

## **Land Transport and HIV Vulnerability: A Conceptual Framework of Vulnerability of Road Users, Road and Environment**

J.O. Oluwoye

School of Engineering and Built Environment, University of Wolverhampton, UK

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**Abstract:** A highway facility must, to varying degrees, serve three interests simultaneously, the road user, the abutting property owner and the general public. AIDS is not just a public health concern in the sub-Saharan Africa. The epidemic threatens to reverse decades of development. The more people travel the faster and further HIV can spread. Thus, population movement in the form of transportation usage is an important factor in the spread of AIDS. The purpose of this paper is to develop a conceptual framework for reducing the HIV/AIDS vulnerability of road users and their environment through a systems approach based on a transport sector's unique attributes. It is anticipated that development planning and creative problem solving can also lead to new modes of cooperation within the transport sector, enabling economic survival in places most severely impacted by the HIV epidemic. The transport sector has unique potential to contribute to the reduction of HIV transmission. Many of the situations in which HIV spreads can be changed through strategies and policies relating to the transport sector. The study concludes that strategic planning can reduce the number of people infected and help ensure that everyone is prepared for challenges that will arise from widespread illness and death through assessing impacts and charting longer-term directions as the basis for shorter-term tactical and operational actions.

**Key words:** Environment, public health, HIV, transport sector

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### **INTRODUCTION**

A highway facility must, to varying degrees, serve three interests simultaneously, the road user, the abutting property owner and the general public. The basic interrelationship between land use and transportation is often postulated in the familiar land use-transportation cycle. Land use activities generate vehicular trips, which in turn identify transportation needs; such needs are then met by transportation facilities which in turn provide additional access to land with the concomitant effect of enhancing land values and affecting the land use activities that complete the cycle by influencing vehicular trip generations<sup>[1,2]</sup>. It should be noted that, failure to exercise adequate access and land development controls leads to an early functional obsolescence of major arterials.

The HIV/AIDS epidemic jumps from city to city in hierarchical diffusion and then spreads out by spatially contagious diffusion from regional epicenters into the surrounding countryside. The more people travel the faster and further HIV can spread. Thus, population movement in the form of transportation usage is an important factor in the spread of AIDS.

The incidence of HIV/AIDS continues to worsen in sub-Saharan Africa and no industry remains untouched by the disease. The land transport sector is no exception. The transport sector has unique potential to contribute to the reduction of HIV transmission. For example, workers in the transport industry can be especially vulnerable to HIV/AIDS, but are often excluded or simply missed in many prevention programs. Many of the situations in which HIV spreads can be changed through strategies and policies relating to the transport sector.

Much population movement is highly fluid with people moving back and forth through these stages of transportation process that are comprised of Source, Transit, Destination and Return (STDR) frequently over a course of days, weeks or months. However, the world is faced with the spread of HIV/AIDS at an infection rate that threatens to erode the growth of world economy and affect other aspects of social life.

Giraud<sup>[3]</sup> and Lema *et al.*<sup>[4]</sup> reported that the transport sector is a major vector for the disease. The reason is simple. People working in the transport sector are mobile, they spend weeks and months away from their families and their homes and many satisfy their sexual needs on the road. Migration, short-term or long-term, increases

opportunities for sexual relationships with multiple partners, transforming transport routes to critical links in the propagation of HIV/AIDS. International studies also suggest that long haul truck drivers are the highest risk group in the road sector<sup>[3]</sup>.

Many studies, particularly in Africa, reported that the availability of transport and spread of HIV/AIDS was strongly correlated and also explaining that long distance truck drivers and truck assistants have been identified as one of the main agents of transmission of HIV along the route of the highway, as they visit sex workers and sexual partners at various points along their regular work route<sup>[5]</sup>. Notwithstanding, the mobility that land transport facilitates which acts as a catalyst for economic development, can also promote the spread of the AIDS epidemic<sup>[6]</sup>. Furthermore, UNDP South East Asia<sup>[7]</sup> reported that diverse sector of mobile populations may interact at certain key points, often involving sedentary community populations. Thus, the question arises, what is mobile population? Mobile population can be described broadly as persons who move from one place to another temporarily, seasonally or permanently for a host of voluntary and or involuntary reasons. This has become increasingly prominent in travel behavior along long-distance (transport) routes. However, the general categories of mobile population include: labor migration-i.e., truckers, traders, seafarers and commercial sex workers; and forced migration-i.e., political refugees, victims of trafficking and internally displaced persons.

