

INVESTIGATING BLOOD ALCOHOL  
CONCENTRATIONS IN VIOLENT DEATH  
AND ITS RELATIONSHIP TO THE COVID-  
19 NATIONAL LOCKDOWN IN  
WESTERN CAPE, SOUTH AFRICA:  
A CROSS-SECTIONAL RETROSPECTIVE  
REVIEW

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SACENDU

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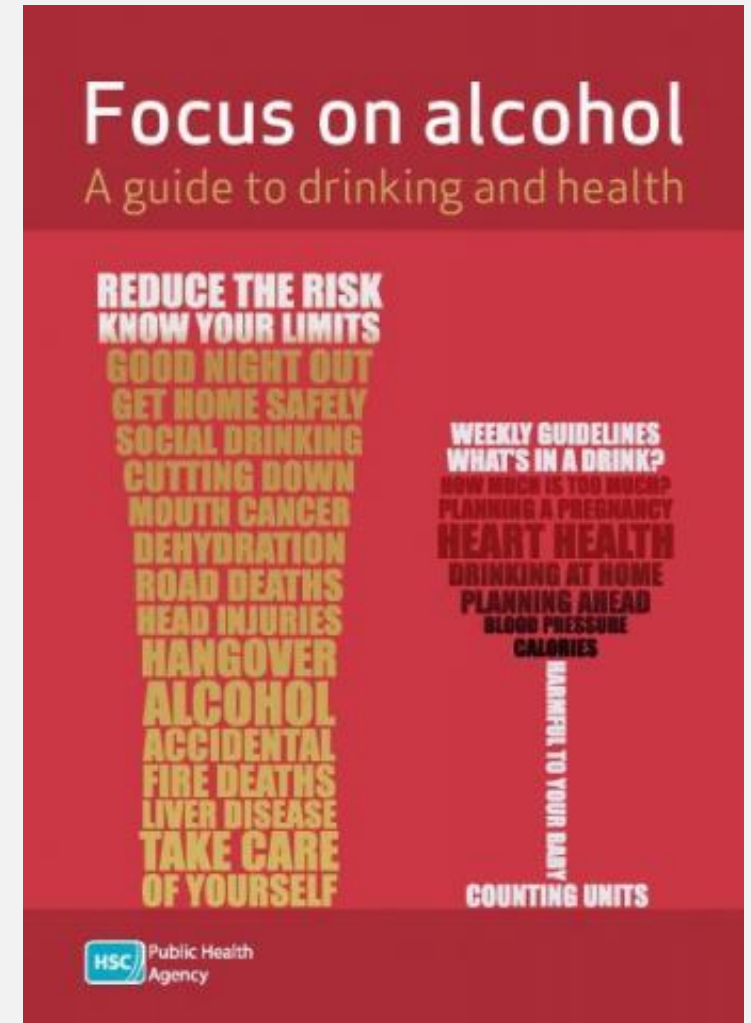
# SETTING

- 16 mortuaries in the Western Cape
- Salt River and Tygerberg mortuaries (yellow on the map) see > 3000 cases per year.
- Investigation of suspected unnatural deaths.
- Assist SAPS
- Training and research



# BACKGROUND

- Alcohol - major contributor to violent death
- Alcohol-related harms reduction important for public health
- COVID-19 lockdown period and alcohol ban - Unique
- Mortuary data
- BAC 2019 and 2020



# ALCOHOL HARMS REDUCTION GAME CHANGER AUGUST 2019

- Cost SA R300 billion in 2009
- Western Cape worse off
- ± 300 alcohol related deaths per month
- One of the game changers of the WC Government

## GAME CHANGER: ALCOHOL HARMS REDUCTION

OUR DELIVERY APPROACH IS TACKLED ON FOUR FRONTS

PRIORITY



Be specific about what we want to achieve

PEOPLE



Political leadership & Capable teams in the respective departments

PERFORMANCE



Focus on results and data (not anecdotal evidence)

PROBLEM SOLVE



Rapid identification and resolution of problems

# ALCOHOL AND THE ECONOMY

How Alcohol  
Affects The  
Economy



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Healthcare and policing sectors

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4% of deaths and disability adjusted life years associated with alcohol globally (1)

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Economic impact estimated at US\$ 746 per person in 2006 (2)

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Comparable to smoking and physical inactivity – however greater returns with alcohol control.

