



# Drug use in Adelaide Monitored by Wastewater Analysis

Project commissioned by Drug and Alcohol Services  
South Australia (DASSA)

Analyses performed by:  
School of Pharmacy and Medical Sciences  
University of South Australia

September 2018

Please note that drug consumption levels may vary slightly from report to report due to adjustments made to sewerage flow rates in some of the treatment plants. The South Australian population has also been updated from August 2016 according to the 2016 Census release (Australian Bureau of Statistics).



## Purpose of the project

- > To determine the prevalence of drug use in South Australia, initially in metropolitan Adelaide, through wastewater analysis.



## Wastewater analysis CAN tell us:

- > The pattern of drug use over the week.
- > The prevalence of drug use every two months over a seven year period.



## Wastewater analysis **CANNOT** tell us:

- > The characteristics of drug users.
- > In what regions of metropolitan Adelaide drug consumption is occurring.
- > The form and way drugs were taken.

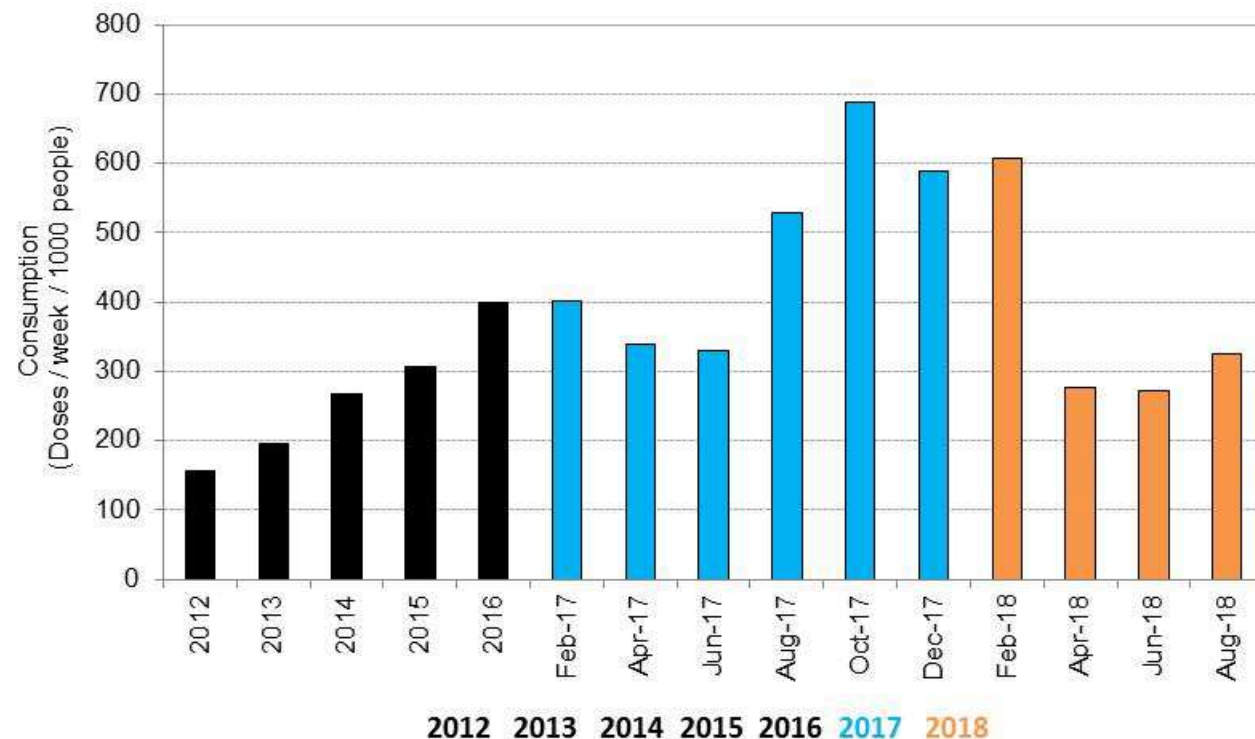


## Wastewater sampling

- > Sampling every two months from Adelaide Metropolitan wastewater, commenced in December 2011.
- > Drugs tested:
  - Stimulants: cocaine, MDMA, and methamphetamine.
  - Opioids: morphine, codeine, methadone, oxycodone, fentanyl and heroin.
  - Cannabis (THC).
  - Nicotine.
  - Anabasine (a tobacco-specific alkaloid).
  - Alcohol.

# Stimulants

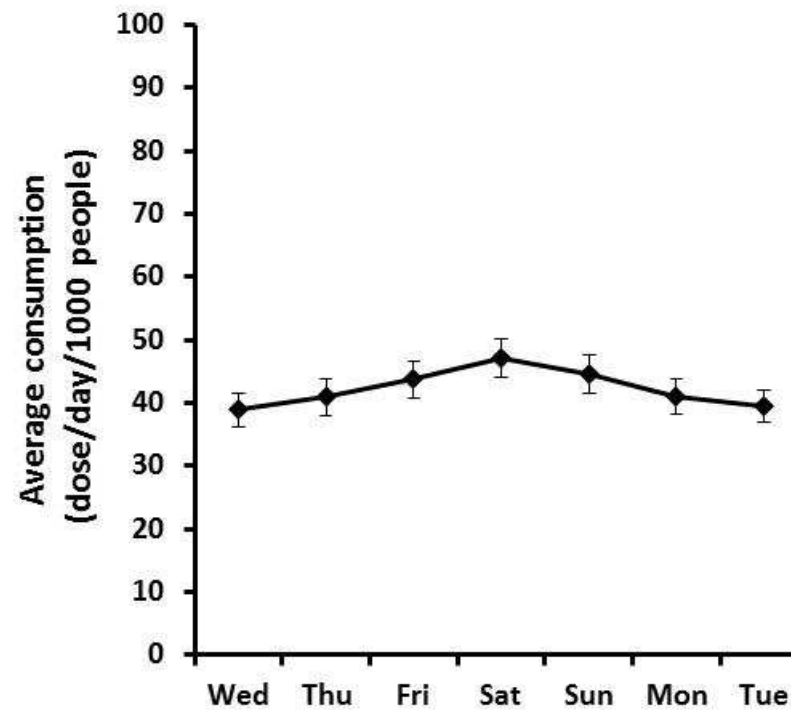
Methamphetamine consumption levels increased from 2012 to 2016. Decreases seen in the first half of 2017 were not sustained, until April 2018 when there was a substantial drop, which remained stable in June and August.



Average consumption (dose/week/1000 people) of methamphetamine for 2012-2016. Weekly consumption (dose/week/1000 people) bi-monthly from February 2017.