As was reported by UNDP South East Asia<sup>[7]</sup> the mobility systems and the road network being established could contribute to the formation of dynamic hubs that have the potential of connecting different epidemics into a larger pandemic with a possible multiplier effect.

One of the complex interrelationships that has not been properly understood by scholars, planners and policy makers, is the magnitude and severity of problems created by commercial roadside developments and their contribution to the rapid transmission of HIV.

**Purpose:** The objective of this study is to develop a conceptual framework that will contribute to the planning process for reducing the HIV/AIDS vulnerability of road users and their environment through a systems approach based on a transport sector's unique attributes.

**Conceptual framework**

**Spatial relationship:** According to Westerman<sup>[8]</sup> and Oluwoye<sup>[1,9,10]</sup> this spatial relationship can be explained as the relationship between land-use, transport and road environment. The distribution of land-use activities, the transport networks, the environmental constraints and road user's behavior determine the public health problem.

It can be used to predict consequences of development in transport terms and vice versa and the consequences of traffic on the road environment and vice versa and the health consequences among road users.

There are many complex interactions affecting the mobility of people vulnerable to HIV/AIDS within road/road environments. They are spatial and temporal and related to functions, basic needs, money and groups affected (i.e., truck driver, migrant, sexworkers).

**Scale of relationship:** All interactions operate at different levels. There are three such levels

- Macro
- Meso
- Micro

**Macro dimensions:** The macro dimension is concerned with the *citywide*, large-scale of population mobility and AIDS interaction. Specifically, interactions between the transport network and other development systems including mobility. It is here that the overall problem of travel/land use is born; the distribution of major land-uses, the transport infrastructure and the cultural and socio-economic characteristics, which determine when and where people will travel. However, within the citywide, HIV is mostly spread through sexual intercourse without condoms and through sharing of injecting equipment when people are using drug.

**Meso dimensions:** Meso dimensions are the scale at the *sub-district level*. The meso dimension is reflected in the trips generated by different land-uses and their intensities locally and how they are distributed over the local network. This affects the amount of local traffic, which the road and others in the vicinity will have to handle (Fig. 1). The meso level is very important for considering the wider

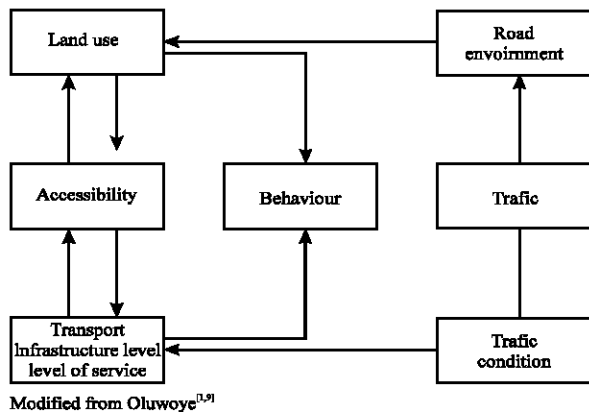
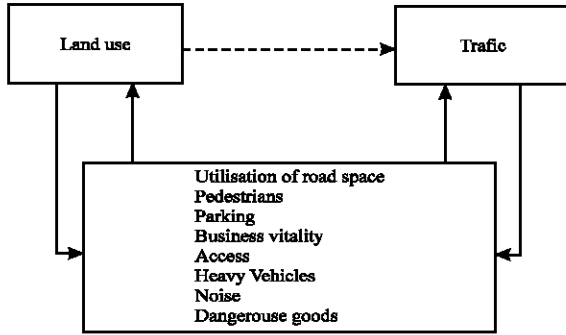


Fig. 1: Spatial relationship-meso dimension



Modified from Oluwoye<sup>1,9</sup>

Fig. 2: Spatial relationship-micro dimension

issues of local road-environment problems and the impacts of any improvements. At the sub-district level, people in some settings are much more likely to engage in commercial sex, drug use and selling blood, than people in other settings Modified from Oluwoye<sup>1,9</sup>.