ALCOHOL AND  
TRAUMA,  
SOCIO-ECONOMIC  
GROUPS AND  
GENDER



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Causal role of violence-related injuries including homicide victims (3,4)

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Consumption patterns differ in socio-economic groups (5)

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Link between alcohol and gender-based violence (5,6)

3 Slater et al. 2006  
4 Machdonald et al. 2005  
5 Probst et al. 2018  
6 Morojele et al. 2006

# COVID 19 AND THE ALCOHOL BAN


- Complete alcohol ban:
  - 27 March 2020 – 24 May 2020
  - 12 July 2020 – 14 Aug 2020
  - 28 Dec 2020 – 2 Feb 2021
- Partial restrictions on alcohol sales:
  - 25 May 2020 – 11 July 2020
  - 15 Aug 2020 – 27 Sept 2020



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## Summary of alert levels

ALERT LEVEL 5	ALERT LEVEL 4	ALERT LEVEL 3	ALERT LEVEL 2	ALERT LEVEL 1
 <b>OBJECTIVE</b>				
Drastic measures to contain the spread of the virus and save lives.	Extreme precautions to limit community transmission and outbreaks, while allowing some activity to resume.	Restrictions on many activities, including at workplaces and socially, to address a high risk of transmission.	Physical distancing and restrictions on leisure and social activities to prevent a resurgence of the virus.	Most normal activity can resume, with precautions and health guidelines followed at all times.  Population prepared for an increase in alert levels if necessary.

**WHATSAPP SUPPORT**  
**0600 123 456**  
**EMERGENCY NUMBER**  
**0800 029 999**  
[sacoronavirus.co.za](http://sacoronavirus.co.za)

  
 REPUBLIC OF SOUTH AFRICA



# COVID-19 AND THE ALCOHOL BAN

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Alcohol bans in Thailand, India, Kenya,  
Mexico

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Opportunity to examine relationship  
of alcohol with trauma in emergency  
rooms

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Found a decrease in trauma loads  
during alcohol bans and increase once  
alcohol sales were reinstated (7)





## AIMS

To investigate the role of alcohol in violent deaths in the Western Cape (WC) between 2019 and 2020.

To examine the effect of restricted alcohol sale during the COVID-19 National Lockdown period in 2020 on blood alcohol concentrations in violent deaths in the Western Cape

# RESEARCH METHODOLOGY

## Study

- Cross sectional retrospective analysis of injury related mortality and BAC

## Sample

- All injury related cases received at WVC mortuaries

## Time span


- 1 January 2019 and  
31 December 2020 (inclusive)

