

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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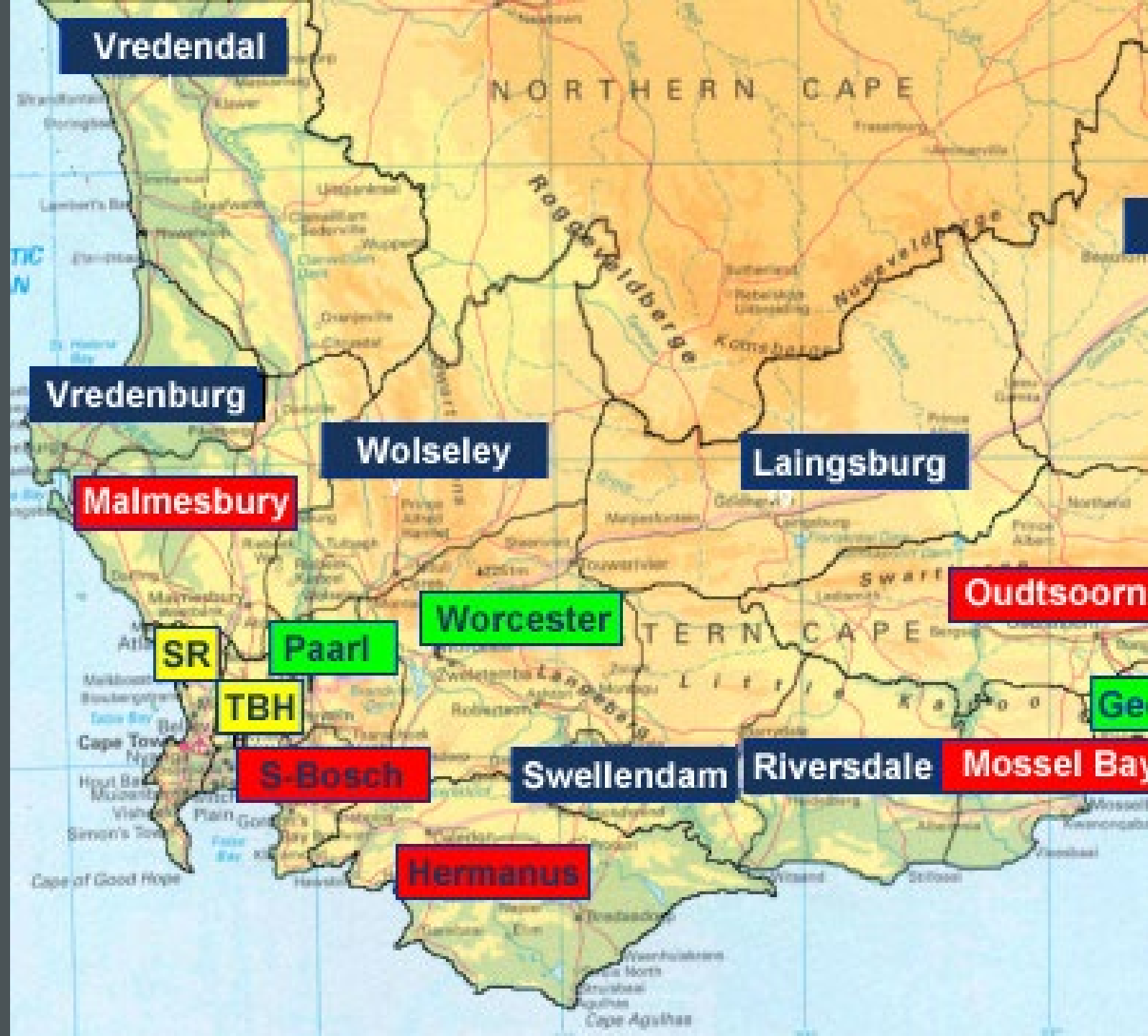
GAPC

October 2023



# SETTING WESTERN CAPE

- Forensic Pathology Service (FPS)
- 16 mortuaries in the Western Cape
- Salt River (now OFPI) and Tygerberg mortuaries (yellow on the map) see > 4000 cases per year.
- Investigation of suspected unnatural deaths.
- Assist SAPS
- Training and research





