

# Cheap alcohol in rural towns of the Western Cape Province, South Africa: Contaminants, risks for Fetal Alcohol Spectrum Disorders (FASD) and policy implications

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# The Western Cape Province (WCP): stunting and fetal alcohol syndrome (FAS)



- Cape Floristic Region 90 000km<sup>2</sup>
- 9000 species of flowering plants
- Nutrient-poor soil → thrive and flourish

## Not so for children

- Inadequate nutrition → stunting
- 17.5%<sup>1</sup> stunted recent provincial survey (2022)
- Children with **stunting** -short for age, cognitive deficits, education challenges
- Adults - reduced employment potential and agency
- Features and outcomes shared with FASD
- Highest recorded rates globally for FAS/FASD since early 2000s
- Rural residence in the WCP and binge drinking are risk factors<sup>2,3</sup>

<sup>1</sup>Senekal, M. et al Western Cape Stunting Baseline Survey on under-5-year-old children. 2023. A collaboration between the Western Cape Department of Health and the DG Murray Trust

<sup>2</sup>May PA, et al. The epidemiology of fetal alcohol syndrome and partial FAS in a South African community. Drug Alcohol Depend. 2007 May 11;88(2-3):259-71.

<sup>3</sup>May PA, Blankenship J, Marais AS, Gossage JP, Kalberg WO, Barnard R, De Vries M, Robinson LK, Adnams CM, Buckley D, Manning M, Jones KL, Parry C, Hoyme HE, Seedat S. Approaching the prevalence of the full spectrum of fetal alcohol spectrum disorders in a South African population-based study. Alcohol Clin Exp Res. 2013 May;37(5):818-30



# Causes of high rates of heavy episodic drinking (HED) and associated harms amongst rural communities in the WCP

- Alcohol as a means of labour control and remuneration
- Part-payment for labour (Dop System) and form of escape
- Heavy weekend drinking amongst farm workers and rural communities - men and women
- HED driven more recently by easy availability of cheap wine in cheap packaging - e.g. an unsupported 5 litre foil bag called a 'papsak'



*“This morning beautiful and clear weather. We have begun to make preparations for the establishment of a school for the Company's Angolan slaves from the Amersvoort... To animate their lessons and to make them really hear the Christian prayers, each slave should be given a small glass of brandy and two inches of tobacco... Within a few days, these slaves will be brought under a proper sense of discipline and become decent people.”*

Jan Van Riebeeck, quoted in Shell, 1997. Children of Bondage.

# The Impact of Bulk Wines on Western Cape Communities Including Chemical Analysis: problematic packaging and contents in 2005