## Ethics

- UCT HREC 751-2020

# DATA COLLECTION AND ANALYSIS

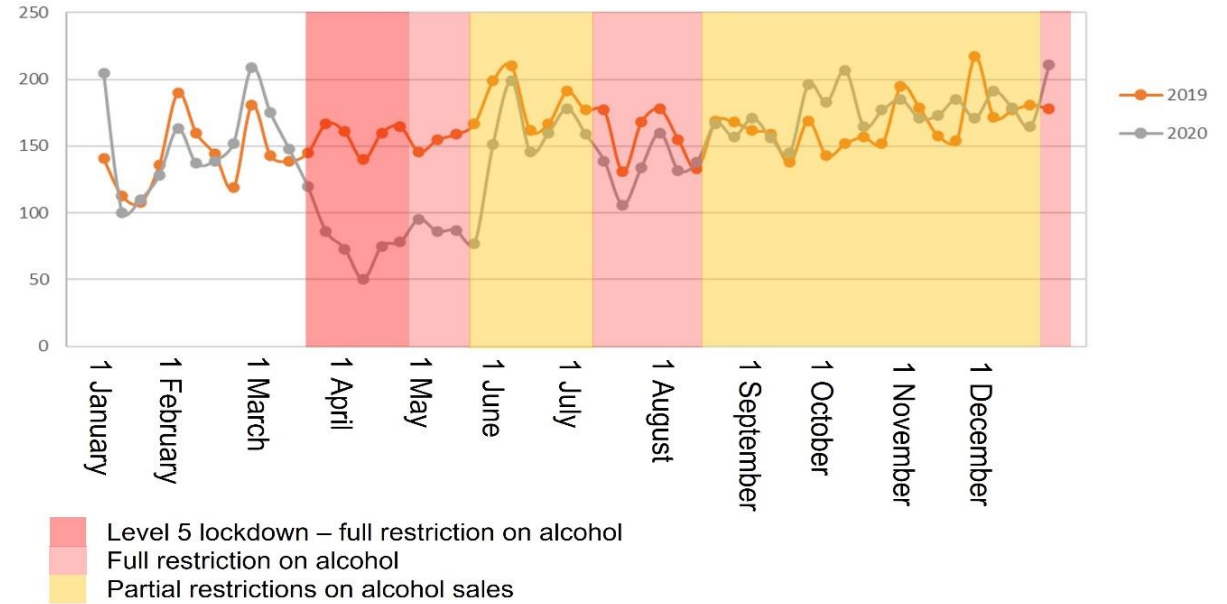
## Data

Demographics	Related to Death	Alcohol and Toxicology
Age 	Date and time of death declaration	Specimen submitted for ethanol analysis (Y/N)
Sex	Suspected manner of death	Alcohol analysis result available (Y/N)
Mortuary	Method of injury	Alcohol concentration in specimen
	Area of incident/injury	Specimens collected for toxicology (Y/N)
	If a road traffic death, the 'user': pedestrian/driver/passenger	Toxicology results

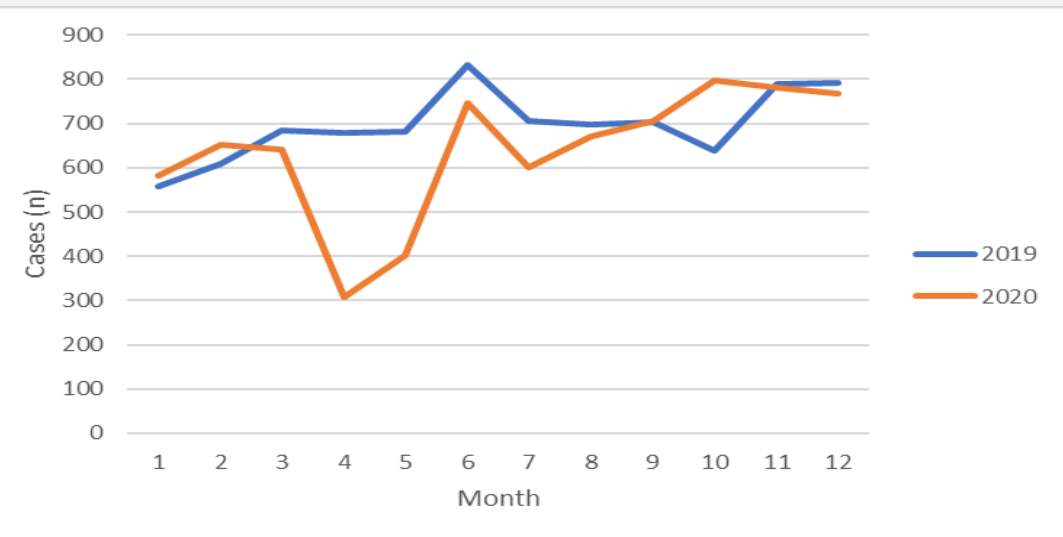
Data analysed using STATA 13

# RESULTS

- 21 796 autopsies in WC between 1 Jan 2019 and 31 Dec 2020.
- 16 027(73.5%) traumatic deaths.
- 47% reduction in injury-related cases in 2020 during period of full alcohol restriction and level 5 lockdown.



