

# DISTRACTED DRIVER BEHAVIOUR IN SOUTH AFRICAN TOWNSHIPS: A ROADSIDE OBSERVATION STUDY

P BINDA\* and K MURONGA\*\*

CSIR, P O Box 395, Pretoria, 0001

\*Tel: 012 841-3355, Email: [pbinda@csir.co.za](mailto:pbinda@csir.co.za)

\*\*Tel: 012 841-2337, Email: [kmuronga@csir.co.za](mailto:kmuronga@csir.co.za)

## ABSTRACT

Driving is an activity which requires full concentration, which means that the driver needs to concentrate on physically controlling the vehicle, mentally making good decisions and at the same time, monitoring the driving environment. One of the safety issues regarding distracted driving is that no matter how well a driver thinks (s)he can drive; a distraction can potentially compromise safe driving. This study observed drivers during their driving task, from the road side at selected locations at public hospitals. The research focused on vehicle drivers at an intersection near Chris Hani Baragwanath Hospital in Soweto and Dr George Mukhari Hospital in Ga-Rankuwa. This paper provides the results of the study and its relevancy to improve road safety in South Africa.

## 1. INTRODUCTION

Driver behaviour studies are not new in South Africa, and the Council for Scientific and Industrial Research (CSIR) has since 2012 been making use of the Naturalistic Driving Study (NDS) methodology to study the behaviour of different groups of drivers (Muronga and Venter, 2014; Venter, 2014). These studies focussed on differences between novice and experienced drivers (2014) as well as heavy vehicle drivers (2017). The past CSIR studies focused on investigating the effectiveness of NDS in understanding the behaviour of drivers and how this understanding can be transferred into improving behaviour to facilitate more compliance with road rules (Muronga and Ruxwana, 2017). What is encouraging is the fact that the 2017 study indicated that it was possible to make use of NDS to recognise risky driver behaviour. Using data from the 2014 NDS study the CSIR in 2018 investigated the manner in which NDS can be utilised to quantify road risk by making use of naturalistic driving data (NDD) that was collected from four primary drivers in 2014. The 2018 study investigated the type and duration of secondary tasks which can be distracting to the driver (Muronga, Botha, Venter, Sinclair, 2018).

## 2. BACKGROUND

Driving is an activity that requires full concentration, which means that the driver needs to focus on physically controlling the vehicle, mentally making good decisions and at the same time monitoring the driving environment, which includes other drivers. Driver distraction is defined as any activity that diverts a drivers' attention away from the task of driving (Ranney *et al.*, no date). Other researchers such as, Young, Regan and Hammer, (2007) refer to driver distraction as an event where a drivers attention is diverted away from the driving task, either consciously or unconsciously, by any event in the driving

environment, that influence the driver in such a manner that the driver is no longer able to perform the driving task safely (Young, Regan and Hammer, 2007).

### **3. PROBLEM STATEMENT**

One of the safety issues regarding distracted driving is that, no matter how well a driver thinks (s)he can drive, a distraction can compromise safe driving. Anecdotal evidence shows that hospitals trigger moral values (*things that people care about*) and compassion from people, as it is a place where vulnerable people receive medical assistance. The Cambridge Dictionary, defines a hospital as “*a place where people who are ill or injured are treated and taken care of by doctors and nurses*”(Cambridge-Dictionary, 2019). Hospitals are therefore busy places throughout the day and night and emergency vehicles frequently travel to and from the hospital carrying patients, while driving at high speeds. One would expect the behaviour of the other drivers near hospitals to show that they are on high alert.

### **4. AIM OF THE PAPER**

The focus of this study is to investigate distracted driver behaviour; however, the research team applied a different approach. This study made use of roadside observations to learn about the behaviour of drivers when driving near hospitals. Observational studies have been used before by other researchers to understand the behaviour of drivers (Sullman, 2012; Huth, Sanchez and Brusque, 2018).

The aim of the paper is to present the results of two intersection observational studies and to show the relevance of the research results within the context of improved approaches to address road safety in South Africa.