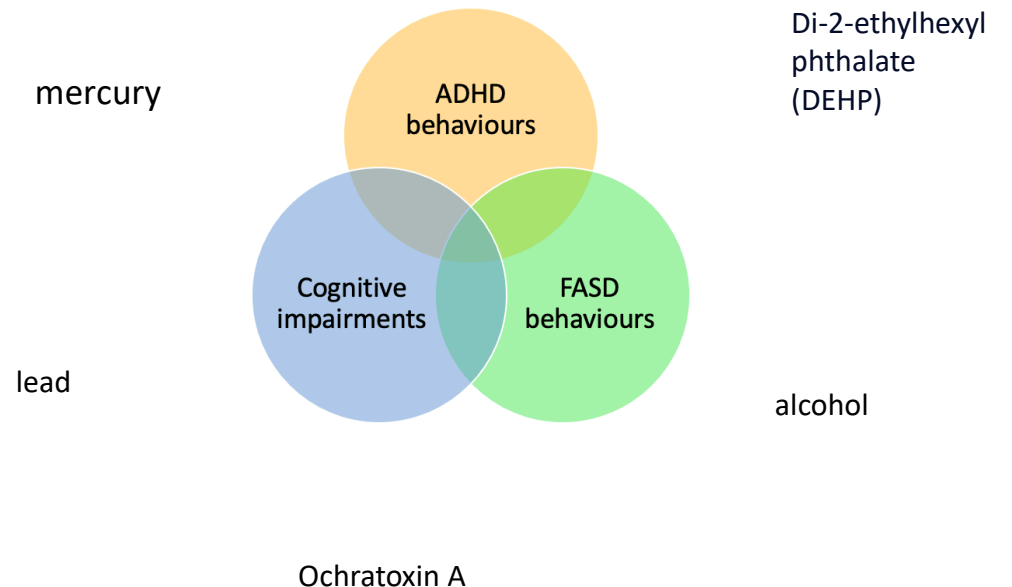
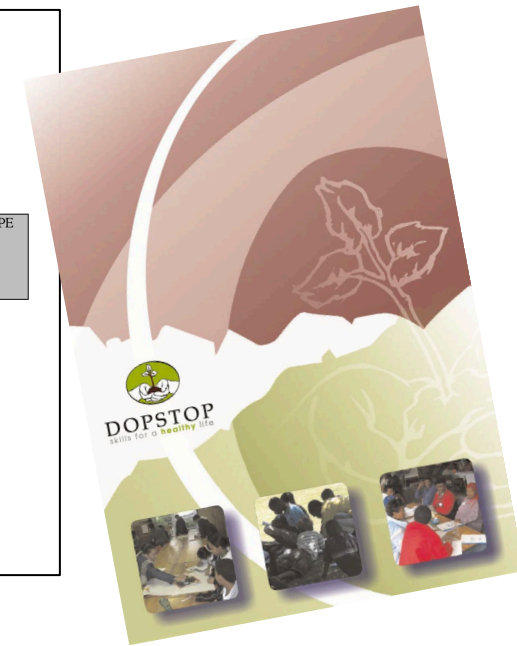
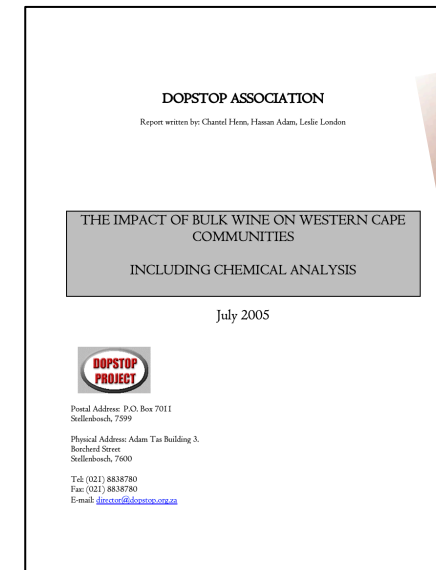
- Commissioned by provincial authorities
- Survey of 51 samples sold in 17 rural towns: concerning levels of **mercury**, **Ochratoxin A (OTA)** and **phthalates**
- Recommendations included: phasing out of wine sold in plastic containers and unsupported foil bags ('papsak')
- Amendment in 2007 - Liquor Products Act 60 of 1989 (LPA): papsak not permitted, plastic containers regulated

What about the contents?

- Higher rates of FAS for lower reported levels of maternal alcohol use in the WC Province<sup>1</sup>
- Suggesting that neurotoxic contaminants of cheap wine may be risk factors for FAS in the province<sup>2</sup>

<sup>1</sup>May PA, et al. Alcohol consumption and other maternal risk factors for fetal alcohol syndrome among three distinct samples of women before, during, and after pregnancy: the risk is relative. Am J Med Genet C Semin Med Genet. 2004 May 15;127C(1):10-20.

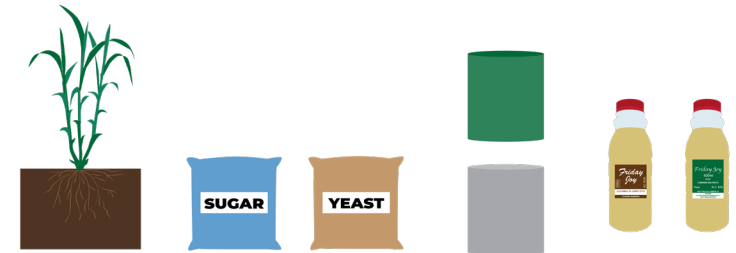
<sup>2</sup>London, L., Mazok, C., Adam, H., Parry, C. "If the alcohol doesn't get you, then the toxins will" The health impacts of bulk wine provision in the Western Cape province of South Africa." Paper presented at the 134th Annual Meeting of the American Public Health Association, Boston, November 2006.