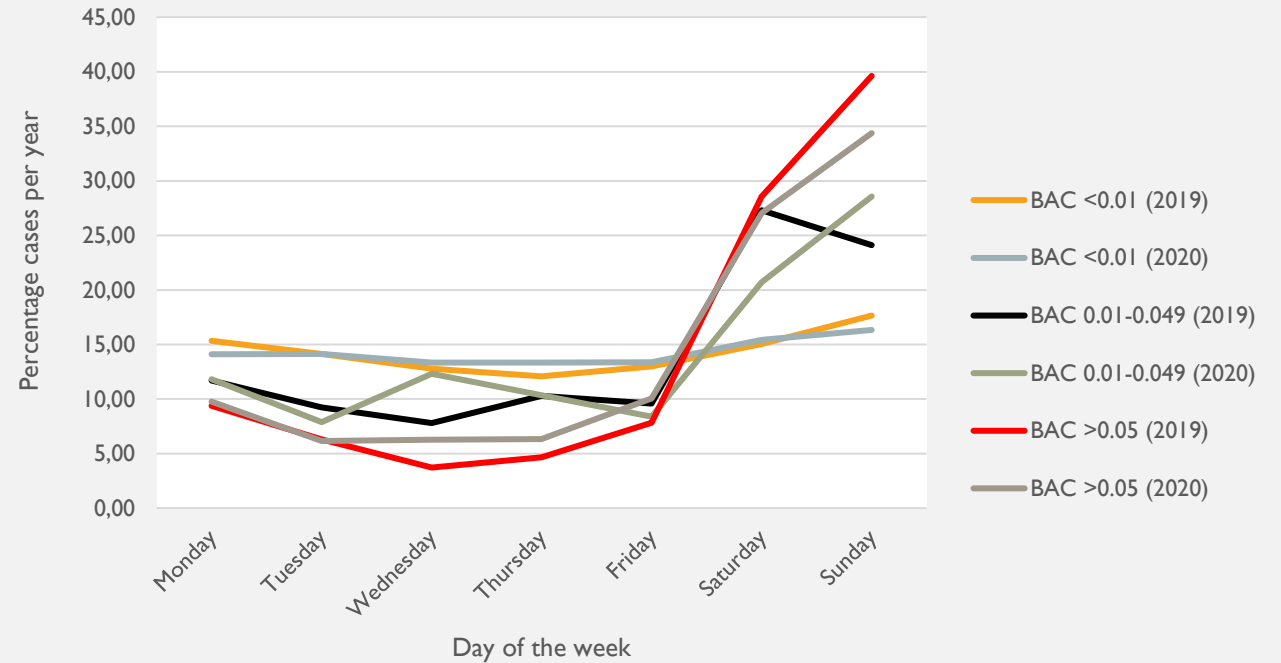
Weekly injury-related deaths in the Western Cape between 1 January 2019 and 31 December 2020, showing levels of alcohol restriction in 2020



