

# ASSESSMENT OF THE EHLANZENI DISTRICT HEALTH TRANSPORT AND LOGISTICS FUNCTION: ENHANCING RURAL HEALTHCARE DELIVERY SYSTEMS

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## ABSTRACT

This paper seeks to establish a baseline against which to assess the impacts of the 'Ehlanzeni District Health Transport Function' for the district's healthcare service delivery output, and by extension, health and welfare outcomes. The main objective of the study was to conduct a strategic analysis of how the transport subsystem of the health and welfare system is linked to subsets of transport-dependent processes of healthcare delivery including the resultant impact on healthcare outcomes. A variety of qualitative and quantitative instruments were employed to gather data to respond to the study research questions. The study findings confirmed the existence of healthcare transport and logistics supply bottlenecks. These have tended to negatively impact on the delivery of healthcare commodities and services for Ehlanzeni residents. Inflexion points in the healthcare delivery continuum have been identified and a range of intervention options serving as counter-measures generated. A strand of thought that filters through the discussion is that the establishment of a district transport authority or a strengthened transport function could possibly be the fulcrum of a sustainable healthcare transport and logistics, and by extension, pro-poor healthcare delivery system.

## Keywords

Rural healthcare, mobility, accessibility, transport, infrastructure, sustainability.

## INTRODUCTION

### Background

At the dawn of a democratic dispensation in 1994, South Africa inherited a fragmented health system, the skewed delivery of which was based on racial lines. The new government has had to respond to a constitutional obligation to develop and implement policies and programmes directed at improving the health status of the whole country (South African Constitution, 1996). This has meant and involves efforts to redress past inequities such as limited access to clinics and hospitals, number of doctors, specialists, and nursing staff particularly in rural areas (South African Human Rights Commission, 2000). The South African Government National Health Act, 2004 (No 61 of 2003) gives priority to eliminating inequities by reforming the health sector. It has sought to achieve reformation through decentralization by way of establishing a district health system that is premised on and committed to the principles of primary healthcare (Department of Health, 2005a). This involves promoting universal access to quality, equitable, responsive and efficient healthcare services that are accountable to the communities they serve with a particular slant towards improving health service delivery to previously under resourced areas (Mashiri et al, 2007a, Mashiri et al, 2008a). However, sustainable delivery of healthcare in developing communities is severely compromised by access and mobility considerations.

### Purpose of the study

The main purpose of the study was to perform a strategic analysis of how the transport subsystem of the health and welfare system is linked to subsets of transport-dependent processes of healthcare delivery, and the resultant impact on healthcare outcomes.

## Organisation of the paper

The paper is organised into four sections. Section one constitutes the backdrop which serves to introduce the purpose of the study as well as anchor the discussion that follows in the context of existing literature. Section two presents the methodology used in conducting the research. The major research findings *are discussed in section three, while section four* sets out the main study conclusions and recommendations.

## **STUDY APPROACH**

### Methodology

Besides secondary data analysis (government publications, internet sources as well as newspapers and journal articles), in-depth interviews with key informants and thematic discussions with selected key informants from hospitals in the study area were conducted. Secondary data sources were analysed for trends, issues, challenges and opportunities regarding district health transport supply. To test the rigour and robustness of the research process, the study objectives were matched with the appropriate research questions and instrumentation.

In general, a non-experimental design mixed method approach was employed using purposeful sampling techniques to gather data with a view to achieving an 'information rich' case. Rapid appraisal methods such as focus group discussions provided a canvass on which to paint a range of issues regarding healthcare transport in the study area. Data from observations have been used to supplement interviews and surveys, and also to verify and triangulate information gathered through other methods. Checklists and telephone interviews were also employed to elicit information from key informants such as the district transport officer and chief operating officers of some of the health institutions. This related to follow up information and research gaps identified after the initial meeting with key informants. In addition, informants were requested to source, generate, and pass onto the research team, other relevant information they deemed necessary to win and procure the same.

A snowballing technique was also used to gather information. Informants were requested to identify other key informants who could provide useful information. This technique allowed the research team to establish contact with other informants outside the originally purposive sample dragnet as respondents acted as referees and links to other informative sources.