# The emergence of cheap alcohol presented as wine: sugar fermented beverages (SFBs)

- Wine - juice of grapes: fructose & glucose → ethanol + CO<sub>2</sub>
- SFBs - cane sugar: sucrose + yeast + water → ethanol + CO<sub>2</sub>
- Reportedly labelled as 'ale', 'alcoholic fruit beverage'
- Cheap alcohol (wine or SFB) typically packaged in clear plastic bottle with a characteristic red lid: colloquially a **'rooioppie'**
- Contents and labelling of wine strictly regulated by the LPA
- SFBs fell outside of the LPA in 2019
- Only way to tell cane sugar substrate from grape sugar substrate is carbon isotope testing

Are there opportunities for regulatory and other interventions to reduce the risks of FASD?



**Loophole: 'Fermented sugar' worth R2,5 bln**

A LOOPHOLE in South Africa's liquor laws and the banning of cheap "papsak" wine sales has created an industry for dodgy – and potentially life-threatening – "ales" already estimated at being worth some R2,5 billion a year.

# Follow up survey in 2019

To determine the presence of contaminants of cheap wine and **cheap alcohol presented as wine** in rural towns in the WCP that could be associated with increased risk of neurodevelopmental impairments in children born to mothers consuming these products during pregnancy

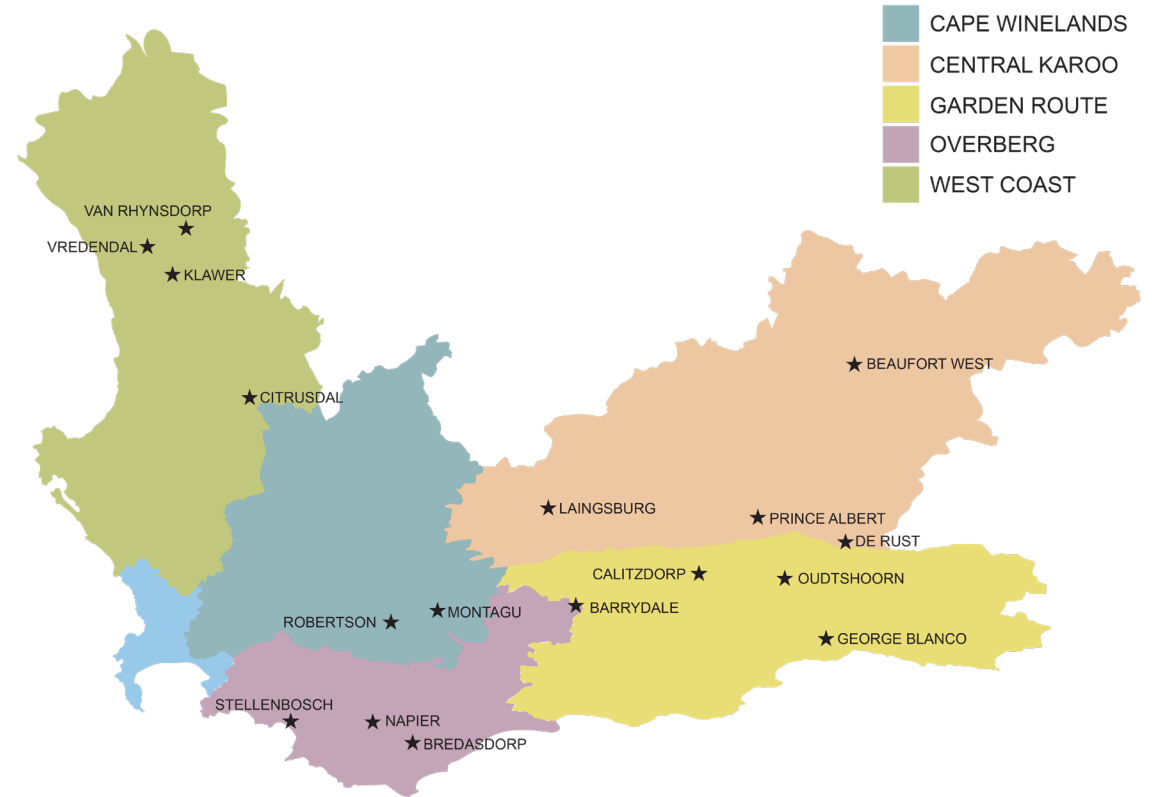