# Stimulants

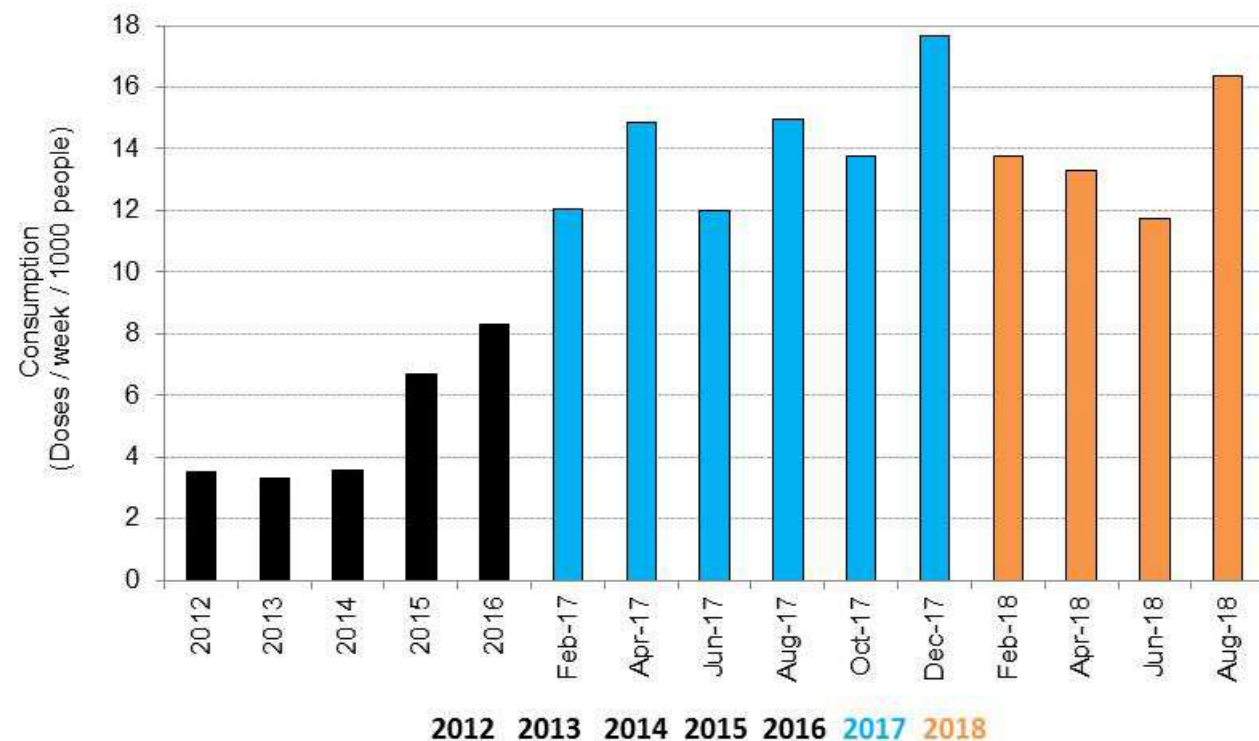
Methamphetamine consumption levels increase slightly on weekends.



Average daily consumption (dose/day/1000 people) of methamphetamine over the week. Dose = 30 mg.

# Stimulants

Cocaine consumption levels have increased since 2015, but overall consumption is low.

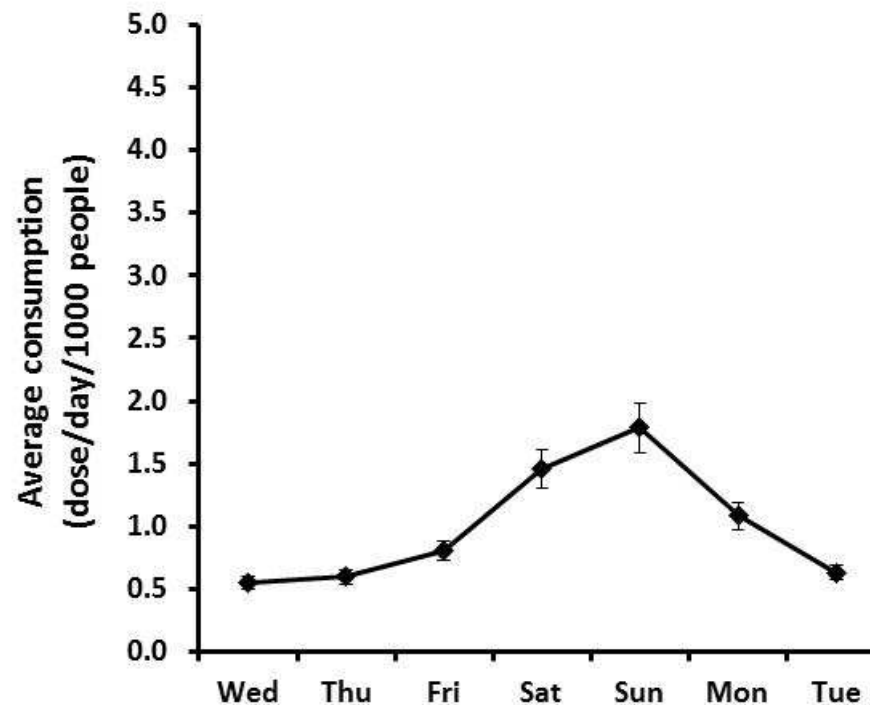


Average consumption (dose/week/1000 people) of cocaine for 2012-2016. Weekly consumption (dose/week/1000 people bi-monthly from February 2017. Dose = 100 mg.



# Stimulants

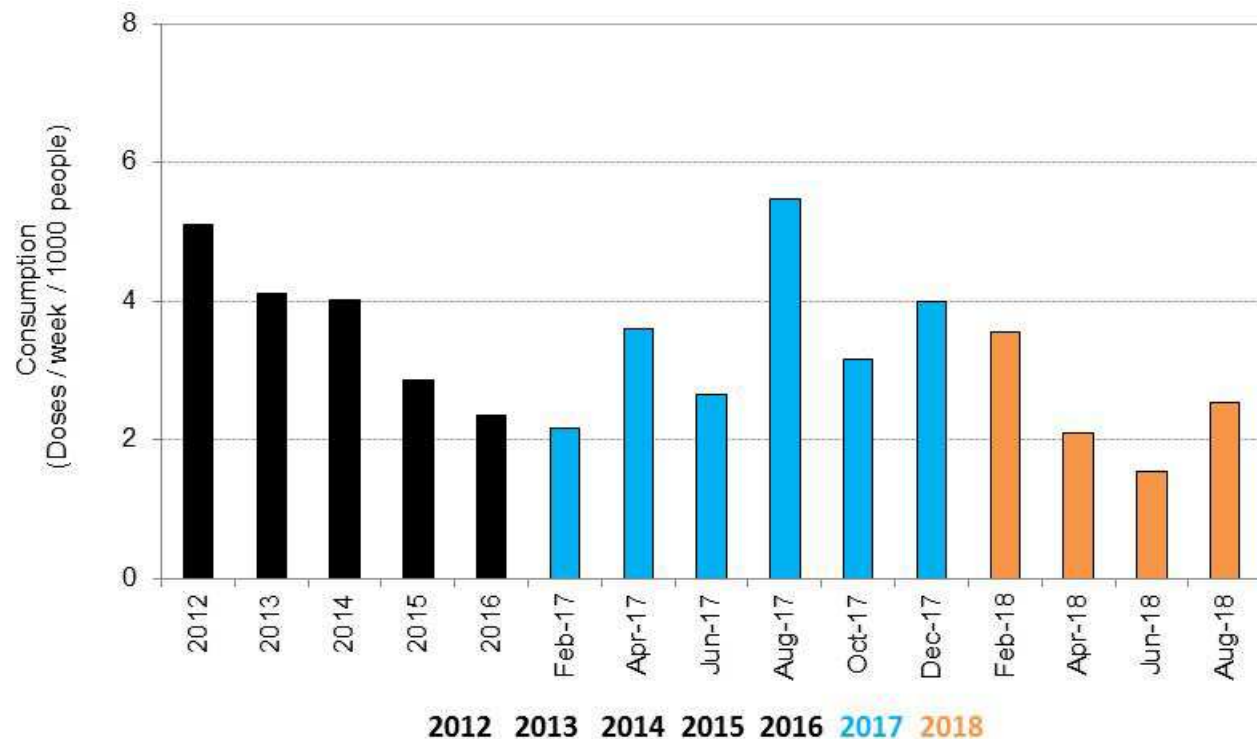
Cocaine consumption levels are higher on weekends.