Monthly distribution of injury-related cases per year

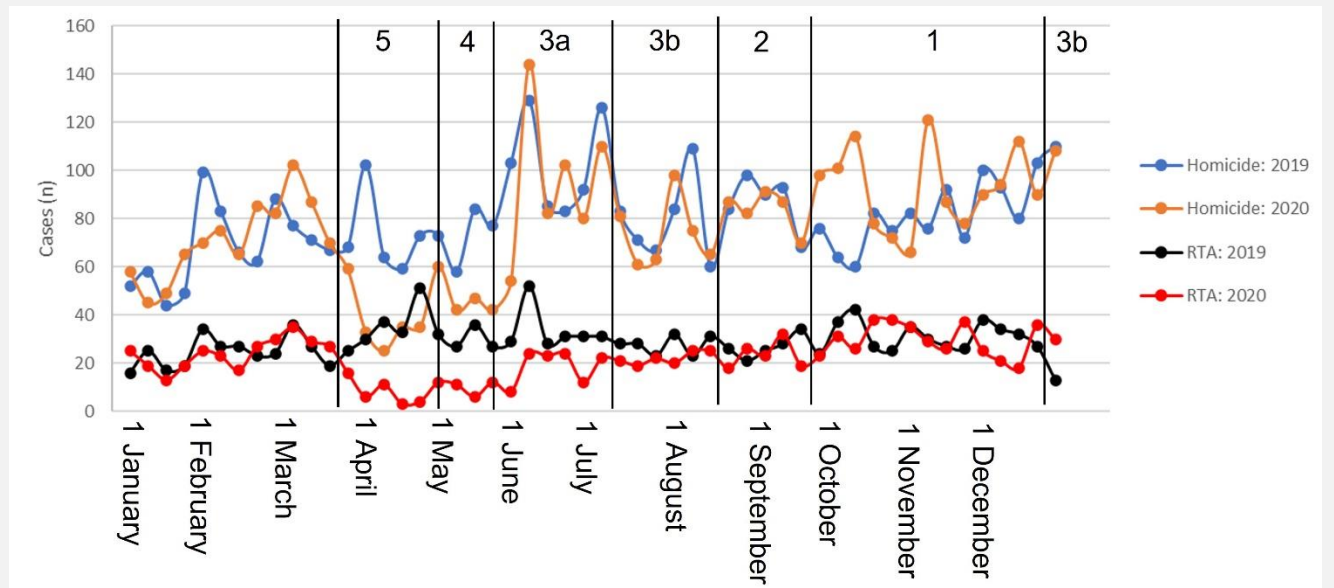
# DAY OF THE WEEK

- Most violent death cases occurred over weekends
  - Saturdays – 18.7 %
  - Sundays – 22.7 %
- BAC > 0.05g/dL increased sharply over weekends



Percentage distribution of cases per year by days of the week and BAC level

# MANNER OF DEATH



Weekly violent deaths in the Western Cape between 1 January 2019 and 31 December 2020, showing levels of lockdown

# BAC ANALYSIS

- BAC requested in 12077 cases (75.4%)
- Results available for 95% of cases.

Manner	Homicide	Suicide	Transport
<b>Alcohol analysis</b>	7227/8190 (85,2%)	1170/1374 (85,1%)	1861/2673 (69.6%)

## Mean (sd) g/100ml BAC positive cases

	2019	2020	p-value*
<b>Total</b>	0.18 (0.1)	0.17 (0.09)	0.0983
<b>Sex</b>			
Female	0.2 (0.11)	0.19 (0.11)	0.2027
Male	0.17 (0.1)	0.17 (0.09)	0.4977
<b>Manner of death</b>			
Homicide	0.17 (0.09)	0.16 (0.09)	0.1311
Suicide	0.14 (0.09)	0.14 (0.09)	1
Accident – transport	0.2 (0.1)	0.2 (0.09)	1

## Distribution of alcohol positive cases (BAC >0.01g/dL and BAC >0.05 g/dL between 2019 and 2020

	BAC >0.01 g/100ml n(% available BAC results)			BAC >0.05g/100ml n(% available BAC results)		
	2019	2020	p-value*	2019	2020	p-value*
<b>Total</b>	2523 (42.03)	1974 (35.94)	<0.0001	2241 (37.33)	1771 (32.24)	<0.0001
<b>Sex</b>						
<b>Female</b>	338 (41.42)	257 (37.14)	0.1802	305 (37.38)	230 (33.24)	0.1833
<b>Male</b>	2183 (42.10)	1717 (35.76)	<0.0001	1935 (37.32)	1541 (32.10)	<0.0001
<b>Manner of death</b>						
<b>Homicide</b>	1465 (41.38)	1160 (34.33)	<0.0001	1291 (36.47)	1035 (30.63)	<0.0001
<b>Suicide</b>	199 (35.1)	156 (29.16)	0.1408	171 (30.16)	130 (24.3)	0.1174
<b>Accident – transport</b>	499 (49.7)	379 (49.67)		465 (46.31)	354 (46.4)	