## Objectives

1. Describe the pattern of cheap alcohol sales in outlets in the rural WCP: type of packaging/containers; **volumes; price**; conditions of storage (refrigerated or not; in the sun or not)
2. Describe the presence and concentrations of selected **contaminants** of cheap alcohol: phthalates, heavy metals, OTA
3. Compare the pattern of contamination to the 2005 data to identify any change
4. Conduct carbon isotope testing to determine the proportion of SFBs or SFB-adulterated wine
5. Identify the main producers of cheap alcohol in the Western Cape
6. If possible, identify possible contamination sources responsible for these pollutants



# Methods

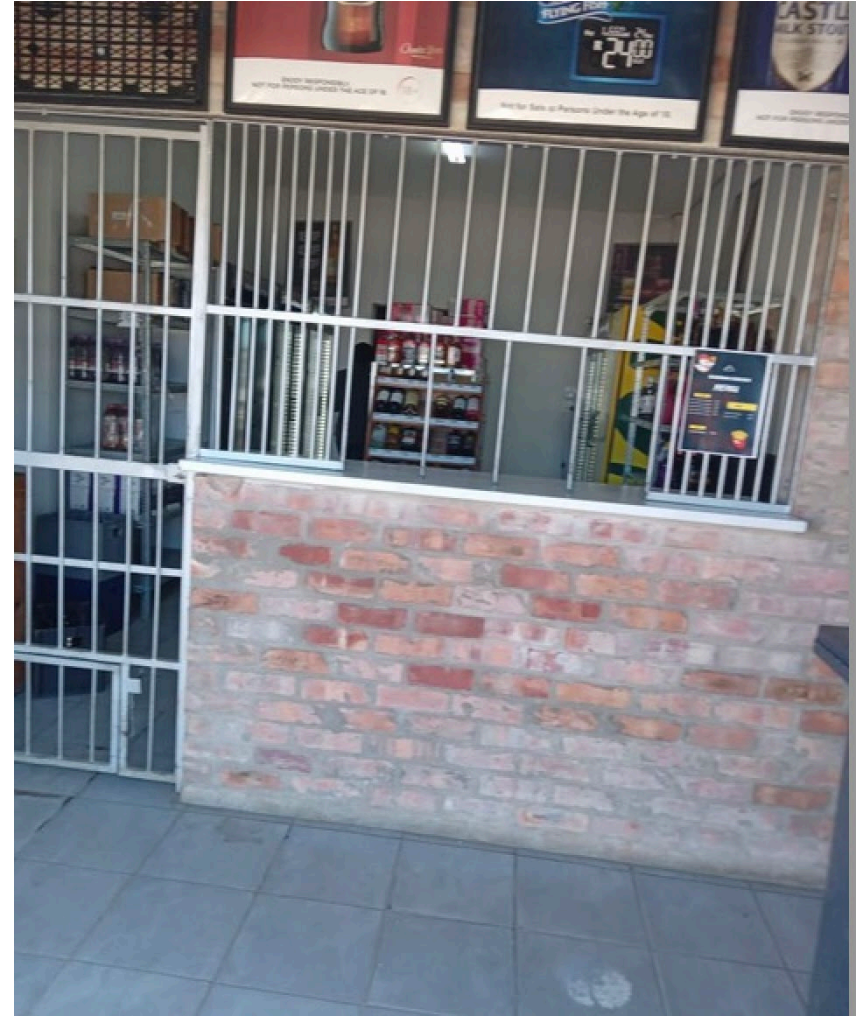
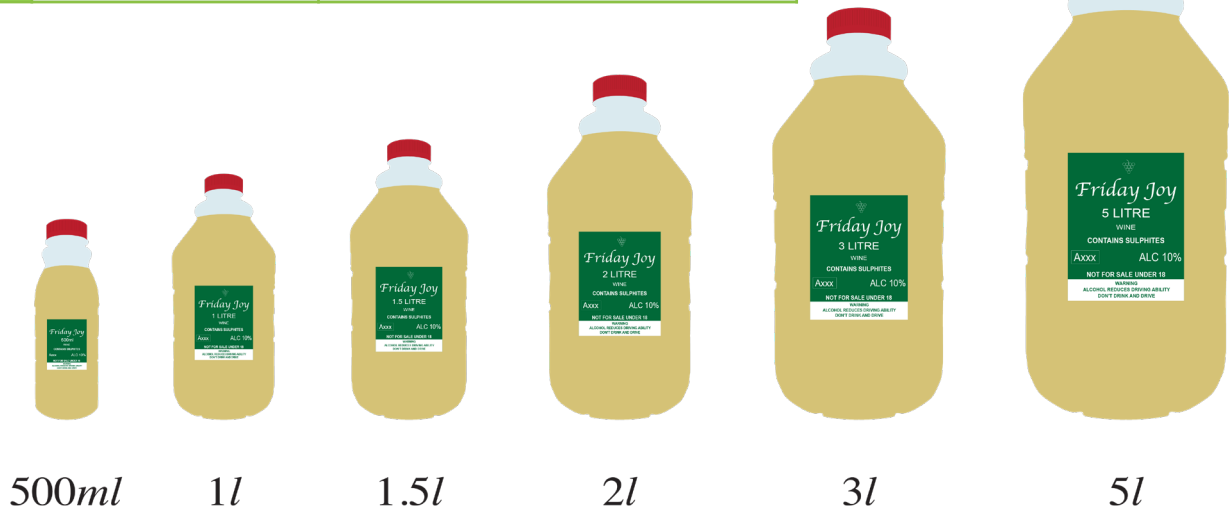
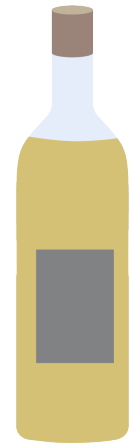
- Ethics approval: HREC UCT 103/2019
- Purchased 55 products presented as white wine in 17 towns
- Key informant interviews
- One field worker purchased samples 25 June-3 July 2019
- 3 samples per town - purposive sampling of brands
- Smallest volume available
- For samples: town, outlet, conditions of storage, packaging, **volume**, **price**, label (included descriptors, responsible seller codes, **alcohol** content, warning label filling date, lot number)
- Laboratory analysis included **alcohol** content (ethanol), methanol, **contaminant** identification and **carbon isotope** testing
- 2 laboratories