Average daily consumption (dose/day/1000 people) of cocaine over the week. Dose = 100 mg.

# Stimulants

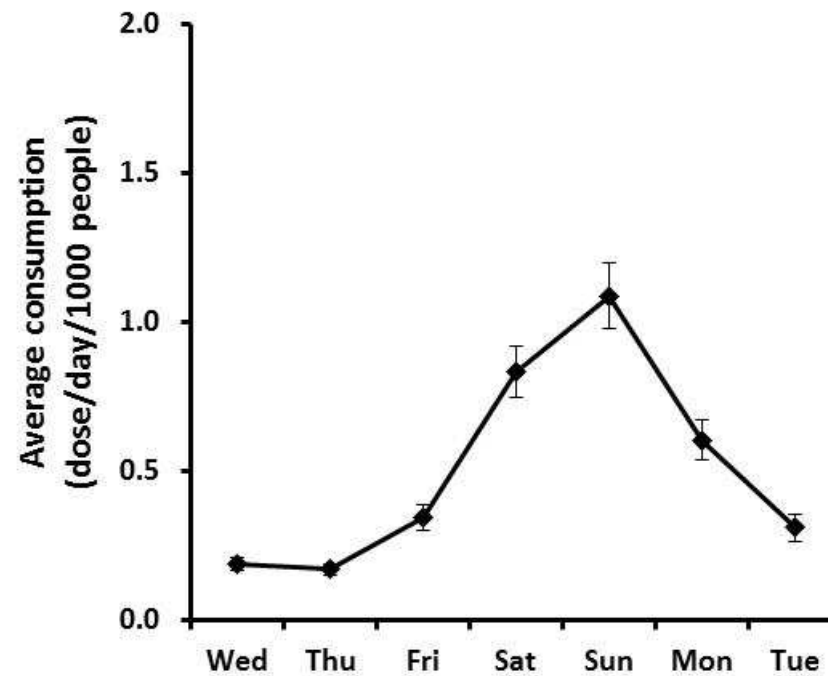
Ecstasy (MDMA) consumption levels decreased from 2012 to 2016, with further small decreases from December 2017.



Average consumption (dose/week/1000 people) of MDMA for 2012-2016. Weekly consumption (dose/week/1000 people bi-monthly from February 2017. Dose = 100 mg.

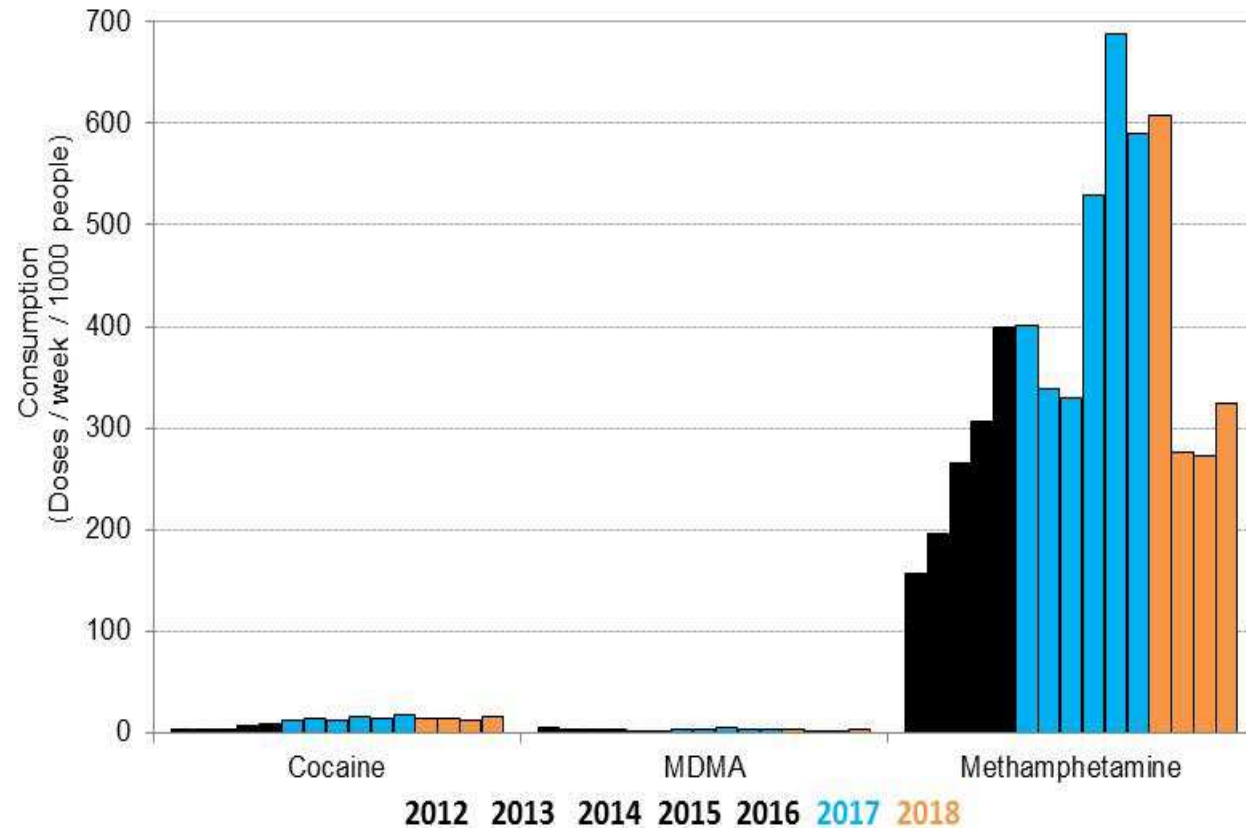
# Stimulants

Ecstasy (MDMA) consumption levels are higher on weekends.



Average daily consumption (dose/day/1000 people) of MDMA over the week. Dose = 100 mg.

# Stimulants



Average consumption (dose/week/1000 people) 2012-2016. Weekly consumption (dose/week/1000 people) of cocaine (100mg dose), MDMA (100mg dose) and methamphetamine (30 mg dose) from Feb 2017.