**Micro dimensions:** The micro dimension is concerned with detailed conditions at the local level; mapping of vulnerability linking mobility to transport network are some examples of the issues of concern. In this study, the micro dimension is concerned with the transport routes and its immediate environment Fig. 2. At the local level, migration, mobility and HIV/AIDS are major problems. People moving between counties to major cities for white collar jobs may be more vulnerable to HIV/AIDS than are populations that do not move. Furthermore, they may acquire HIV while on the move for white collar jobs and take the infection back with them when they return home Modified from Oluwoye<sup>1,9</sup>.

## RESULTS AND DISCUSSION

**Analysis:** The land use, transport and road environment variables are also related to other factors: mobile people are attracted by land-uses and their concentration; the land-users are attracted because of accessibility and visibility from the road; the vehicular traffic is caused by macro, meso and micro distributions of land-use activities and networks.

Vulnerability to HIV infection concerns both the road users (population mobility) and the road environment. The road users are vulnerable on account of spread of HIV/AIDS and on account of infectious diseases. The environment (i.e., truck stops, auto-garages and marketplace) is vulnerable on account of risk, pollution and social separation.

These interactions need to be understood before any action to reduce vulnerability can be determined.

But not all interactions are of equal sensitivity. The available evidence suggests that the critical interactions regarding the road users are those of the migrants and mobile people (and this is a function of movement from one place to another). The critical interactions for the road environment are risk (a function of truck drivers, traders, bar/hostel workers activity and the movement of people from one place to another) and social barrier (a function of land use interaction, traffic volume and distance).

Planning for reducing vulnerability to HIV/AIDS involves the development of a road/road environment classification, determination of the critical measures for each type and the implementation of design and management measures for both the population mobility and the road environment

However, forward planning can reduce the number of people infected and help ensure that everyone is prepared for challenges that will arise from widespread illness and death. Planning and creative problem solving can also lead to new modes of cooperation within this sector, enabling economic survival in places most severely impacted by the HIV epidemic.

### HIV/AIDS prevention and care program for mobile populations along arterial commercial road

**Macro level:** What needs to be done at macro level is changing people's behavior through encouragement of using condoms for sex, or to use *clean needles*. These behaviors require ongoing commitment of the road users and ownerships of the commercial land use along the road corridors as well as a supportive road environment. Factors that enable change include access to information, social support and resources such as condoms.

**Meso level:** The needs for change the conditions that affect people's behavior is by reducing HIV transmission by providing safe alternatives for people engaged in drug use and selling blood and ensure safe sexual behavior along arterial road corridor. This might create enabling environments in specific locations and segments of arterial roads, changing the ways people travel (i.e., long distance drivers or men drivers who travel alone are more likely to engage in sex than truck drivers or men drivers who travel with their wives and families, or women partners). There is a need for changing the policies and regulations that influence people's vulnerability to behaviors that enable HIV transmission (i.e., to reduce the length of time trucks have to stop before destination points).

### CONCLUSION

The introduction of a viable HIV policy and strategy to the transport sectors requires an understanding of transport sectors unique micro, macro and meso attributes at both sectoral and subsectoral levels. However, an important premise is that one needs to focus on risk zones on road/environment where risk may occur. Such target interventions in places through which a large number of mobile people pass. It is important as a matter of deliberate planning policy, how they are to be achieved and what the implications are in land-use and traffic terms. There are several avenues for further research: Trader behavior and driver behavior along traffic corridors; long distance truck driver activities and number of truck stops; linked activities in the road environment; and links between migration, mobility and HIV/AIDS.

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