Out of the eight hospitals with a transport officer function in Ehlanzeni District, aggregated data for all the hospitals was collected and collated. However, for three of these hospitals, which roughly represented a cross-section of all hospitals in the district, some relatively detailed analysis was performed. This covered disaggregated data analysis on various transport key performance indicators, operational and financial issues, human resource needs, processes and information flow and causality chains regarding the district health transport and logistics system.

### Location of study area

The study area is located in the Thaba Chweu local municipality in Ehlanzeni District – one of three constituent districts of Mpumalanga province. The district, which is made up of four local municipalities, namely, Umjindi, Thaba Chweu, Mbombela and Nkomazi, is bordered by Mozambique to the east, Swaziland in the south and Limpopo province in the north. Thaba Chweu is located to the north-west of Mpumalanga province. Large scale crop and game farming characterise the western half of the municipality centred around Lydenburg, while forestry activities predominate in the eastern half, with Sabie and Graskop as the centres (Thaba Chweu, 2007). Hospitals, clinics and health centres in the communal areas of Leroro, Matibidi and Moremela, which are hemmed in between these major land uses to the northern tip of the municipality, were chosen as the study areas.

### Transport as a key component for effective healthcare delivery

Hall et al (2006) conducted a study in the Eastern Cape province of South Africa with a view to understanding the impacts of transport to healthcare service delivery. Their findings demonstrated not only the need for improved transport services in the delivery of health, but also the importance of using the right type of vehicles. Their study also revealed that during the rainy season, it was exceedingly difficult for delivery vehicles laden with drug supplies to access health facilities largely because of poor road infrastructure running along hilly, often broken and generally difficult terrain that characterise the province. In wet weather, these roads become muddy and slippery. In fact, health transport problems are indeed most severe in the wet season for most rural areas not only in South Africa but also in other developing countries (Gray & Suleman (1999). This severity is felt much more keenly in emergency cases.

In a study done by Mobility and Health (2008) in Namibia, it was demonstrated that transport for emergency cases comes at a higher cost for people living in rural and largely marginalised areas. Very often, patients get too exhausted or die while waiting for Ambulances, which take over three hours on average to report at the scene after a callout. In South Africa, there is a huge backlog in terms of the provision of emergency medical services (EMS) especially in the public health sector. This situation is exacerbated by the short supply of specially designed and equipped vehicles as well as well-trained staff or paramedics – the hallmark of EMS. Small wonder then that organisations such as the Southern African Rural Poverty Network (SARPN) have clamoured for the generation of a national EMS strategic plan (as part of a concerted efforts to achieve the Millennium Development Goals) using the 2010 FIFA Soccer World Cup as a fillip (SARPN, 2007).

Lack of adequate and affordable transport services particularly in remote rural and marginalised areas, under-girded by sound transportation infrastructure, are obstacles to achieving meaningful service delivery. Clearly, without proper transport infrastructure and services, healthcare facilities in these areas will remain under-serviced in terms of maintaining adequate levels of medical supplies and retaining medical staff as well as eliciting confidence and therefore regular utilization of the facilities by locals (Mashiri et al, 2007b; Mashiri et al, 2008). As part of the overarching framework of the National Transport Policy for South African, it is envisaged that policies in the transport sector will be outward looking, shaped by the needs of society in general (Department of Transport, 1996). Among those needs is transport for health service delivery. The importance of transport services is summarised by Hall et al (2006) as:

*“...Adequate and appropriate vehicles, which are efficiently managed, are essential for delivery of quality healthcare within a health system. The correct number and vehicle mix, suitable for topographical area in which the service is provided, is required. A comprehensive management system for monitoring and evaluating transport services is essential...”*

### Transport for healthcare professionals and care workers

While effective transportation of patients and medical supplies to healthcare facilities is crucial, what is often underplayed is the fact that healthcare professionals and care workers also require efficient transport systems to effectively perform their duties. Healthcare professionals naturally include the provision of such services high up in their decision matrix regarding taking up and holding onto such positions. Verwey (2006) has noted that this often leads to compromises in healthcare delivery in rural areas with severe transport infrastructure and services provision backlogs compared to urban areas as a result of medical staff shortages – as professionals naturally gravitate towards locations with better services.