## Stimulants - summary

- > **Methamphetamine:**
  - > Highest level of consumption of the stimulants.
  - > Steady increase in consumption levels since December 2012. Decreases seen in the first half of 2017 were not sustained, until April 2018 when there was a substantial drop, which remained stable in June and August 2018.
- > **Cocaine:**
  - > Consumption levels have increased since 2015 but overall consumption is low.
- > **Ecstasy (MDMA):**
  - > Consumption levels decreased from 2012 to 2016 with further small decreases in 2018.

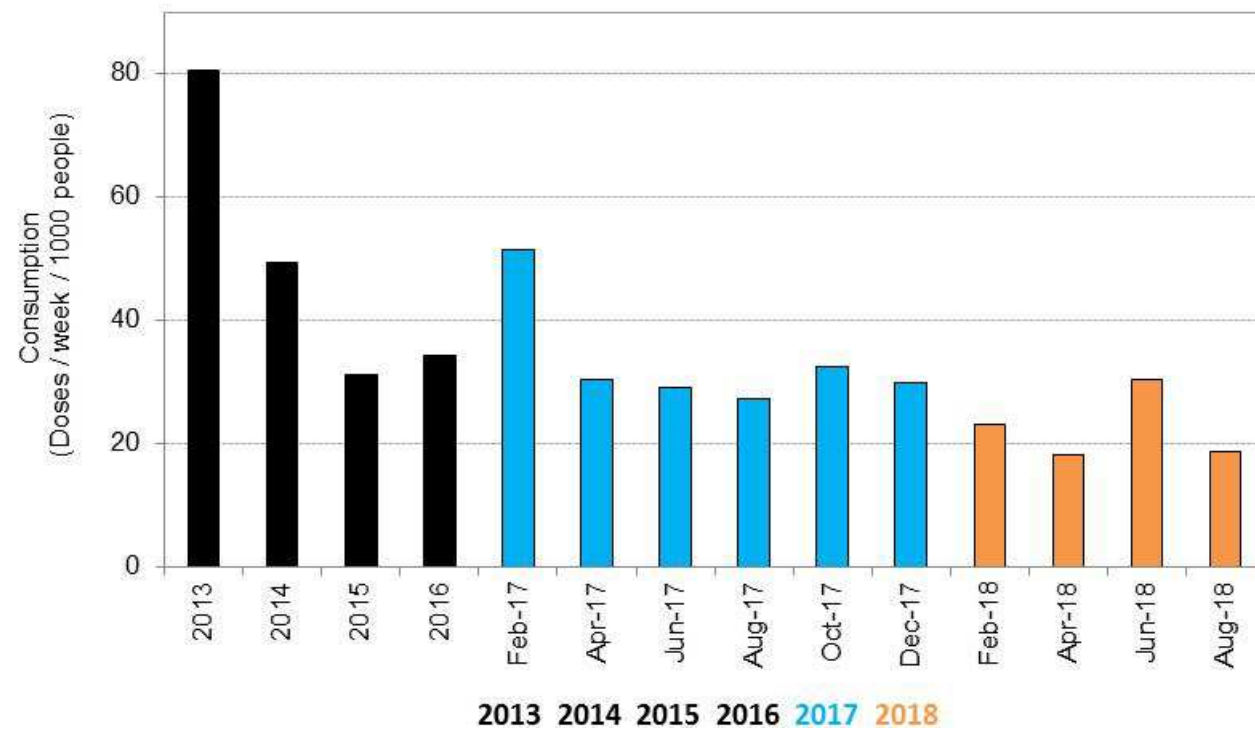


# Opioids

- > Opioids are a class of drugs that are used for pain relief (e.g. codeine, morphine) or for the treatment of opioid dependence (e.g. methadone).
- > Codeine in the samples can originate from prescription or over the counter medications.
- > Morphine, methadone, oxycodone and fentanyl can be used legally on prescription or may be sourced illegally.
- > The analysis of opioids, except for heroin, cannot differentiate illicit from licit use.

# Opioids

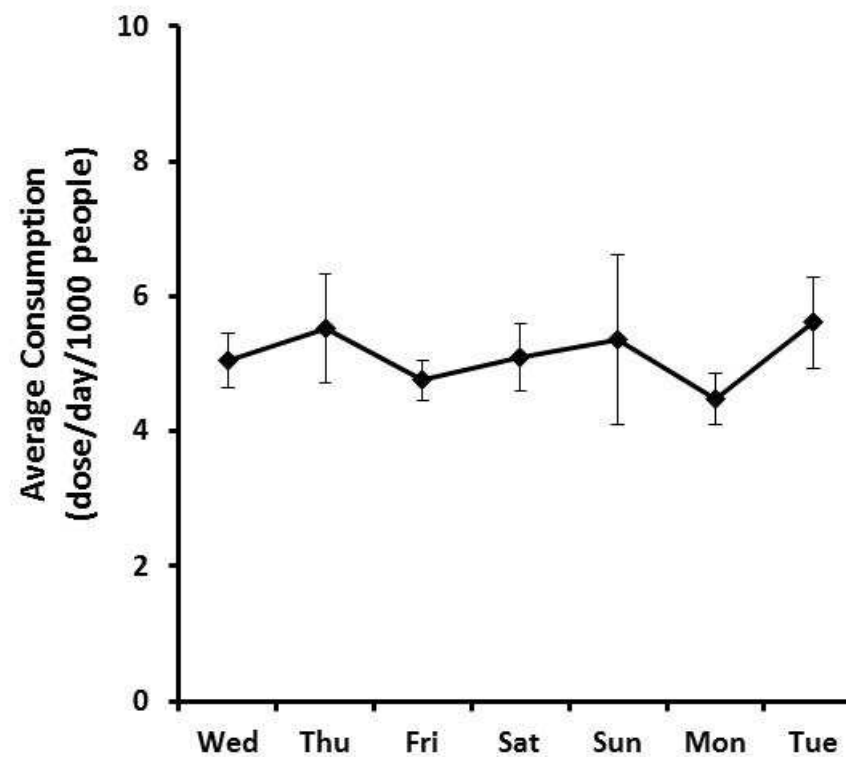
Heroin consumption levels have decreased since 2013.



Average consumption (dose/week/1000 people) of heroin for 2013-2016. Weekly consumption (dose/week/1000 people) bi-monthly from February 2017. Dose for calculation = 20 mg.