SALT RIVER → → → OFPI

# WHY ALCOHOL?

- Alcohol - major contributor to violent death
- COVID-19 lockdown period & alcohol ban
- ± 300 alcohol related deaths per month
- Western Cape – drinking capitol of SA
- Link between alcohol, homicide and gender-based violence(1-4)

1 Slater et al. (2006)

2 Macdonald et al. (2005)

3 Probst et al. (2018)

4 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



## AIM

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 WC mortuaries

## Time span


1 January 2019 and 31 December 2020 (inclusive)

## Ethics

UCT HREC 751-2020

# DATA COLLECTION AND ANALYSIS

## Data

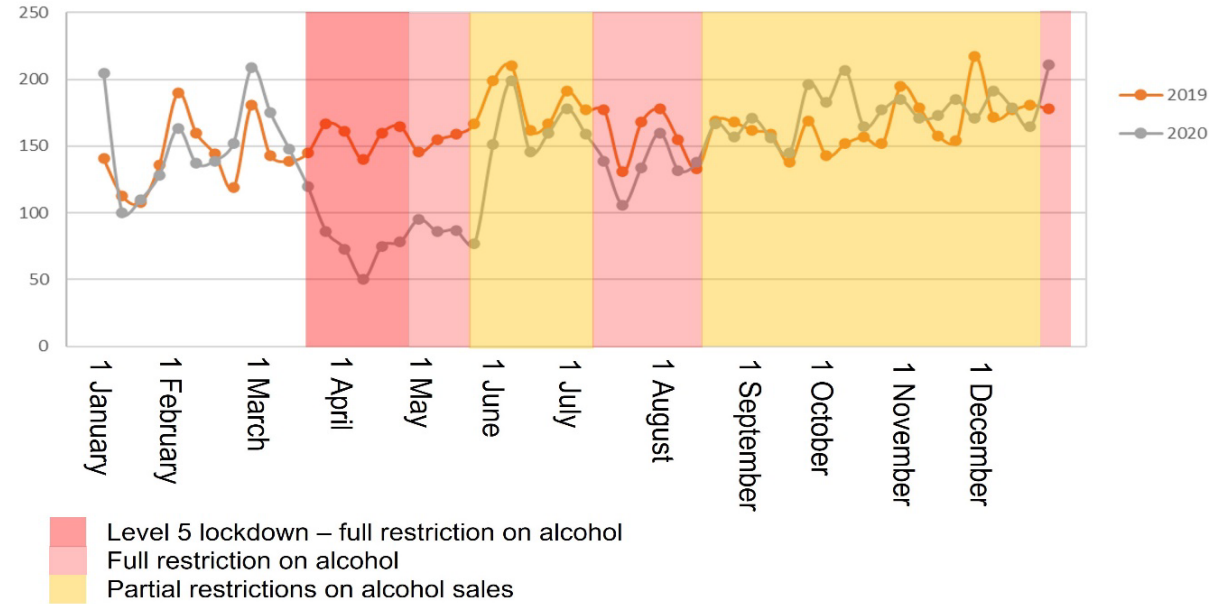
Demographics	Related to Death	Alcohol and Toxicology
Age	 Date and time of death declaration	Specimen submitted for ethanol analysis (Y/N)
Sex	Suspected manner of death	Alcohol analysis result available (Y/N)
Mortuary	Method of injury	Alcohol concentration in specimen
	Area of incident/injury	Specimens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