Bundred and Levitt (2000) have likened inequalities that exist between and within countries, to those that exist between developed and underdeveloped areas to better understand the raison d'être for health professionals' location decisions. The authors came to the inescapable conclusion that professionals migrating from poor to developed areas are often influenced by perceived better opportunities such as income and good working conditions. Translated into tangibles, 'good working conditions' would imply, among others, easily accessible and well-equipped medical facilities.

In the same vein, healthcare workers such as home-based care workers often visit patients in their homes. The Institute for Transport and Development Policy (ITDP) (2003) argues that about 70% of adults and over 80% of children living with HIV/AIDS are in Africa – living in the most underdeveloped areas. Persons living with HIV/AIDS cannot always visit healthcare facilities due to difficulties they face in travelling – they often require the assistance of healthcare workers due to physical weakness in environs characterised by inadequate and unaffordable transportation services (Mashiri et al, 2007a; Mashiri et al, 2007b,). While the need to mobilise healthcare workers who do outreach work is recognised, the need for improved transport services cannot be over-emphasized.

In order to resolve some of these challenges, one of the most telling changes in the health sector in South Africa has been the adoption of the district health system – a system that is widely accepted as the most effective way of organising and delivering district health services including addressing questions of the system’s urban-bias and centralisation (Department of Health, 2004).

### Structural complexities in health transport procurement and deployment

Many studies exist that demonstrate the major role that transport plays in the healthcare procurement, provision and delivery continuum and the potentially decisive role that the public sector could play (Mashiri et al, 2007c; 2008). However, the public sector’s ability to play this decisive role appears hamstrung by the complex and somewhat convoluted processes involved in procuring and deploying health transport vehicles. In this regard, unpacking the national and provincial system is crucial to understanding the drivers of health transport procurement. The Department of Transport (DoT) is responsible for formulating transport policies for consumption by national and provincial departments. These departments are also referred to as ‘user departments’. Transport policies are monitored by Government Motor Transport, which is a subdivision of DoT’s Corporate Services Division. This sub-division is also responsible for managing all user department vehicles.

For a user department (e.g. Department of Health [DoH]) to purchase a vehicle, a purchase request has to go through a series of different institutions before being approved – sequentially – the provincial department (e.g. DoH), Government Garage, Provincial Department of Finance and eventually, Provincial Department of Roads and Transport (PDRT) completes work on the initial purchase request from the user department. However urgent the request might be, the final decision on whether or not to grant authority to purchase a particular vehicle model depends on the recommendation of PDRT and the availability of funds.

Clearly, for DoH to acquire patient transfer vehicles, for example, cumbersome and lengthy procedures have to be satisfied. What needs to be reiterated here is that even after meeting such demanding conditions, the final decision to acquire the vehicle including its specifications, does not lie with the user department. Instead PDRT effects the final determination based on its discretion and budget. This, in essence, is problematic since some districts may require special vehicles justified by their special needs which are in turn, influenced, for example, by factors such as terrain, road condition and risk profile of the area. And yet they can only motivate for but not decide on what they eventually have.

### Overview of the Ehlanzeni District transport system

Mashiri et al (2007c), in their paper that sought to unpack the relationship between access and healthcare delivery in rural South Africa, used four villages in the Thaba Chweu local municipality, Mpumalanga, as case studies to map out this relationship. One of the key findings of the study, which largely focused on demand aspects, was that health-seeking behaviour of most rural communities is significantly influenced by access considerations.

Although the main roads linking the major towns of Thaba Chweu are in relatively good condition, the state of most of the internal streets and storm water systems, particularly in the Central Business Districts in all the urban areas, are poor (Thaba Chweu, 2007). While the municipality has since commenced with the upgrading works on the main bus routes in rural settlements of Moremela, Leroro and Matibidi, much work still needs to be done to ensure improved access by villagers.