# Same towns, shifts in outlet type, fewer brands, choice of volumes

	2005 n=51	2019 n=55
Towns	17	17
Outlet number visited	28	66 visited 40 purchased from
Outlet type	independent	13 towns (77%) supermarket, grocery store, franchise identified
Registered	✓	✓
Choice	range of brands	range of volumes, fewer brands

We purchased glass bottles for R40 or less



- Independent outlets: serving hatch → ask for product, no browsing or label reading
- Stored on shelves or on the floor
- Sells out within a week



# Packaging in 2019: no papsak, 'rooirooppie' prominent



year (n)	Unsupported foil	Plastic	Carton	Bag-in-box	Glass
2005 (51)	16=31%	32 =63%	3=6%	0	0
2019 (55)	0	27=49%	7=13%	2=4%	18=33%

- ✓pre-packaged
- ✓sealed with tamper-proof elements, 7 leaked in-transit

- ✗sachets
- ✗decanting

'rooirooppie' 21/27=78%



# Price by volume, packaging and per unit alcohol



	Thin clear plastic 			Carton	Bag-in-box	Thick plastic	Glass	
Volume	500ml	1000ml	2000ml	1000ml	5000ml	750ml	500ml	750ml
n	16	10	1	7	2	1	2	16
Price range R	10.00-20.00	<b>10.00-28.00</b>	<b>30.00</b>	23.99-32.99	100-110	38.90	20.00-40.00	22.00-40.00
Median price R	<b>13.60</b>	20.25		30.00				34.99
R/unit range	3.00-5.00	1.30-3.65		2.88-5.00	<b>2.64-2.73</b>		5.00-10.91	3.26-10.67
R/unit median	3.67	2.76	2.25	4.12		5.77		6.12

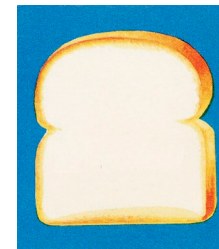
- 🍇 We purchased smallest volumes available
- 🍇 1 unit=12g or 15ml pure ethanol
- 🍇 Alcohol content on label