Data analysed using STATA 13

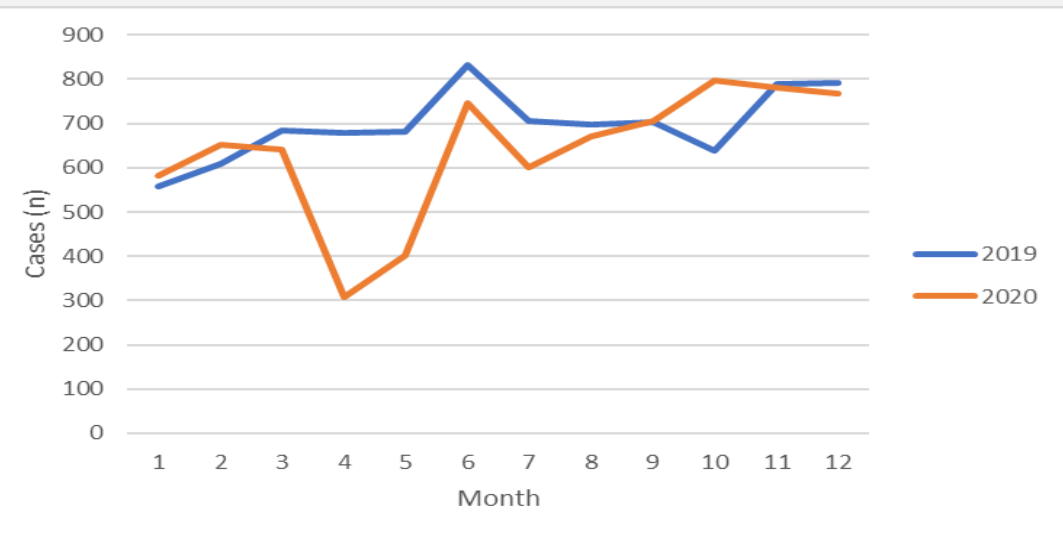


# RESULTS

- 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.



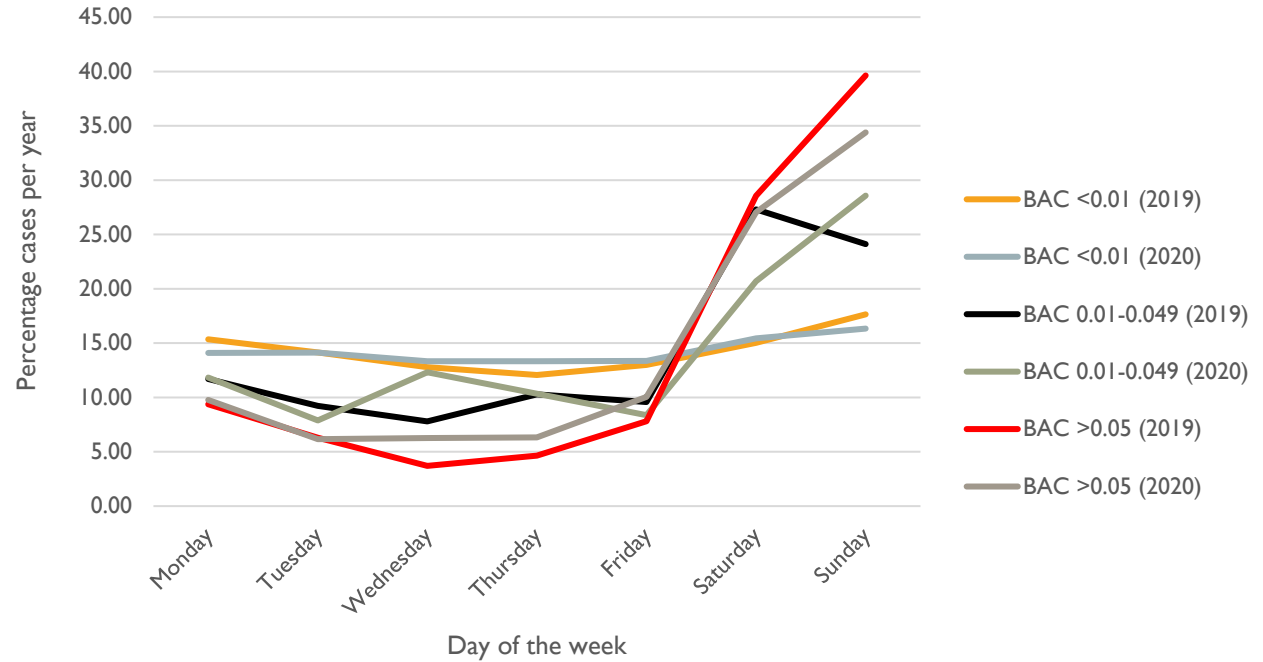
Weekly injury-related deaths in the Western Cape between 1 January 2019 and 31 December 2020, showing levels of alcohol restriction in 2020