- In males and in homicides, significant difference between the 2 years in
  - BAC > 0.01 g/dL
  - BAC > 0.05 g/dL



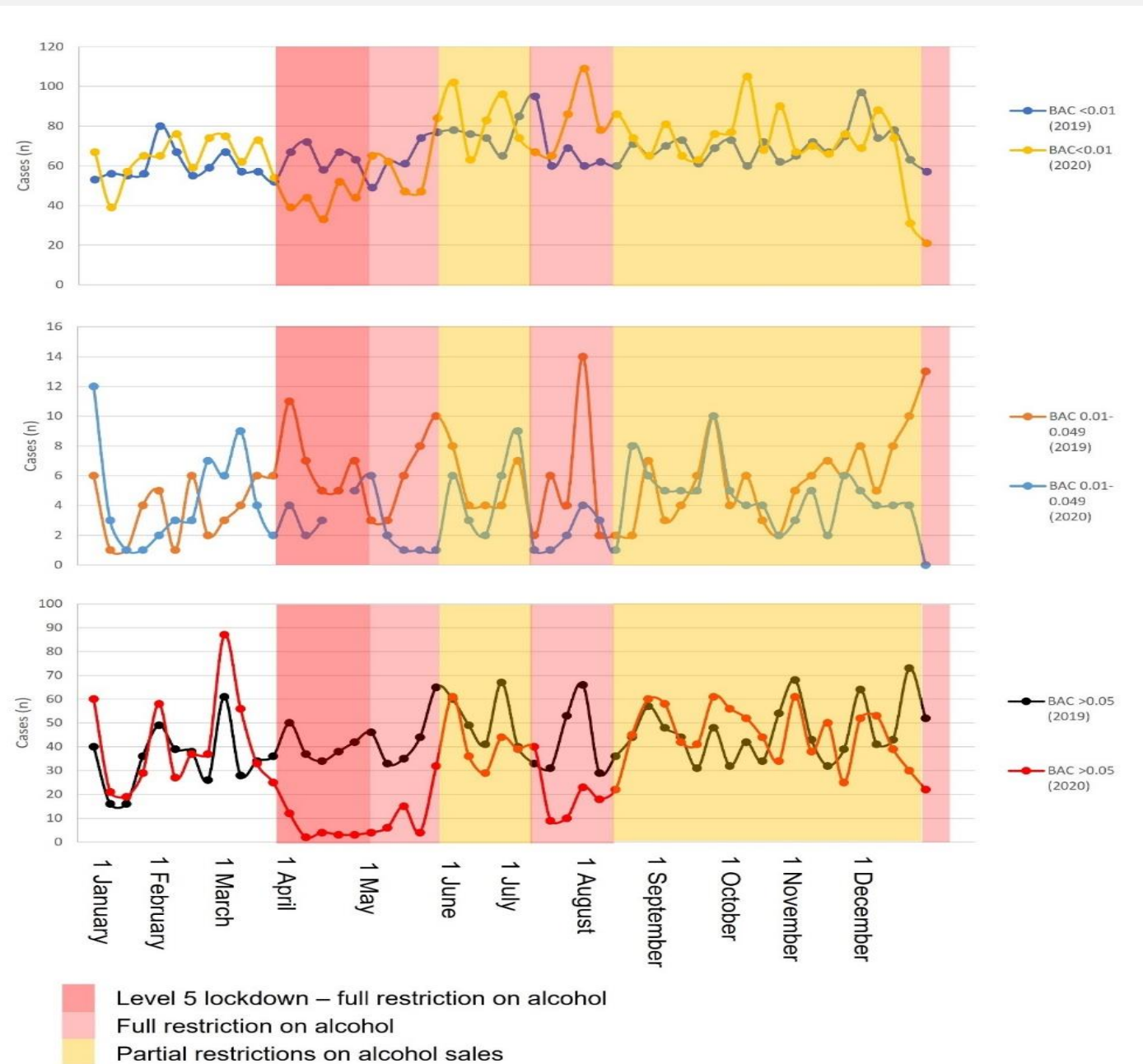
# ALCOHOL BANS

## Distribution of alcohol positive cases between 2019 and 2020

	Mean (sd) g/100ml BAC positive cases			BAC >0.01g/100ml n(% available BAC results)			BAC >0.05g/100ml n(% available BAC results)		
	2019	2020	p-value	2019	2020	p-value	2019	2020	p-value
<b>Complete ban</b>	0.18 (0.11)	0.17 (0.09)	0.1777	434 (43.05)	147 (19.39)	<0.0001	384 (38.09)	127 (16.75)	<0.0001
<b>Partial ban</b>	0.18 (0.1)	0.17 (0.09)	0.5589	685 (41.92)	641 (39.01)	0.2363	617 (37.76)	577 (35.12)	0.3038
<b>No restrictions</b>	0.17 (0.1)	0.17 (0.1)	1	1404 (41.77)	1186 (38.36)	0.0148	1240 (36.89)	1067 (34.51)	0.1275

# BAC ANALYSIS

- Significantly more individual had no alcohol detected in 2020 than in 2019 ( $p < 0.001$ )
- Significant drop in BAC levels during periods of lockdown and alcohol restriction.



Weekly violent death cases by BAC level in the Western Cape between 1 January 2019 and 31 December 2020, showing levels of lockdown

## DISCUSSION

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Decrease in caseload of mortuaries is similar to decreases seen in trauma patients during this time (8)

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Increases in injury-related deaths and higher BAC over weekends.

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79% of cases with positive blood alcohol concentrations had BAC levels above the legal limit of 0.05g/dL.

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Greatest proportion of positive BAC in homicide and transport related cases.

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## IMPACT AND CONCLUSION

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Data confirms great burden of injury-related mortality in the WC province