# Opioids

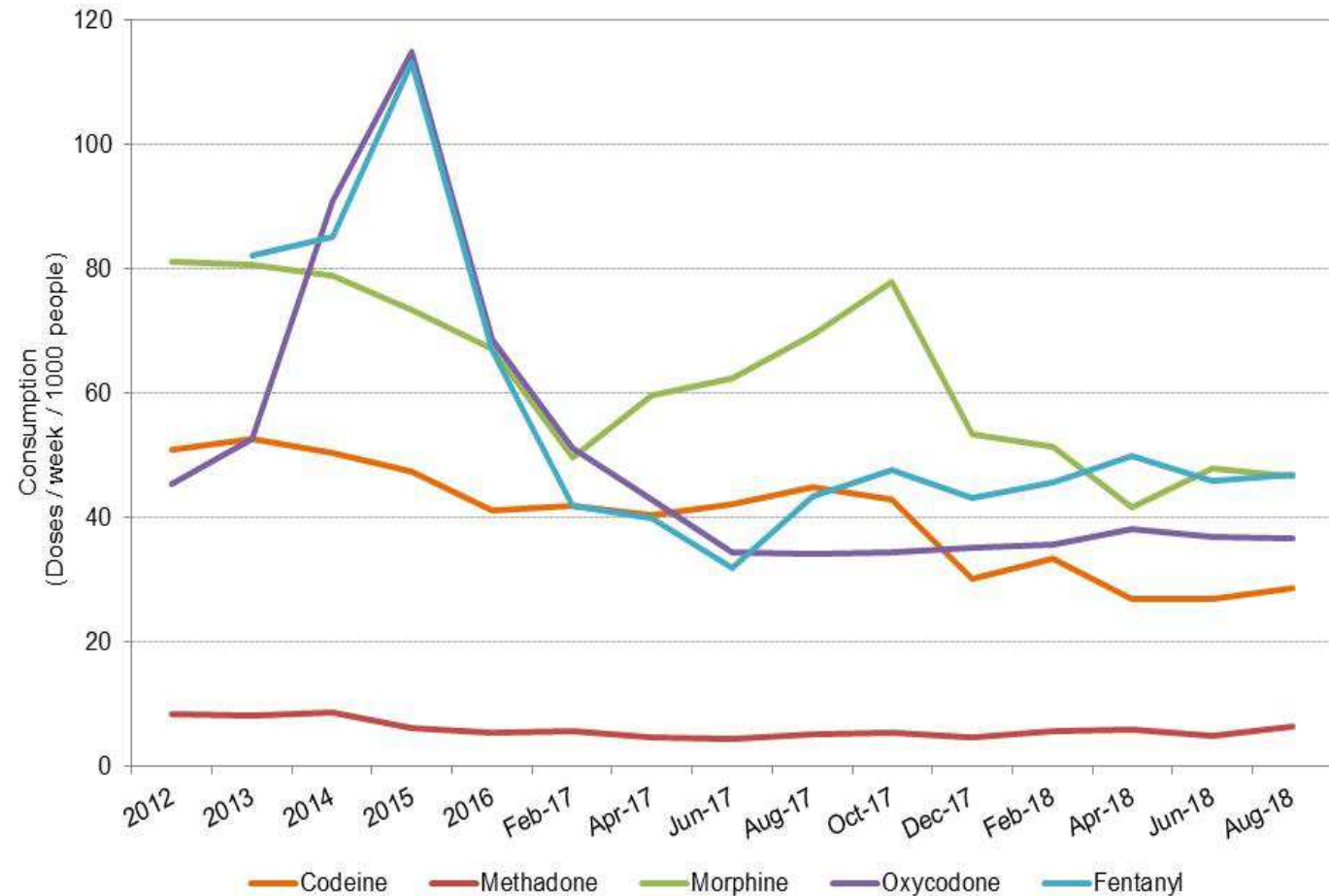
Heroin consumption levels are constant over the week.



Average daily consumption (dose/day/1000 people) of heroin over the week. Dose = 20mg.



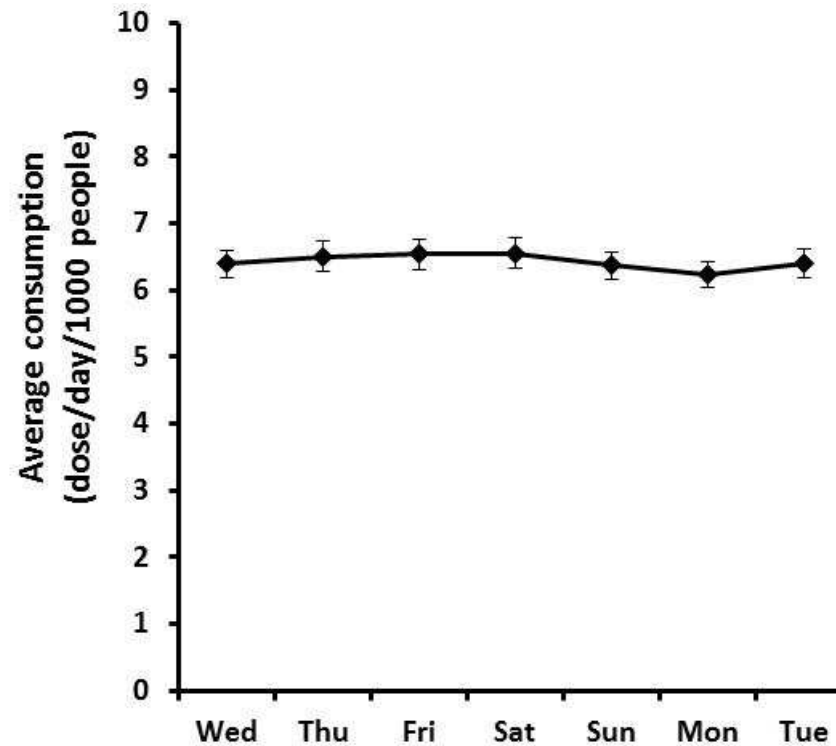
# Pharmaceutical Opioids



Average consumption (dose/week/1000 people) for 2012-2016. Weekly consumption (dose/week/1000 people) bi-monthly from February 2017. Codeine (200mg dose), morphine (30mg dose), methadone (100mg dose), oxycodone (10mg dose) and fentanyl (0.2mg dose).

# Opioids

Codeine consumption levels are constant over the week.

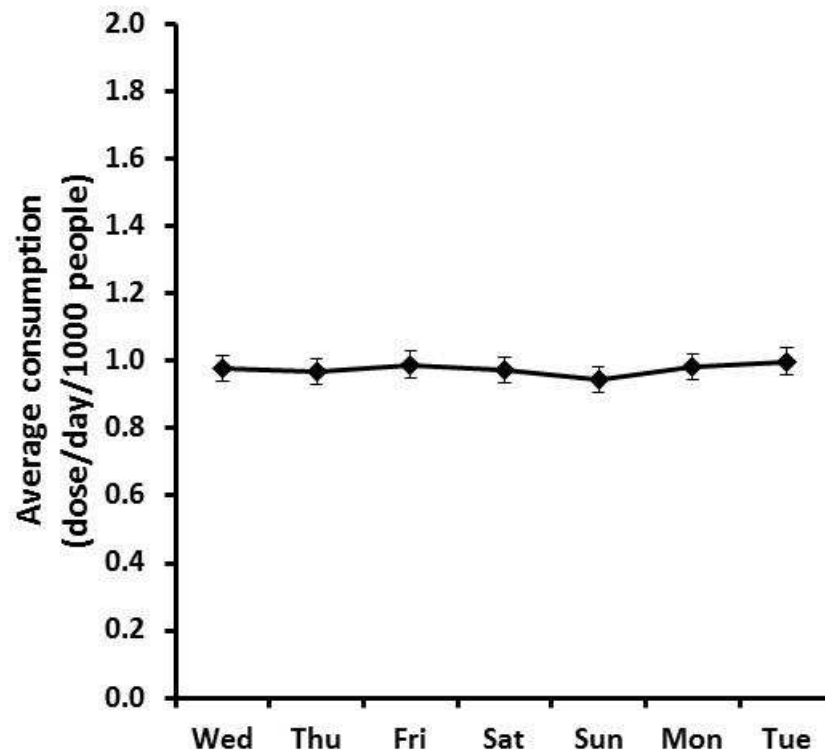


Average daily consumption (dose/day/1000 people) of codeine over the week. Dose = 200 mg.