Monthly distribution of injury-related cases per year

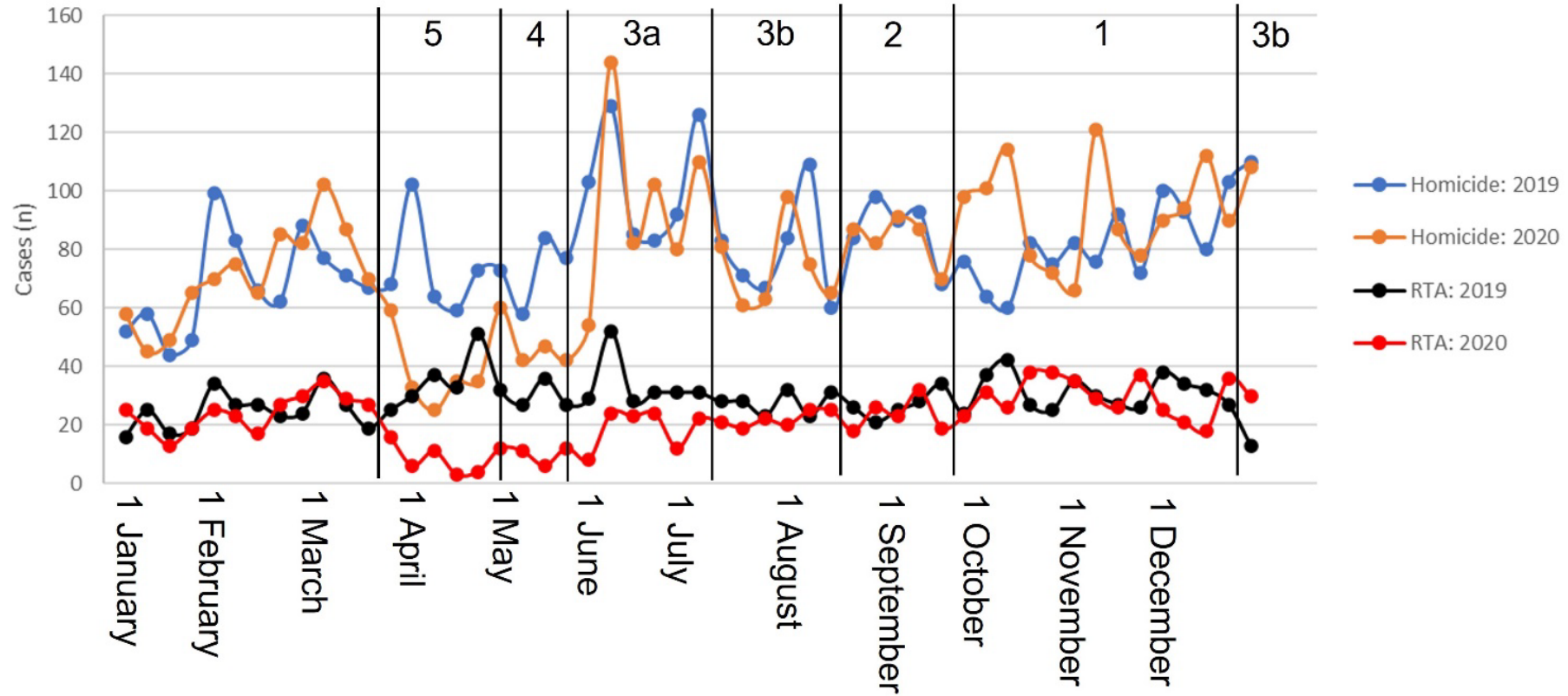
# DAY OF THE WEEK

- 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

Mean (sd) g/100ml BAC positive cases

	2019	2020	p-value*
<b>Total (12077 – 75.4%)</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>	<b>2019</b>	<b>2020</b>	<b>p-value</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