### **5. METHODOLOGY**

#### **5.1. Overview**

Roadside observation studies, involves a researcher stationed by the roadside, simply recording all activities and characteristics of the drivers in a selected location, this is done without intruding on the driver's space, as the drivers are observed discreetly (Huisingh, Griffin and McGwin, 2015). In 2018 an observational study investigated children's behaviours across two play grounds: Similarities and differences in physical activity levels for boys and girls in seven areas across two playgrounds (Stanton-chapman *et al.*, 2018). In 2018 an observational study was used to study the effect of age on children's pedestrian behaviour (Wang *et al.*, 2018). In 2015 an observation study was used to study drivers' cellular phone use at red traffic lights (Huth, Sanchez and Brusque, 2015). It is clear from the examples of other observational studies that, these types of studies are finding a place in research communities and are assisting researchers to add to the body of knowledge.

In the study about the effectiveness of the naturalistic driving studies in improving driver behaviour (Muronga, 2016), the researchers had three categories that were linked to a driver behaviour, namely Distractions, Fundamentals and Traffic Violations. They listed distractions as: cell phone use; eating or drinking whilst driving and taking passengers, and fundamentals included activities that require the driver to apply their mind whilst driving, such as driving too fast for the road condition, e.g. wet road surface, and traffic violations related to any traffic contravention act in the country of the study.

On the report published by the Road Traffic Management Corporation of South Africa, the activities recorded as distracted driving were categorised as “human factors” which they defined as a stable, general human abilities and limitations that are valid for all users regardless (RTMC, 2017), these human factors included mainly traffic violations and fundamentals such as cell phone use, drinking and driving, following vehicle too closely etc. Human factors on the RTMC report were recognised as the main contributor to traffic crashes, including fatal crashes, with the fatal crashes for 2017 showing an increase of 13% from the previous year (RTMC, 2017). The human factors listed in the report are linked to drivers being distracted before performing any of the activities which leads to fatal crashes. Therefore, the high proportion of distracted driving observed in this study is a cause for concern.

For the purpose of this study we combined descriptions from Muronga, 2016 and RTMC, 2017 and named them as Human factors and with specific focus on attributes as listed on the procedure section (5.2.3) below.

## 5.2. Overview of roadside observation study

### *5.2.1. Setting*

A road side observation study was conducted near two public hospitals, in townships located in the Gauteng Province. The study took place at an intersection near Dr George Mukhari Hospital in the City of Tshwane (Ga-Rankuwa township) and an intersection near Chris Hani Baragwanath Hospital in the City of Johannesburg (Soweto township). The observation study considered selected passenger vehicles including: minibus taxis, buses; cars and trucks. At both intersections, the researchers focused on vehicles that were travelling towards the city centre. The city centre’s direction that was covered was the City of Johannesburg and the City of Tshwane, both in the Gauteng province of South Africa.

The motivation for making use of township roads in the direction towards the city centre is that township roads in South Africa, since democracy in 1994, carry a great deal of traffic towards the city centre, as these townships were designed to be situated in the outskirts of the cities (Pernegger and Godehart, 2007), with many people having to travel to the city centres for work purposes. Economic activities in the townships in South Africa are not diversified and are marginal. With Soweto accommodating about 43 % of the population of the City of Johannesburg (Pernegger and Godehart, 2007), it is no surprise that many people travel towards the city centre on a daily basis, and this pattern is also replicated in other townships.

Due to limited funding for the project, the researchers could only conduct the study for one day per site during morning peak and off-peak periods.

### *5.2.2. Time and duration of observations*

At Chris Hani Baragwanath Hospital in Johannesburg the observations took place on Wednesday the 31<sup>st</sup> of October 2019 during the morning peak hours from 06:00 to 09:00. At Dr George Mukhari Hospital in Tshwane the observations took place on Friday the 11<sup>th</sup> of November 2019 during the morning peak from 06:00 to 09:00 and off-peak period between 11:00 - 13:00.

