, a drop in motor vehicle usage, or some combination of both.

Pedestrian Crashes

More than 10 percent of those killed in motor vehicle collisions are pedestrians. In 2002, 4,808 pedestrians were killed by motor vehicles, and over 70,000 were injured DOT, 2002a DOT, 2002a. The death rate for pedestrians tends to grow with age, with those over seventy-four having a rate of 3.62 per 100,000 persons. Male pedestrians are more than significantly more likely as female pedestrians to be killed. Fatal pedestrian collisions are more likely to occur at night, in metropolitan locations, during normal weather conditions, and away from junctions and crosswalks. Alcohol consumption also plays a part in over half 46 percent of deaths, with the pedestrian victim more commonly inebriated than the vehicle operator 34 percent vs 13 percent DOT. Fatality and injury rates have been dropping continuously over the last thirty years, while the rate of walking, as measured by the proportion of individuals walking to work, has also fallen significantly over that time. It is not clear if the fall in pedestrian deaths is attributable to improved safety or simply less exposure to the dangers of walking Surface Transportation Policy Project

Pedestrian fatality rates are greater for nonwhite ethnic minorities than for whites in the United States. Studies undertaken in Atlanta, Washington, D.C., and Los Angeles have revealed mortality rates among Hispanics to be up to six times higher than those among whites. Rates are greater among Black Americans as well. While Black Americans make up 12 percent of the U.S. population, they account for 20 percent of all pedestrian deaths. The causes for these disparities have not been well-studied, although lower rates of automobile ownership and higher rates of walking to work, among Hispanics in particular, have been identified as one factor.

Urban form seems to be connected with pedestrian death rates. When pedestrian mortality rates are compared among U.S. cities after correcting for the number of persons who walk to work, a pattern has been observed. The highest adjusted pedestrian death rates are in the newer, more widespread cities of the Southeast and Southwest, notably Orlando, Houston, and Phoenix. Older cities that tend to have greater walking rates and more compact layout, such as New York and Boston, have considerably lower adjusted pedestrian death rates STPP. Availability of crosswalks is an essential factor 45 percent of deaths whose locations were identified, happened in places with no crosswalks. Despite the fact that walkers account for almost 10 percent of all motor vehicle–related deaths and walking is the method of 5.4 percent of all journeys made, pedestrian infrastructure gets less than 1 percent of the government investment on transportation

While children under fifteen may not have the greatest pedestrian death rates, they account for over 10 percent of all pedestrian fatalities, and nearly 24 percent of all pedestrian injuries DOT, 2002a DOT, 2002a. Fatal pedestrian crashes are the second largest cause of mortality in children between the ages of five and fourteen years old STPP. Child pedestrians are specifically at risk due to participating in play activities near their houses. Forty percent of child pedestrian injuries occur after school time between 5:00 and 9:00 P.M., and almost half occur over the weekend Friday afternoon through Sunday Friday afternoon through Sunday.

In older children the majority of pedestrian deaths are due to dartouts into traffic, with the youngster being killed by an oncoming automobile Brison, Wicklund, and Mueller, 1988. Brison, Wicklund, and Mueller, 1988. In 2002, 79 percent of kid pedestrian fatalities occurred outside designated junctions. A British study of fatal head injuries in children noted that 80 percent of fatal pedestrian head injuries occurred within 1 mile of home Sharples, Storey, Aynsley-Green, and Eyre, 1990, and a study in Oakland, California, found that nearly two-thirds of child pedestrian fatalities occurred within 0.25 miles of home Tester, Rutherford, Wald, and Rutherford, 2004. In the Oakland research, placing speed bumps as traffic calming devices lowered death risks to children living on those streets by over 50 percent.

Bicyclist Crashes

Bicyclists account for around 2 percent of motor vehicle collision deaths and injuries. Similar with pedestrian deaths, bike fatalities are more probable in nonintersecting sites, in metropolitan areas, and between the hours between 5:00 and 9:00 P.M. The fatality rate for kids with ages of five and fourteen is

almost 40 percent higher than the general rate 3.2 vs 2.3 per million people DOT, 2002b DOT, 2002b. In 2002, men were eight times more likely to be murdered riding a bicycle than females, and in roughly one in four fatal bicycle collisions, the rider was intoxicated with alcohol.

Comparing Risks Among Modes of Travel

If individuals move their transport modes from motorized forms to nonmotorized forms, there are major public health advantages, including lower air pollution and greater physical activity. But does a change from motorised vehicles to walking and biking raise the danger of injury and death, negating any health gains? Comparative risk assessments tend to place travel by mass transportation air, train, and bus as safest, followed by personal motorized vehicles, with walking, biking, and motorcycle riding being the most risky. For example, recent research by the National Academy of Sciences NAS that focused on school commuting indicated that students were at greatest risk of dying per 100 million miles while biking and walking Transportation Research Board of the National Academies, 2002. Transportation Research Board of the National Academies, 2002. However the relative ranking of these dangers fluctuates dramatically, depending on the measure of risk utilised. Using kilometres travelled as the denominator benefits modes that are quicker, such as airplanes and cars.

Assessing risk per trip taken may be most useful when considering replacing short automobile trips with nonmotorized excursions. There are further reasons to believe that fatality figures may be inaccurate. Nonmotorized journeys tend to be shorter than motorised ones, thus minimising exposure, while the hazards from walking and biking tend to be overstated owing to higher risk populations small children and the elderly disproportionately choosing these modes Victoria Transport Policy Institute [VTPI], 2004. Several studies have demonstrated that the health benefits of greater exercise exceed any increase in risk from being hit. Most significant, improvements in pedestrian and bicycle infrastructure, sidewalks, and roadways may contribute to a large decrease in pedestrian and biker risk.

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