Drug and Alcohol Services South Australia

# Opioids

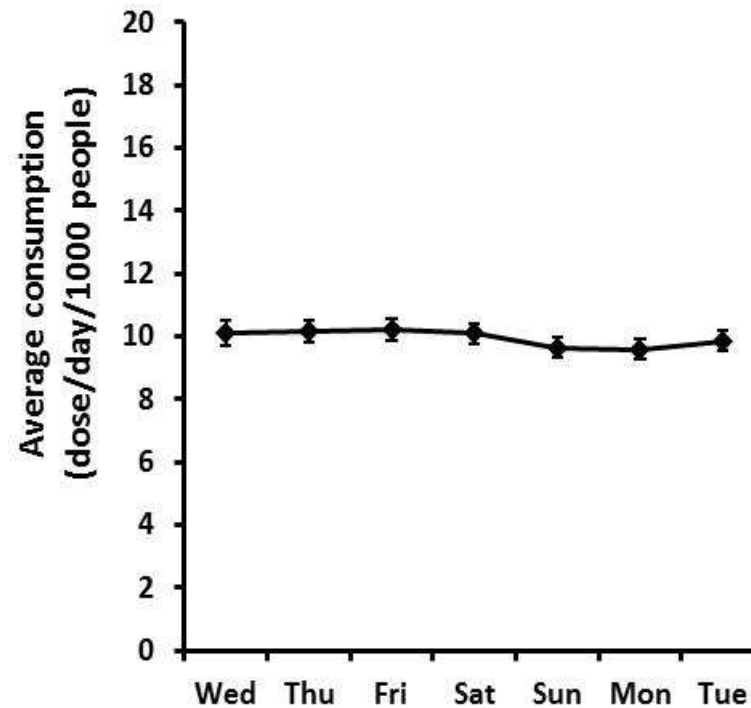
Methadone consumption levels are constant over the week.



Average daily consumption (dose/day/1000 people) of methadone over the week. Dose = 100 mg.

# Opioids

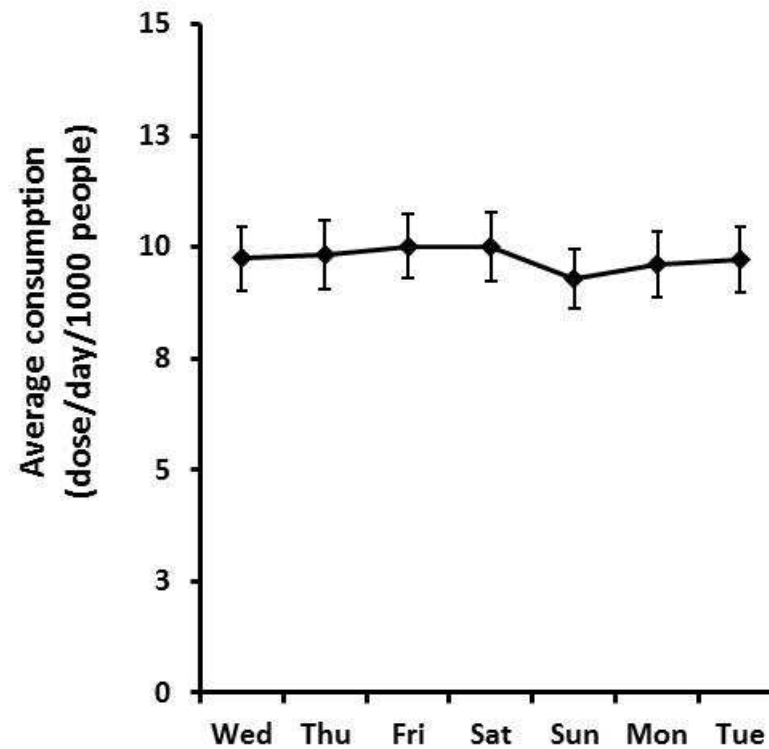
Morphine consumption levels are constant over the week.



Average daily consumption (dose/day/1000 people) of morphine over the week. Dose = 30mg.

# Opioids

Oxycodone consumption levels are constant over the week.

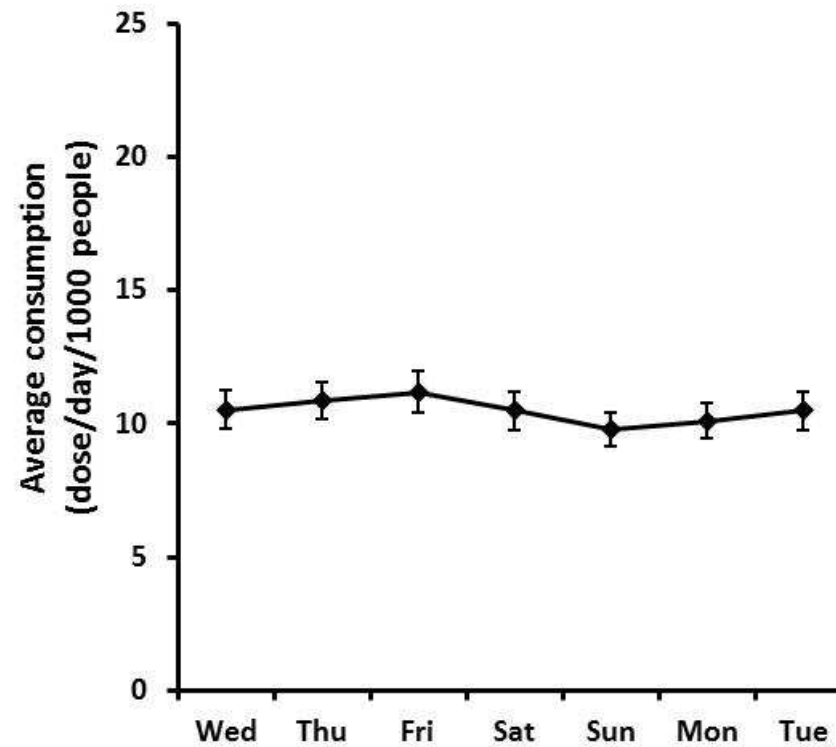


Average daily consumption (dose/day/1000 people) of oxycodone over the week. Dose = 10 mg.

Drug and Alcohol Services South Australia

# Opioids

Fentanyl consumption levels are constant over the week.



Average daily consumption (dose/day/1000 people) of fentanyl over the week. Dose = 0.2mg.