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

## 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

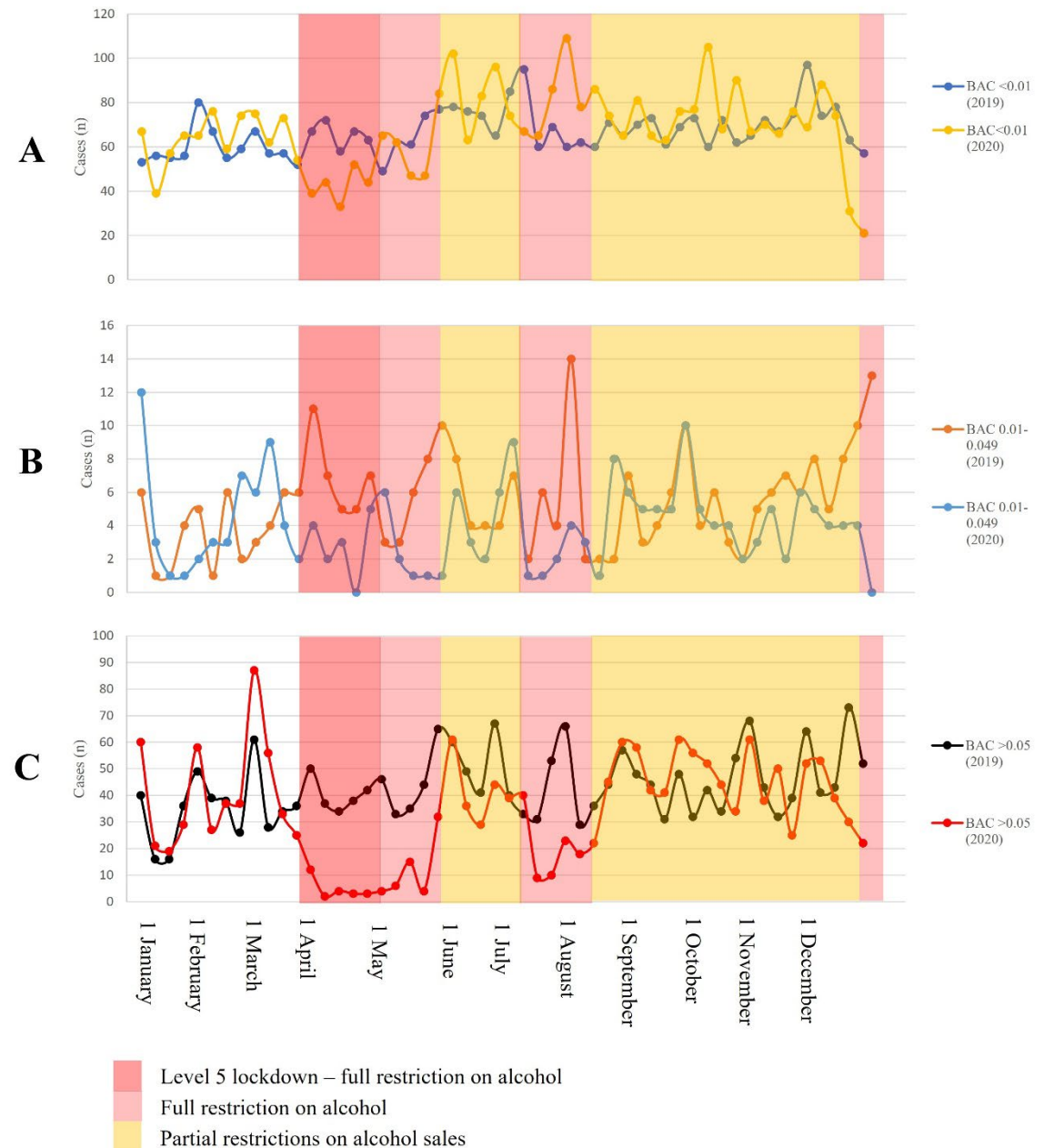
# ALCOHOL BANS

## 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
Complete ban	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
Partial ban	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
No restrictions	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 (5)

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

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Greater number of injury-related deaths in October 2020 compared with October 2019.

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## DISCUSSION

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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, majority involving pedestrians (6)

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Alcohol restrictions vs limitation of movement (7)

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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.

# REFERENCES

1. 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.
2. 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.
3. 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).
4. 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.
5. 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.
6. 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
7. Govender R, Suikai A, Roux D, van Niekerk A. Driver intoxication and risk for fatal crashes in South Africa: A 3-year review. *South African Med J*. 2021;111(10):968–973. <http://dx.doi.org/10.7196/samj.2021.v111i10.15057>
8. Moultrie TA, Dorrington RE, Laubscher R, et al. Unnatural deaths, alcohol bans and curfews: Evidence from a quasi-natural experiment during COVID-19. *South African Med J* 2021;111(9):834–837. <https://doi.org/10.7196/samj.2021.v111i9.15813>

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