While the urbanised areas of Thaba Chweu municipality are easily accessible by taxi, the same cannot be said of the rural areas (Mashiri et al, 2008b). Most of the communal and commercial farming areas have to endure poor and inefficient public transport services. In addition, the municipality lacks adequate postal services, information and telecommunications infrastructure which could be employed to reduce possible trips as well as in improving the response times of emergency services such as Ambulances and fire-fighting services (Thaba Chweu, 2007). In addition, the existing emergency services are inadequate to service the whole region.

As a follow up to the study referred to above, another study was conducted to establish a baseline against which to assess the impact of the “Ehlanzeni District Health Transport Function” on the district’s healthcare service delivery output, and by extension, health and welfare outcomes (Mashiri et al. 2008b). The major findings of this study constitute the output of this paper.

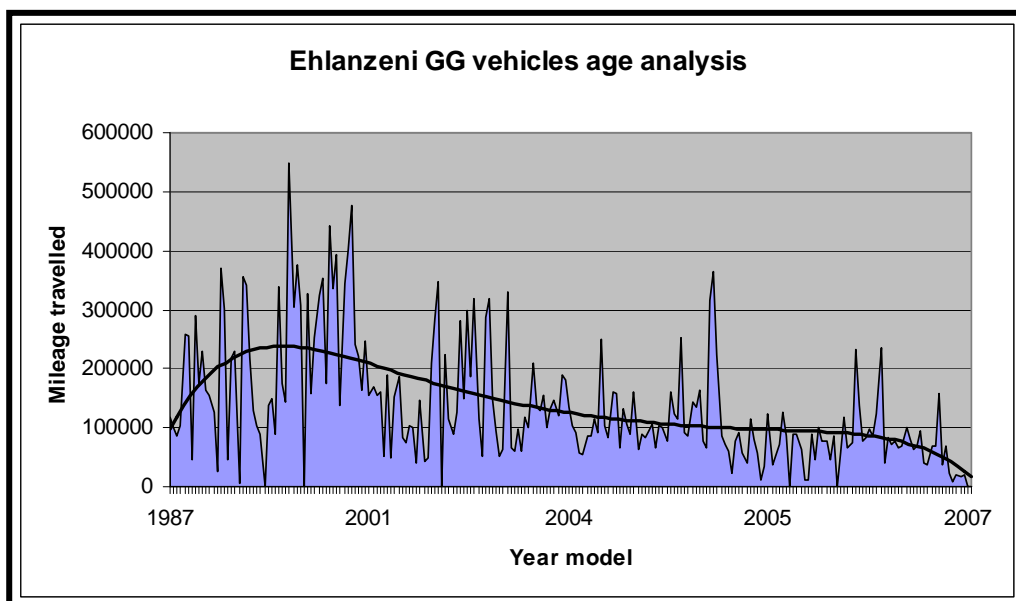
### The importance of health transport management

Achieving the correct vehicle mix and balance in terms of composition and availability is essential for improved health transport especially for developing communities. This also means that proper maintenance, disposal and procurement of newer models that can cope with difficult conditions should also be considered for effectiveness. There appears certainly to be some scope for crafting policies relating to procurement processes in favour of user departments. Ultimately, this may mean as observed by Hall et al (2002) that transport for healthcare delivery should also be decentralised to health districts or administrative districts. Such districts would need to be equipped with planning skills employing such tools as the TransAid’s Transport Management Manual (2001) – a relatively comprehensive guiding framework for enhanced district transport procurement and deployment in terms of, for example, the establishment of the correct number and vehicle mix suitable for the defined geographical areas, policy development, operational management, fleet management and information management.

## **STUDY FINDINGS AND ANALYSIS**

### Ehlanzeni district health vehicle pool and age analysis

The study focussed on assessing Government Garage (GG) vehicles and largely excluded those falling under the subsidy group, partly because subsidy vehicles are often not fully utilised to undertake fieldwork activities other than as transport to work. In addition, they constitute a small number in relation to the total GG fleet.



**Figure 1: Ehlanzeni GG vehicles age analysis**

Of the GG vehicles that were assessed, fewer than 60% were under 5 years old. As depicted in Figure 1 above, vehicles that had very high mileage were models dating back to before year 2000.