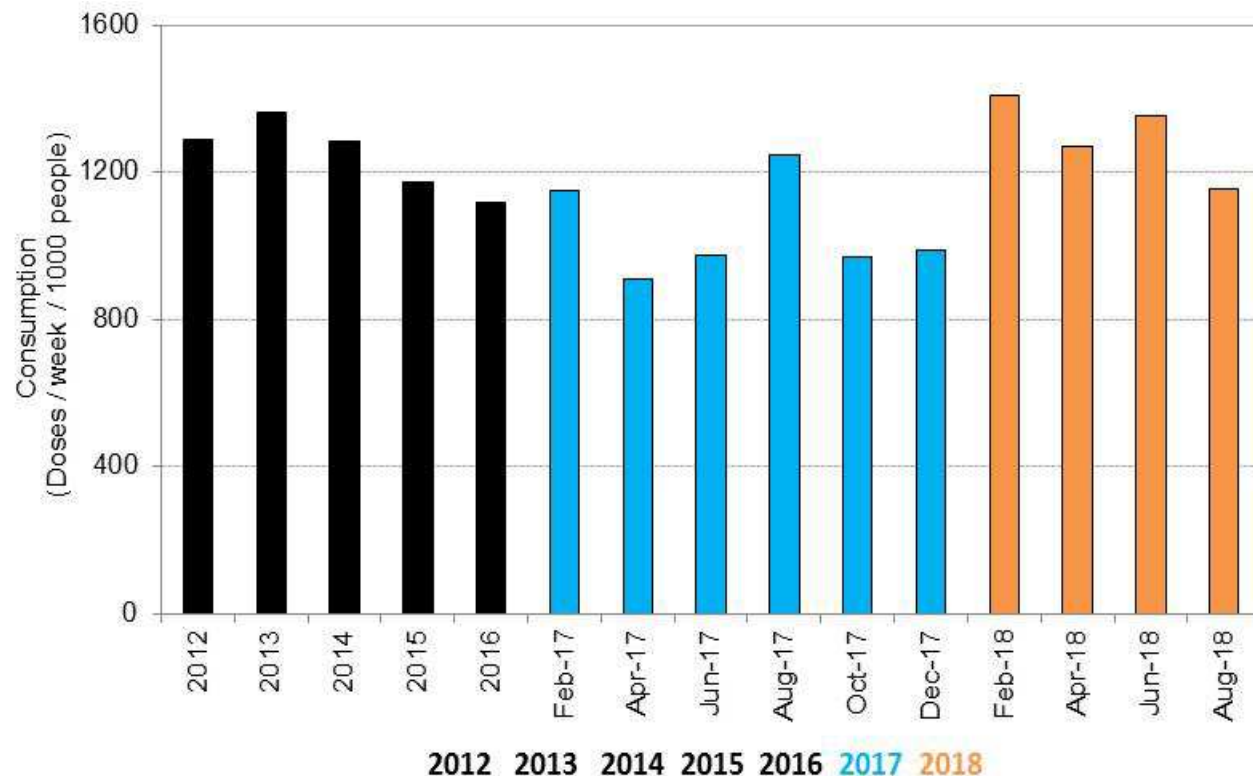


## Opioids - summary

- > Oxycodone and fentanyl showed increases in consumption levels over the period of data collection, but have decreased from 2016 to levels at or below those seen in 2012 and 2013.
- > Heroin consumption levels have decreased since 2013 and have stayed relatively low.

# Cannabis

There was a small downward trend in cannabis consumption levels between 2012 and 2017, with small increases in 2018.

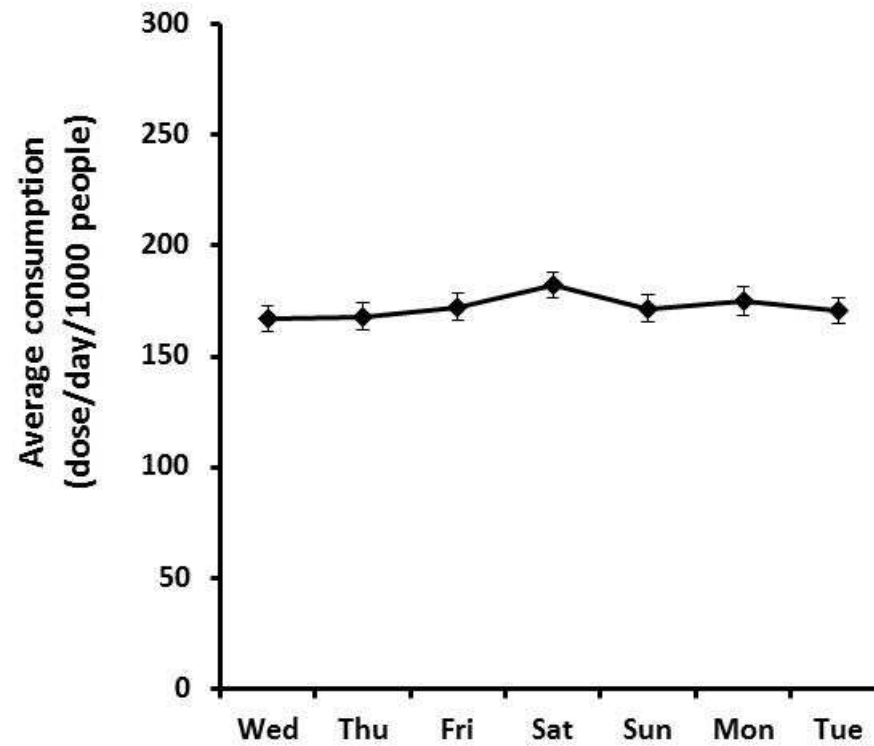


Average consumption (dose/week/1000 people) of THC for 2012-2016. Weekly consumption (dose/week/1000 people) bi-monthly from February 2017. Dose = 125 mg.



# Cannabis

Cannabis consumption levels are fairly constant over the week.