### *5.2.3. Procedure*

The data was collected at two intersections by two researchers. The researchers were situated at an observation point where it was safe for them to see the drivers of the vehicles clearly. The vehicles which were observed were only vehicles that were passing

on the side of the researchers. All the vehicles which passed were counted and distracted driving actions were recorded.

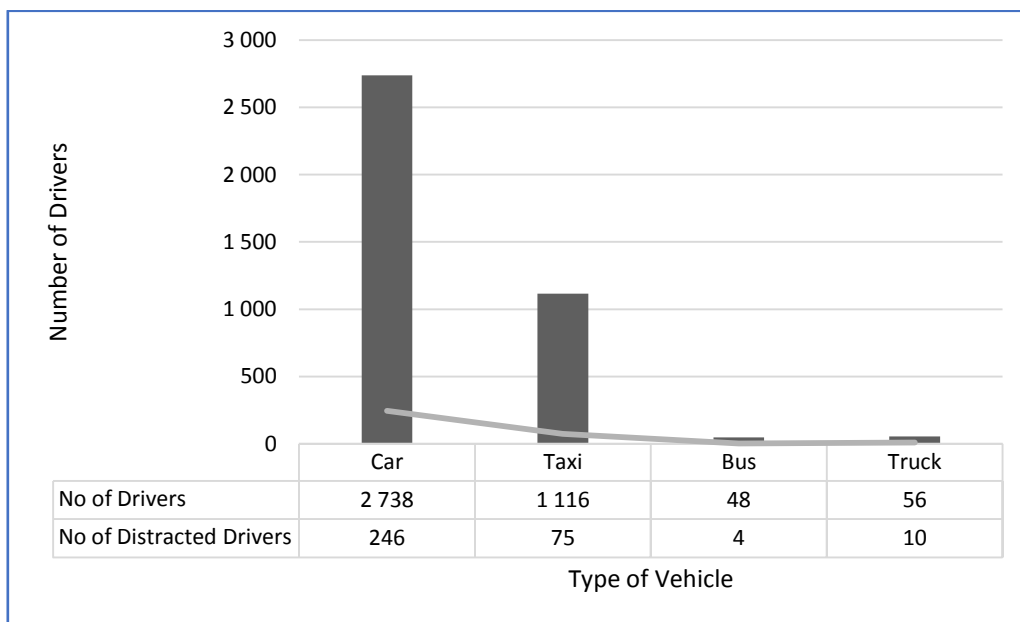
Distracted driving actions that were observed included:

- **Mobile device use** – The driver is either holding or making use of a mobile device.
- **Smoking** – The driver is smoking or preparing to light a cigarette.
- **Passengers** – The driver is communicating to the passengers in a distracting manner (looking away from the road and focusing on the passenger).
- **Grooming/Eating** – The driver is either grooming, eating or drinking whilst the vehicle is moving.
- **External** – The driver is paying attention to external activities around the road environment.

## 6. RESULTS

### 6.1. Chris Hani Baragwanath Hospital Intersection

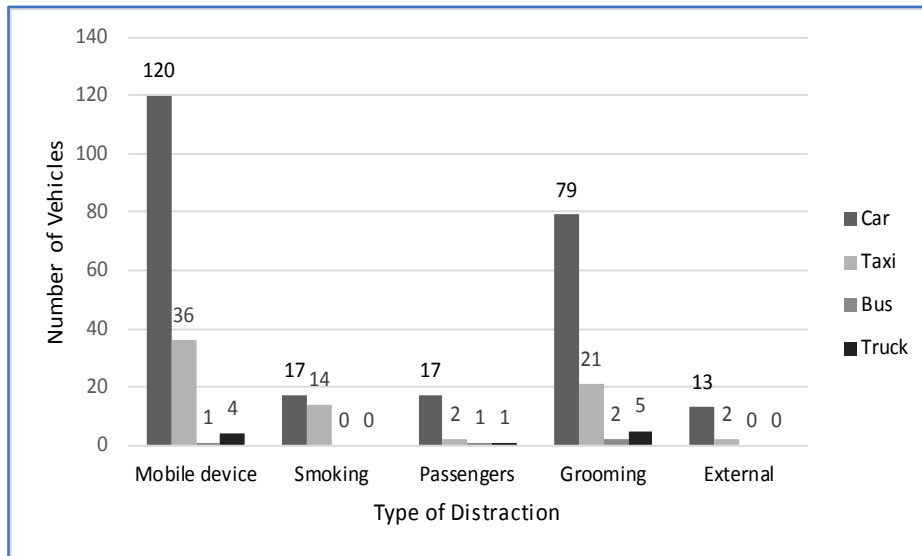
At Chris Hani Baragwanath Hospital, a total of 3 958 vehicle drivers were counted using the road (from the hospital) towards the city centre. Figure 1 below shows the number of drivers that were observed and the number of distracted drivers per type of vehicle that the driver was operating.