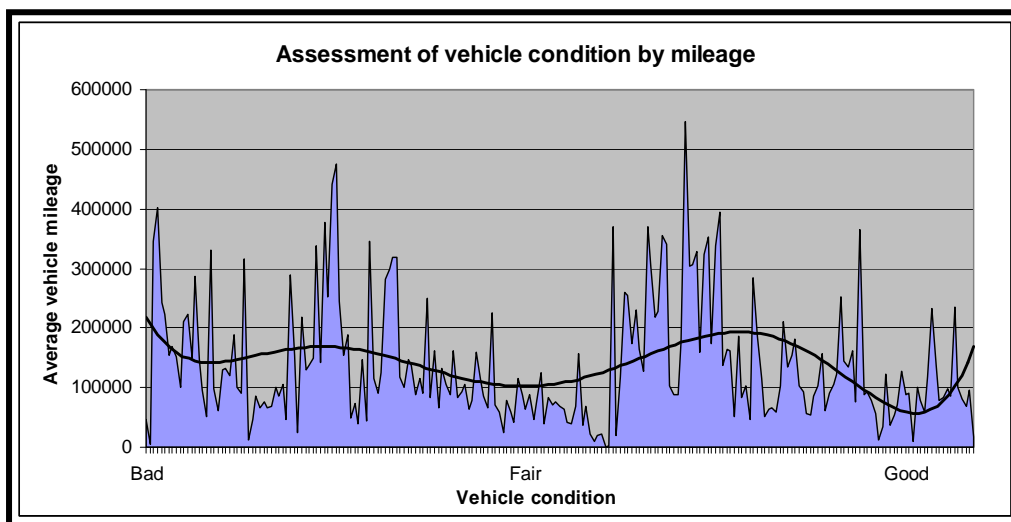


Figure 2: Assessment of vehicle condition by mileage

Very old vehicles are often unreliable and not safe for transporting passengers let alone sick ones. Among these were vehicles used to transport patients – that is planned patient transport, administration vehicles, and those used by doctors and environmentalists for clinic visits and outreach programmes. The oldest vehicles were 1987 models, which meant they had been in service for over twenty years. Most of these vehicles' odometers had rotated twice around the clock, that is, they had travelled over a million kilometres and started from zero again. Figure 2 above and 3 below graphically illustrate the vehicle assessment results according to their age and condition on a scale of good, fair and bad (as documented in and gleaned from the district transport officer's monthly reports).

On average, vehicles that were considered to be in good condition had travelled about 50,000km, those considered to be in fair state of repair had travelled less than 100,000km, while those that had travelled over 200,000km were categorised as bad. In fact, the district still had, on its books, vehicles that should have long been retired – increasing risks related to accidents, frequent breakdowns and general discomfort for the patient – a situation that describes relatively low service levels.

### Planned patient transport

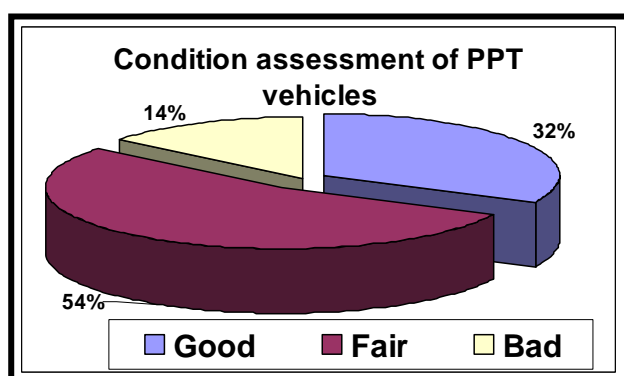


Figure 3: Condition assessment of PPT vehicles

Planned patient transport (PPT) system is utilised by hospitals to move patients who have been referred from one hospital to another (where specialists exist). Given that most hospitals in Ehlanzeni have general practitioners and not specialist doctors, the district regularly uses the PPT service to ferry patients to specialists, most of whom are located in Witbank (for TB patients), Nelspruit and Pretoria. Patients especially those from the dense 'displaced' urban settlement of Bushbuckridge often travel over a thousand kilometres for a return trip to Pretoria to see specialists. Thus, to some extent, PPT vehicles

are over used since they are on active service on a daily basis often covering large distances.