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Decrease in injury-related deaths and BAC during periods of hard lockdown and alcohol ban with increases following relaxation of restrictions.

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This information should be considered in the formulation of future policy in this regard.

# REFERENCES

1. Rehm J, Mathers C, Popova S, Thavorncharoensap M, Teerawattananon Y, Patra J. Global burden of disease and injury and economic cost attributable to alcohol use and alcohol-use disorders. *Lancet* 2009;373(9682):2223–33.
2. Bouchery EE, Harwood HJ, Sacks JJ, Simon CJ, Brewer RD. Economic costs of excessive alcohol consumption in the U.S., 2006. *Am J Prev Med [Internet]* 2011;41(5):516–24.
3. Slater MD, Long M, Ford VL. Alcohol, illegal drugs, violent crime, and traffic-related and other unintended injuries in U.S. local and national news. 2006;67(6):904–10.
4. Macdonald S, Cherpitel CJ, Borges G, Desouza A, Giesbrecht N, Stockwell T. The criteria for causation of alcohol in violent injuries based on emergency room data from six countries. *Addict Behav* 2005;(1):103–13.
5. Probst C, Parry CDH, Wittchen HU, Rehm J. The socioeconomic profile of alcohol-attributable mortality in South Africa: A modelling study. *BMC Med* 2018;16(1).
6. Morojele NK, Kachieng'a MA, Mokoko E, Nkoko MA, Parry CDH, Nkowane AM, et al. Alcohol use and sexual behaviour among risky drinkers and bar and shebeen patrons in Gauteng province, South Africa. 2006 [cited 2020 Oct 4];62(1):217–27.
7. Chu KM, Marco JL, Owolabi EO, Duvenage R, Londani M, Lombard C, et al. Trauma trends during COVID-19 alcohol prohibition at a South African regional hospital. *Drug Alcohol Rev* 2022;41(1):13–9.
8. Navsaria PH, Nicol AJ, Parry CDH, Matzopoulos R, Maqungo S, Gaudin R. The effect of lockdown on intentional and non-intentional injury during the COVID-19 pandemic in Cape Town, South Africa: A preliminary report. *South African Med J* 2021;111(2):110–3

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