**Figure 1: The number of drivers compared to the number of distracted drivers (Chris Hani Baragwanath Hospital).**

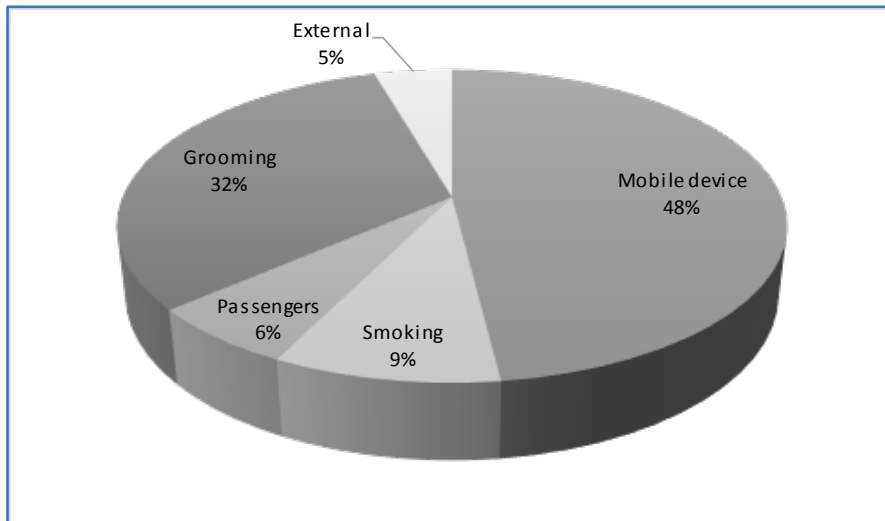
A total of 335 vehicle drivers of the 3 958 drivers counted were engaged in distracting activities which means about 9% of vehicles driving through the intersection were distracted (Figure 1).

Figure 2 below shows the total number of drivers involved in a type of distraction observed from the different types of vehicles.



**Figure 2: Number of Distracted Drivers (Chris Hani Baragwanath Hospital)**

In terms of percentages, the distractions observed can be interpreted as per Figure 3 below shows that of all the distractions observed during the survey, 48% are related to **mobile device** use, 32% **grooming, eating or drinking**, 9% **smoking**, 6% talking to **passengers** and 5% **external** activities within the driving environment.