The greater majority of PPT vehicles i.e. 68 percent (19 vehicles), as depicted in Figure 3, are not in good condition, particularly given that most vehicles that are in the fair basket (15 vehicles) are also on the brink of falling irretrievably into the 'bad' category. Only 32% of the total vehicle pool (9 vehicles) is in good condition. Curiously, 14 percent of vehicles (4 vehicles) dedicated to the movement of patients, which should most probably have been scrapped by now, are still on the

road. This indeed places patients, the drivers and other road users at serious risk. The need to revisit and revitalise the health vehicle fleet management system of the district cannot therefore be over-emphasized.

### Emergency medical services

In each of the five local municipalities of Ehlanzeni, there exist between one and three emergency medical services (EMS) stations. Most EMS stations are located within hospital premises. A regular EMS station is comprised of one response car, one administration vehicle and two ambulances. District EMS managers claim that this setup does not always work perfectly for some local municipalities.

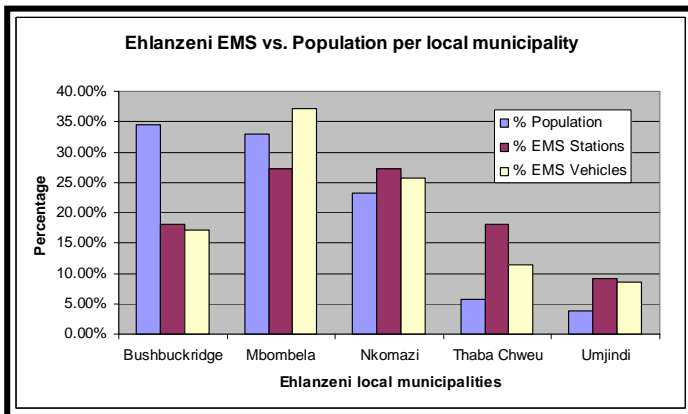


Figure 4: Ehlanzeni EMS vs. population per local municipality

Chief among the reasons for this is that the strategy employed to allocate EMS services to the local municipalities does not take into account the question of need as amplified by the uneven population distribution (Ehlanzeni's total population is 1 444 397 people with 11 EMS stations served by 35 vehicles). As depicted in Figure 4 above, while Bushbuckridge, Mbombela and Nkomazi boast of the highest population figures in the district, Bushbuckridge is not well-endowed in terms of EMS allocations. In order to improve the level of service, by for example, reducing the response times of

Ambulances, the authorities need to revisit their allocation formula.

### Outsourced transport services – Pharmaceuticals

The supply and distribution of drugs and medical supplies in Ehlanzeni district, as is the case for the entire province, is a service provided by a private company located in Bronkhorstspuit (about 40km east of Pretoria). As indicated in Figure 5, the process of drug ordering and procurement starts with clinics and hospitals which order their requirements through the district pharmacist in the provincial capital, Nelspruit. Orders are manually placed, normally through faxes. This drug ordering process has many constraints which affect real time physical availability of drugs at district health facilities.