'wine'  
500ml  
R13.60



long life milk  
1 litre  
R15.15



white bread  
1 loaf  
R13.51

# Unit price by packaging, carbon isotope analysis and possible Minimum Unit Pricing (MUP) levels



## SFB or SFB-adulterated wine

- 7/27 (26%) of clear plastic
- No other packaging types

## labelling

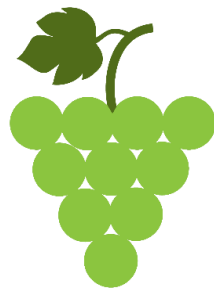
- **X** labelled as ales or alcoholic fruit beverage
- wine (1)
- 'flavoured alcoholic beverage'
- brand name only
- brand name + late harvest/semi-sweet/dry
- ✓ responsible seller codes (4/7 the same)

Per unit price 2019	n	Cumulative %	Packaging				SFB
			Plastic	Bag-in- box	Carton	Glass	
< R3	10	18	7	2	1	0	1
< R5	28	69	19	0	5	4	6
< R8	14	95	2*	0	1	11	0
<R10	1	96	0	0	0	1	0
<R12	2	100	0	0	0	2	0
<b>Total</b>	55		28	2	7	18	7

\*1 fortified, 1 thick

- 18% retailed for <R3/unit
- 69% retailed for <R 5/unit
- SFBs - cheap but not exclusively the cheapest
- Note: bag-in-box, cartons and glass in <R5/unit category
- 96% of the products we purchased would increase in price at a MUP or R10

# Reduced prevalence of contaminants in 2019 compared to 2005



## Mercury (Hg)

Year (sample size)	Not detected		Detected below or at allowable limit		Detected above allowable limit		Max (mg/l)
	n	%	n	%	n	%	
<b>2005 (51)</b>	15	30	17	34	<b>18</b>	<b>36</b>	<b>0.494</b>
<b>2019 (55)</b>	29	52.7	26	47.3	<b>0</b>	<b>0</b>	<b>0.0002</b>

🍇 DEHP - no association with container

🍇 No methanol detected

## Ochratoxin A (OTA)

Year (sample size)	ND		At or below EU allowable limit		Above EU allowable limit		Max ug/l
	n	%	n	%	n	%	
<b>2005 (51)</b>	6	11.8	31	60.8	<b>14</b>	<b>27.5</b>	<b>25.4</b>
<b>2019 (55)</b>	51	92.7	3	5.5	<b>1</b>	<b>1.8</b>	<b>2.91*</b>

\*clear plastic, SFB

## Di-2-ethylhexyl phthalate (DEHP)

Year (sample size)	ND		Detected below LOQ*		Detected below 100ug/l		Detected above 100ug/l		Max ug/l
	n	%	n	%	n	%	n	%	
<b>2005 (51)</b>	2	3.9	2	3.9	33	64.7	<b>14</b>	<b>27.5</b>	<b>2382</b>
<b>2019 (55)</b>	11	20.0	43	78.2	0	0	<b>1</b>	<b>1.8</b>	<b>219.7</b>

\*LOQ=level of quantification

## Strengths and Limitations

- Representative of available **brands** of cheap alcohol presented as wine in plastic packaging
- First survey to estimate, by means of laboratory confirmation, the proportion of SFBs of cheap alcohol presented as wine in the WCP
- Contributes information on alcohol pricing for rural communities in the WCP
  
- Not representative of **volumes or prices** of all cheap alcohol presented as wine in rural towns
- Prices are from 2019
- Comparability of laboratory results for contaminants

## Conclusion and Recommendations

- Evidence of reduced prevalence of contaminants
- The easy availability of cheap alcohol presented as wine persists in rural communities in the WCP
- A quarter of cheap alcohol products presented as wine and sold in plastic packaging was SFBs or SFB-adulterated wine
- Cheap alcohol that meets the criteria for wine is widely available in rural towns across a range of packaging types
  
- Regulation of alcohol availability to high-risk populations and price interventions, such as minimum unit pricing (MUP), needs urgent consideration
- This consideration could include exploring the coordinated introduction of food subsidies with the implementation of pricing interventions