**Figure 3: Percentage of distractions observed at Chris Hani Baragwanath Hospital**

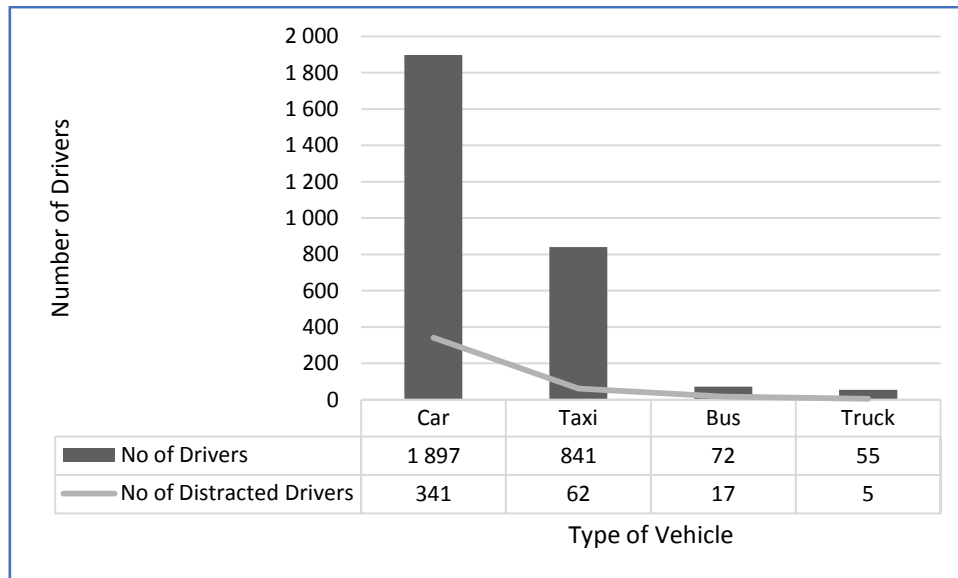
Table 1 below shows the percentages of each type of distraction out of the total number of each type of vehicle drivers counted.

**Table 1: Percentage of distraction type per vehicle type (Chris Hani Baragwanath Hospital)**

Vehicle	Mobile device	Smoking	Passengers	Grooming	External
<b>Car</b>	4.4 %	0.6 %	0.6 %	2.9 %	0.5 %
<b>Taxi</b>	3.2 %	1.3 %	0.2 %	1.9 %	0.2 %
<b>Bus</b>	2.1 %	0.0 %	2.1 %	4.2 %	0.0 %
<b>Truck</b>	7.1 %	0.0 %	1.8 %	8.9 %	0.0 %

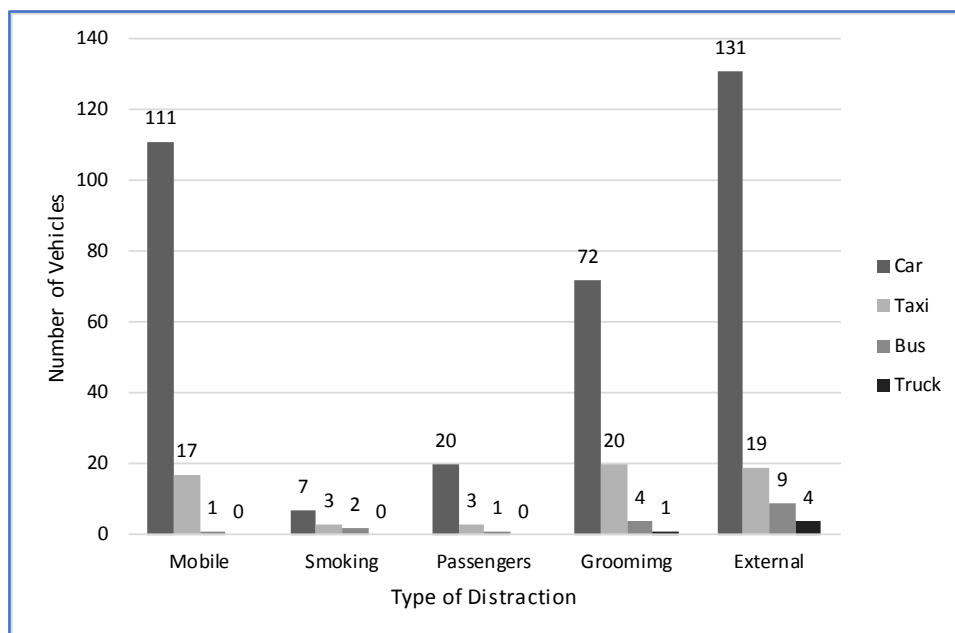
## 6.2. Dr George Mukhari Hospital Intersection

At Dr George Mukhari Hospital, a total of 2 865 vehicles were counted using the road (from the hospital) towards town. Figure 4 below shows number of vehicle drivers counted and the number of distracted vehicle drivers in terms of the vehicle type.