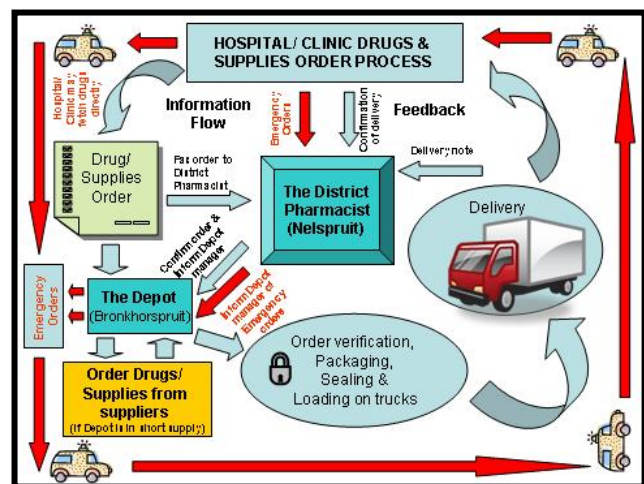


Figure 5: Ehlanzeni pharmaceutical order process

Firstly, most clinics and some hospitals do not have pharmacists or battle to retain them because of their scarcity. In some institutions, vacancies have not been filled for years on end. In addition, drug and medical supplies inventory management skills are often severely limited. As a result, sisters at clinics sometimes place orders only when the institution is running completely out of stock. This then forces patients to either wait for medicines for longer periods at clinics or at their homes or to travel to other healthcare facilities in search of drugs, inevitably putting pressure on those institutions' stocks as well as on the disposable income of villagers. Secondly, the communication model is often hindered by unreliable telephone lines. Some orders that are placed and need to be confirmed do not reach the district pharmacist because of vandalised or broken telephone lines.

The need to improve the availability of pharmaceuticals in Ehlanzeni is clear. Part of the solution lies in genuinely decentralising the function as well as outsourcing some of the services. This would necessarily involve significant capacity building. In addition, the entire communication model



also needs to be revisited, starting with introducing on-time computer-based drug and medical supplies management systems.

### Capacity challenges

A finding of the study was that most transport officers in hospitals have not received training relating to their portfolio. Many of the officers are not even involved in transport planning sessions held at district offices. In addition, there is a shortage of experienced drivers. Thus, on some days there were no PPT trips which meant patients missed their appointments. Driver indiscipline was

also cited as a challenge – a problem exacerbated by the fact there is a deficit in driver numbers in relation to available PPT vehicles. Anecdotal evidence of relatively poor levels of service include patients dying while in transit, accidents involving patients while in transit (refer to Figure 6), and patients giving birth inside PPT vehicles.



Figure 6: An example of fatalities involving PPT vehicles

The level of service required for patient transportation is almost currently 'unattainable' for most PPT units in hospitals, largely because PPT does not meet and conform to appropriate standards and regulations, for example, PPT vehicles are not designed to and should not carry some categories of patients, such as patients on stretchers and wheelchairs, as well as those that require intensive care (see Figure 7). The suggestion has thus been made that PPT should merge with EMS to form one integrated unit since EMS meets the required standards and conform to the regulations.



Figure 7: An example of PPT vehicle not suitable for patient transport

Due to limited resources, most hospitals' PPT services only start their trip from the hospital to the referral institution. This means that patients have to first get to the hospital using their own means of transport before being allocated transport on the PPT programme – putting tremendous pressure on meagre household income. On the other hand, neither clinics nor patients call EMS for cold-cases. As a result, many patients who cannot get to a hospital endure the pain at their homes or have to find alternative ways to get to health facilities.

## **CONCLUDING REMARKS AND RECOMMENDATIONS**

### Conclusion

The study has confirmed the existence of healthcare transport supply bottlenecks which have tended to negatively impact the delivery of healthcare commodities and services to Ehlanzeni residents. Inflexion points in the healthcare delivery continuum have been identified and a range of intervention options serving as counter-measures generated. A strand of thought that filters through the discussion is that decentralising the health transport function and strengthening the district transport function could possibly be the fulcrum of sustainable healthcare transport and logistics, and by extension, a pro-poor healthcare delivery system.



## Recommendations

Old vehicles that are still operating in the district pose a threat to the safety of employees, patients and other road users – they need to be disposed of and newer vehicles purchased. This suggests that there needs to be robust district health transport management strategies in place to address most planning and management issues, for example:

Generation of a clear and consistent district health fleet retirement and replacement strategy, which should take into account the conditions under which vehicles are scrapped as well as matching vehicle design and functional requirements such as vehicle operating environmental conditions. In addition, the government vehicle subsidy system should be extended to cover district health transport personnel to increase the pool of vehicles available for emergency and routine district health transport functions.

