Summary Report: Modeling of Trauma Admissions in Lockdown Level 3

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Team

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Background

Over the past 100+ days of the lockdown in South Africa, there has been an exponential rise in positive cases of Covid-19: from 116 on 18 March to 196,750 on 5 July. During levels 4 and 5 of the lockdown, which included a ban on the sales of liquor from both on and off-consumption outlets and substantial restrictions on movement/work, there was a 60%-70% reduction in hospital visits and admissions related to trauma (Parry et al., under review). The period of "lockdown light" from 19 to 26 March comprised of restrictions on the operating hours and days of the week when sale of alcohol at on- and off-consumption outlets was permitted as well as a restriction on the number of patrons allowed at on-consumption outlets selling alcohol. A quick review of preliminary data for the weekend of 21 and 22 March 2020 showed a 25%-50% drop in transport emergencies dealt with by ER24's contact centre, a drop in assaults and stabbings recorded by Rescue 786 Ambulance Services, and a decline in surgical and medical emergency cases at Johannesburg's Chris Baragwanath Hospital outside Soweto (de Wet, 2020).

Following the easing of restrictions to Level 3 on 1 June 2020 a noticeable surge in trauma-related hospital visits has been observed. This has been anecdotally attributed to easing of restrictions related to the sale and distribution of alcohol. Calls are now being made to re-impose alcohol restrictions with claims that this would stem trauma-related hospital visits, thereby freeing health services, staff and wards, for the care of Covid-19 patients.

This raises the following question of the effect of re-imposing a ban on liquor sales during Level 3 lockdown on trauma-related hospital visits and admissions.

The effect of a ban on liquor sales on trauma-related visits during the Level 3 lockdown

Table 1 below sets out a process whereby the team estimated the number of trauma unit visits that could be averted if a ban on liquor sales is implemented.

Table 1: Modelling the effect of a reduction in trauma unit presentations in Level 3 lockdown following imposition on of a ban on liquor sales

	Multiplier	Number
Number of trauma unit presentations per year in SA		
Number of trauma presentations per year across 356+ secondary & tertiary public hospitals (1999)		1,511,040
Estimated number in 2020 across secondary & tertiary public hospitals	1.47	2,221,229
Estimates per week		
Estimated trauma presentations per week before lockdown	0.019	42,716
Estimated trauma presentations in Level 3 per week (80% of pre lockdown trauma presentations) compared to pre-lockdown	0.8	34,173
Estimated alcohol-relate trauma presentations Level 3	0.5	17,086
So what % of ~17,000 would disappear if alcohol sales stopped as in L4 & L5?		
1st week after instituting a ban on liquor sales in Level 3 lockdown	0.2	3,417
2nd week	0.3	5,126
3rd week	0.4	6,835
4th & subsequent weeks	0.4	6,835
Est. saving in alcohol-related trauma presentations over 4 weeks: 22,212 trauma presentations; over 8 weeks: 49,550		

This summary report does not include the deliberations made over the two days or the reasons given for assumptions made.

In comparison to the drop in alcohol-related trauma that occurred with the imposition of a temporary ban on alcohol sales at the beginning of lockdown Level 5 (60%-70%), the effect of the ban during lockdown Level 3 is likely to be somewhat less as a result of people and businesses stockpiling alcohol, in some cases for resale for greater profit. In addition, people have learned to improvise and brew their own alcohol. The longer the duration of the ban the greater the impact.

Using the model demonstrated in Table 1 above, it is estimated that a ban could achieve a reduction of approximately 3,400 alcohol-related trauma presentations across public secondary and tertiary hospitals by the end of the first week following a ban on liquor sales (that is, an estimated 10% reduction in Level 3 weekly trauma presentations, or 20% of the alcohol-related trauma presentations), levelling out to a maximum reduction of approximately 6,800 alcohol-related trauma presentations by the end of the third week (or 20% of all trauma admissions/40% of alcohol-related trauma presentations).

This is likely to have a substantial impact on reducing the burden on staff in trauma units, the demand for inpatient beds, ICU facilities and ventilation capacity. In many cases such patients place a strain on medical care for extended periods. For example, 2% of stab-related admissions (a common trauma

associated with alcohol use) require admission to the ICU for an average of 5 days. The impact of blunt force trauma is greater. Of 72% requiring a hospital admission, 25% are admitted to the ICU for an average of 9 days.

A trauma patient presenting to a health care facility and not requiring admission, contributes to overcrowding, and therefore increasing the risk of transmission of Covid-19 between patients and staff in the emergency centres. It is worth noting that trauma patients requiring surgery consume resources such as theatre time, and skilled staff such as anesthetist, two surgeons, an anesthetic nurse, scrub sister and floor nurse. Such staff can potentially be deployed to other areas of need in the hospital. Poly-trauma patients frequently require prolonged hospitalisation and extended rehabilitation often exceeding 4-weeks. We considered the percentage of cases admitted to general wards and to ICU units and the length of stay in general wards and ICU units for six different injury types: blunt force trauma, burns, sharp force trauma, road collisions, gunshots, self-harm and falls. Using the median values across these six categories we estimated that the 49,550 cases from Table 1 would, over 8-weeks, equate to 200,578 days spent in general wards and 70,138 days of ICU bed occupancy. These cases could potentially be averted through an alcohol sales ban. If we use data in Level 3 from 5 Western Cape Hospitals to indicate the spread of trauma presentations across different injury types, 49,550 less trauma presentations would come to 124,424 less days spent in general wards and 46,246 less days of ICU bed occupancy or a saving of R1.3 bn (not all of which would be realized as only about 25%-27% relates to consumables), but this saving would enable the treatment of about 17,755 Covid-19 patients in general wards OR about 12,947 in ICU wards [Using MOSAIC model, Cleary et al., 2020 for costing and ward stays].

In general, alcohol use is expected to reduce adherence to non-pharmacological methods of reducing the transmission of SARS CoV 2 such as physical distancing, hand sanitation and use of masks within the social setting. In addition, hospitals are considered high risk areas for exposure to COVID. By limiting alcohol-related hospital visits/admissions we are limiting exposure to and transmission of SARS CoV 2. A ban on alcohol sales will also have an impact in terms of reducing the burden on primary care and private facilities, but we were unable to quantify this at this time due to lack of data.

References

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3. Parry, C.D.H., Nicol, A.J., Navsaria, P., & Matzopoulos, R. (under review). Lifting the ban on alcohol sales during the Covid-19 lockdown on admissions to trauma units in South Africa: A modelling study