**Figure 4: The number of vehicle drivers compared to the number of distracted vehicle drivers (Dr George Mukhari Hospital)**

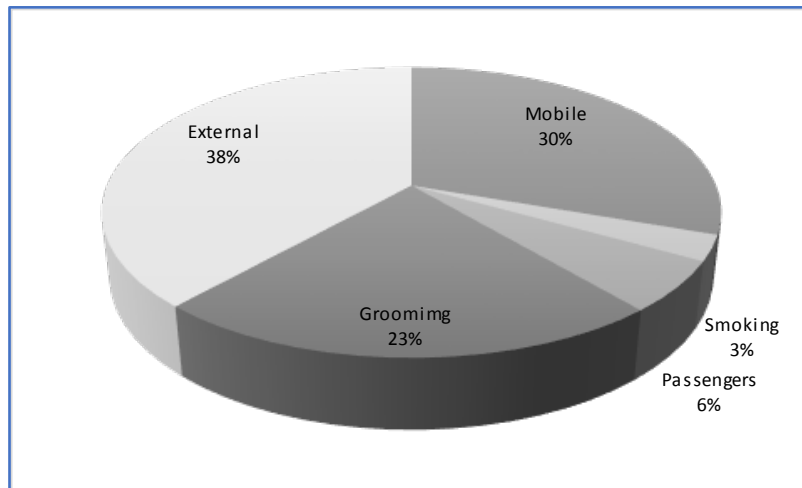
The secondary activities observed during the survey is drivers using their **mobile devices**, drivers which are **smoking**, drivers which are talking to **passengers** inside the vehicle, drivers which include **eating, drinking or grooming**, and drivers which are looking at **external** activities around immediate driving environment. Of all the vehicles counted (2 865) a total of 425 vehicle drivers were distracted which means about 15 % of vehicles driving through the intersection were distracted.



**Figure 5: Number of Distracted Drivers (Dr George Mukhari Hospital)**

Figure 5 above shows the total number of vehicle drivers involved in a type of distraction observed amongst the different types of vehicles.

In terms of percentages, the distractions observed can be interpreted as per Figure 6 below shows that out of all the distractions which were observed during the survey 30% was for **mobile devices**, 23% was for **grooming**, eating or drinking, 3% **smoking**, 6% talking to **passengers** and 38% **external** activities around the immediate driving environment.



**Figure 6: Percentage of distractions observed at Dr George Mukhari Hospital**

Table 2 below shows the percentages of each type of distraction out of the total number of each type of vehicle counted.

**Table 2: Percentage of distraction type per vehicle type (Dr George Mukhari Hospital)**

Vehicles	Mobile device	Smoking	Passengers	Grooming	External
<b>Car</b>	5.9 %	0.4 %	1.1 %	3.8 %	6.9 %
<b>Taxi</b>	2.0 %	0.4 %	0.4 %	2.4 %	2.3 %
<b>Bus</b>	1.4 %	2.8 %	1.4 %	5.6 %	12.5 %
<b>Truck</b>	0.0 %	0.0 %	0.0 %	1.8 %	7.3 %

## 7. DISCUSSION

With the observation being conducted near hospitals, the expectation was that drivers should be more cautious than usual whilst driving on routes where emergency vehicles drive at high speeds and could appear from any direction. Navigating these routes requires the driver's full attention and focus on monitoring the driving environment; being able to mentally make good decisions and physically control the vehicle. According to Celestine, Corinne Tracey & Cara one of the contributing causes for emergency vehicle crashes driving in emergency mode is distraction/ inattention which shows that as much as emergency vehicles can be seen or heard as they approach not only near hospitals but anywhere, the high speeds and inability of the surrounding vehicles to respond could add to increased crash risks (Missikpode *et al.*, 2018).

The results of the study show that although drivers are expected to be a lot more cautious around hospital routes, quite a high percentage of drivers who were observed to be involved in activities that may be distracting. One might expect even higher percentages of distracting activities on routes that do not pass a hospital, but this would need to be confirmed with more observational studies.