- The existing manual pharmaceutical procurement service needs to be automated to improve data capture, information processing, retrieval and forecasting. In time, this initial database may possibly be linked with a geographical information system so that the road, route and environmental conditions can be captured. This may also even entail the use of radio signalling system for communication with vehicles in operation to improve logistics and distribution services.
- The shoe-string budget that most hospitals' PPT services are allocated allows transport only from hospital to the point of referral. This means that patients have to first get to the hospital using their own means of transport before being allocated transport on the PPT programme. To alleviate the unbearable pressure on household finances, alternative low-cost district health transport interventions, such as bicycle Ambulances, motor-bikes with sidecars should be investigated through demonstration projects. In addition, operationally, public-private partnerships in the form of brokerage agencies could also be investigated.
- Capacity building for the existing transport officers and recruitment of qualified and well-trained officers is of critical importance.
- Progress towards the implementation of an EMS strategic plan including the advisability of a well-structured merger of PPT and EMS units, needs to be closely monitored.

## **REFERENCES**

Bundred, P.E. & Levitt, C. (2000). "**Medical migration: Who are the real losers?**" The Lancet 2000 viewpoint; 356: 245-246, University of Liverpool, UK.

Gray, A. & Suleman, F. (1999). "**Drug policy**". Health Systems Trust, Durban.

Hall, W. Du Plessis, D. & McCoy, D. (2002). "**Transport for health care delivery**". Health Systems Trust, Durban.

Hall, W. Radebe, D. & Roberts, J. (2006). "**Transport policy for health services in the public sector: Lessons learnt from a study of the impact on health services of a Public-Private Partnership for transport in the Eastern Cape**". Health Systems Trust, Durban.

Institute for Transport & Development Policy ITDP (2003). "**Healthcare and Transport**". Fact Sheet, December 2003, ITDP. (Article accessed November 2008 on: <http://www.itdp.org>).

Mashiri, M. Kistan, K. Marrian, B & Elrahman, O.A. (2007a). "**Uplifting developing communities through sustained technology transfer, Proceedings: 3rd Africa Technology Transfer Conference**". Sun 'N' Sand Holiday Resort, Mangochi, Malawi, 22 – 25 May 2007.

Mashiri, M. Chakwizira, J. Madzikigwa, B & Maponya, G. (2007b). "**Rapid appraisal of community transport infrastructure & services**", Mpumalanga Department of Roads & Transport, Nelspruit.

- Mashiri, M. Maponya, G. Nkuna, Z. Dube, S. & Chakwizira, J. (2007c). **“Unpacking the relationship between healthcare, mobility and access”**. CSIR PG Report, Pretoria.
- Mashiri, M. Madzikigwa B. Chakwizira, J. Nyoni, P. & Makgalemane, M. (2008a) **“Integrated Rural Mobility & Access: Mainstreaming environmental issues in community transport project planning and construction”**, Proceedings: SATC, 2008, Pretoria South Africa.
- Mashiri, M. Maponya, G. Chakwizira, J. Nhemachena, C. Dube, S. & Maritz, J. (2008b). **“Strengthening the decentralized healthcare system in rural South Africa through improved service delivery: Testing mobility & information & communication technology intervention options”** CSIR PG Report, Pretoria.
- Mobility & Health (2008). **“Impact of transport on access to health services for PLWHA in Namibia”**. (Article accessed November 2008 on: <http://www.mobilityandhealth.org/news/full.php?view=263&Submit3.x=125&Submit3.y=6> )
- South African Department of Health (2004). **“The district health system in South Africa: Progress made and next steps”**. (Article accessed November 2008 on: <http://www.doh.gov.za/docs/policy/dhsystem.html>).
- South African Department of Transport (1996). **“White Paper on National Transport Policy”**. Pretoria.
- Southern African Rural Poverty Network SARPN (2007). **“Millennium Development Goals: Mid-term country report”**. (Article accessed November 2008 on: [http://www.sarpn.org.za/documents/d0002895/South\\_Africa\\_MDG\\_midterm\\_Sept2007.pdf](http://www.sarpn.org.za/documents/d0002895/South_Africa_MDG_midterm_Sept2007.pdf)).
- Thaba Chweu Local Municipality (2007). **“Integrated Development Plan: 2006 2011.”** Draft, March 2007. Thaba Chweu Local Municipality.
- TransAid (2001). **“A practical transport management system for non-profit & service delivery organisations”**. Transaid Worldwide, London.
- Verwey, B (2006). **“Dire staff shortage hampers health sector”**. Health Systems Trust, Durban, South Africa.