The use of mobile devices was frequently observed and this can be interpreted as a disregard for the law, as the use of mobile devices whilst driving is illegal in South Africa. The use of mobile device requires the driver: a) use hands to press buttons on the mobile device while needing to control the vehicle; b) to remove eyes from the road to look at the device; c) if the device is a mobile phone, to pay attention to the conversation therefore lose focus of the driving environment; and d) not to think about driving, but focusing thoughts on other things that can lead to failing to pay attention and make good judgements (Lipovac *et al.*, 2017).

A red flag from the study, was the results indicating that, drivers of public transportation vehicles (drivers of busses and minibus taxis), were recorded as smoking whilst driving, and during peak periods, which indicates a vehicle full of passengers. Table 1 shows a higher percentage of minibus taxi drivers smoking compared with the other types of vehicles and in Table 2 the percentage is higher for bus drivers. Smoking in public places is illegal in South Africa, and one can only do it in designated areas. But these drivers showed a lack of concern for their passengers' health, and/or either the fact that they are breaking the law. Health related issues that are caused by secondary smoking, which can be referred to as involuntarily inhaling of tobacco as it is smoked by others are many including respiratory problems, lung cancer and death (Nguyen *et al.*, 2016).

## **8. CONCLUSIONS**

Although this study is based on a small amount of data, some initial conclusions can be drawn, but these should be tested with further data collection (see recommendations, below). This study has shown that even with a combined observation of just eight (8) hours, a high proportion of drivers showed distracted behaviour and intentionally disregard for the laws of the country. The highest distraction at the Dr George Mukhari Hospital in Ga-Rankuwa township was due to fundamentals, meaning drivers looking at external activities and therefore not concentrating on their driving, and the highest distraction at the Chris Hani Baragwaneth Hospital in Soweto was the use of mobile devices. As already discussed above the shocking results were that some of the observed drivers, especially those driving public transport vehicles, showed a lack of concern for their passenger's health, and/or the fact that they are breaking the law by smoking in public. Smoking in public places is illegal in South Africa, and one can only do it in designated areas and definitely not when transporting public passengers.

## **9. RECOMMENDATIONS**

In this study, the number and types of distractions were pointed out, but further studies should be conducted as they could help establish the amount of risk each distraction poses to other drivers, passengers and the environment, by specifically looking at the damage that could potentially be done by the different types of vehicles if the distraction caused a crash. Further studies on the same attributes should also be conducted over a longer period of time, covering all the travel times of the day and more days of the week. Also, more studies should be done in other locations to determine whether the assumption that drivers are more careful around hospitals is a valid one. More data is needed and,



with more information coming out of these types of studies, authorities will be able to identify alternative solutions for improving the behaviour of drivers and subsequently improve safety on South African roads.

## 10. REFERENCES

Cambridge-Dictionary, 2019. *HOSPITAL* | meaning in the Cambridge English Dictionary. Available at: <https://dictionary.cambridge.org/dictionary/english/hospital> (Accessed: 8 April 2019).

Huisingh, C, Griffin, R and McGwin, G, 2015. 'The Prevalence of Distraction Among Passenger Vehicle Drivers: A Roadside Observational Approach', *Traffic Injury Prevention*, 16(2), pp. 140-146. doi: 10.1080/15389588.2014.916797.

Huth, V, Sanchez, Y and Brusque, C, 2015. 'Drivers' phone use at red traffic lights : A roadside observation study comparing calls and visual – manual interactions', *Accident Analysis and Prevention*. Elsevier Ltd, 74, pp. 42-48. doi: 10.1016/j.aap.2014.10.008.

Huth, V, Sanchez, Y and Brusque, C, 2018. 'Drivers' phone use at red traffic lights: A roadside observation study comparing calls and visual-manual interactions', *Accident Analysis and Prevention*, 74, pp. 42-48. doi: 10.1016/j.aap.2014.10.008.

Lipovac, K *et al.*, 2017. 'Mobile phone use while driving-literary review', *Transportation Research Part F: Traffic Psychology and Behaviour*, 47, pp. 132-142. doi: 10.1016/j.trf.2017.04.015.

Missikpode, C *et al.*, 2018. 'Does crash risk increase when emergency vehicles are driving with lights and sirens?', *Accident Analysis and Prevention*. Elsevier, 113(February), pp. 257-262. doi: 10.1016/j.aap.2018.02.002.

Muronga, K, 2016. *The effectiveness of the Naturalistic Driving Studies in improving driver behaviour*. Tshwane.

Muronga, K *et al.*, 2018. 'Towards Quantifying Road Risk : A Case Of Distracted Driving', in *2018 SARF/IRF/PIARC Regional Conference for Africa*. Durban. Available at: <http://hdl.handle.net/10204/10549>.

Muronga, K and Ruxwana, N, 2017. 'Naturalistic Driving Studies : The Effectiveness Of The Methodology In Monitoring Driver Behaviour', in *36th Annual Southern African Transport Conference*, pp. 534-543. Available at: <http://hdl.handle.net/2263/62734>.

Muronga, K and Venter, K, 2014. 'Naturalistic driving data: managing and working with large databases for road and traffic management research', in *33rd Annual Southern African Transport Conference*. Available at: <http://hdl.handle.net/2263/45534>.

Nguyen, KH *et al.*, 2016. 'Tobacco Use, Secondhand Smoke, and Smoke-Free Home Rules in Multiunit Housing', *American Journal of Preventive Medicine*. Elsevier, 51(5), pp. 682-692. doi: 10.1016/j.amepre.2016.05.009.

Pernegger, L and Godehart, S, 2007. *Townships in the South African Geographic Landscape – Physical and Social Legacies and Challenges, Training for Township Renewal Initiative*. Available at: [http://www.treasury.gov.za/divisions/bo/ndp/TTRI/ TTRI Oct 2007/Day 1 - 29 Oct 2007/1a Keynote Address Li Pernegger Paper.pdf](http://www.treasury.gov.za/divisions/bo/ndp/TTRI/TTRI%20Oct%202007/Day%201%20-%2029%20Oct%202007/1a%20Keynote%20Address%20Li%20Pernegger%20Paper.pdf).

Ranney, TA *et al.* (no date). 'NHTSA Driver Distraction Research: Past, Present, And Future Vehicle Test and Research Center, East Liberty, OH Paper Number 233', *Driver Distraction Internet Forum (July 5 - August 11, 2000)*, (233).

RTMC, 2017. *RTMC Road Fatality Report for 2017*. Available at: [https://www.arrivealive.co.za/documents/RTMC Road Fatality Report for 2017.pdf](https://www.arrivealive.co.za/documents/RTMC%20Road%20Fatality%20Report%20for%202017.pdf).

Stanton-chapman, TL *et al.*, 2018. 'Early Childhood Research Quarterly An observational study of children's behaviors across two playgrounds: Similarities and differences', *Early Childhood Research Quarterly*. Elsevier Inc., 44, pp. 114-123. doi: 10.1016/j.ecresq.2018.03.007.

Sullman, MJM, 2012. 'An observational study of driver distraction in England', *Transportation Research Part F: Psychology and Behaviour*. Elsevier Ltd, 15(3), pp. 272-278. doi: 10.1016/j.trf.2012.01.001.

Venter, K, 2014. *An Exploratory Study into South African Novice Driver Behaviour*. Stellenbosch University. Available at: <http://hdl.handle.net/10019.1/86602>.

Wang, H. *et al.*, 2018. 'Effect of age on children's pedestrian behaviour: Results from an observational study', *Transportation Research Part F: Traffic Psychology and Behaviour*. Elsevier Ltd, 58, pp. 556-565. doi: 10.1016/j.trf.2018.06.039.

Young, K, Regan, M and Hammer, M, 2007. 'Driver distraction: A review of the literature', *Distracted driving*. Sydney, NSW: Australasian College of Road Safety, pp. 379-405.