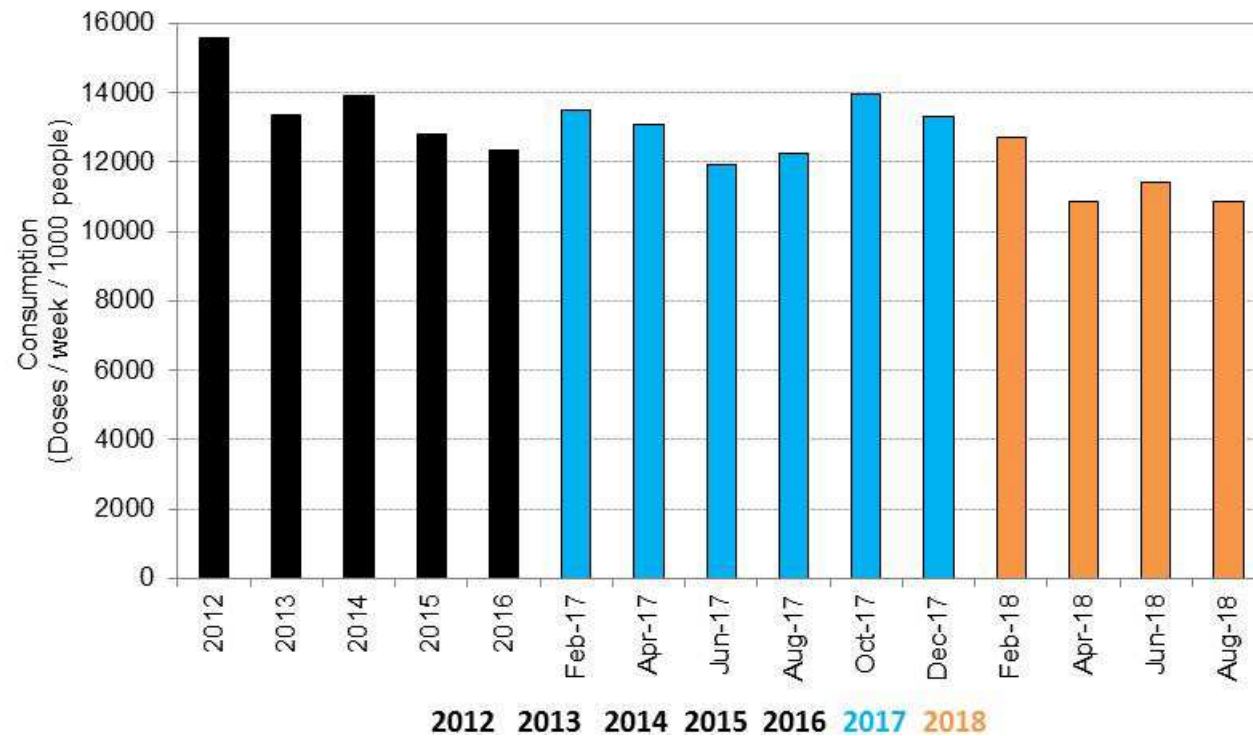


Average daily consumption (dose/day/1000 people) of THC over the week. Dose = 125 mg.

Drug and Alcohol Services South Australia

# Nicotine\*

Nicotine consumption levels have shown a gradual decline since 2012.

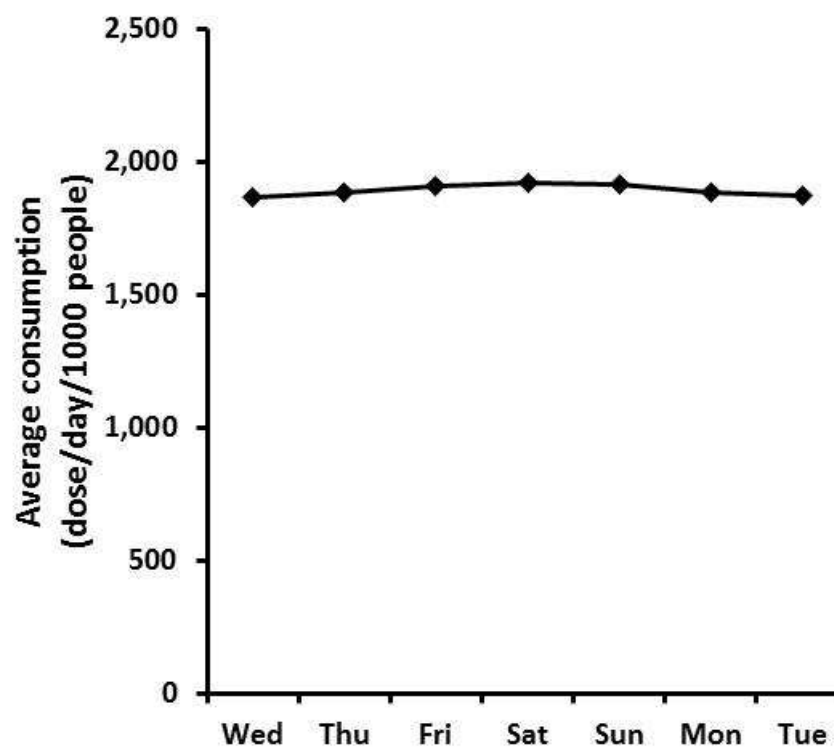


Average consumption (dose/week/1000 people) of nicotine for 2012-2016. Weekly consumption (dose/week/1000 people) bi-monthly from February 2017. Dose = 1mg.

\*Does not differentiate between tobacco and nicotine replacement therapy (NRT) use

# Nicotine

Nicotine consumption levels are fairly constant over the week.

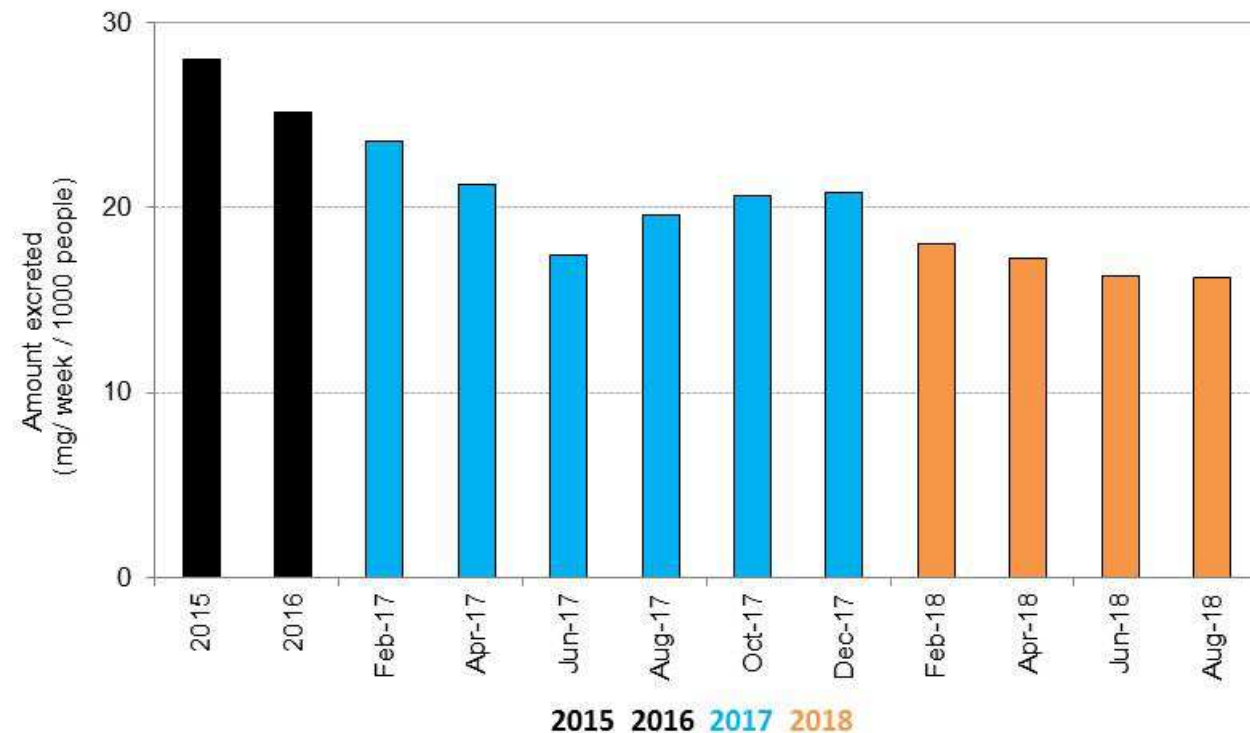


Average daily consumption (dose/day/1000 people) of nicotine over the week. Dose = 1mg.

Drug and Alcohol Services South Australia

# Anabasine\*

Anabasine consumption levels have shown a decline since 2015.

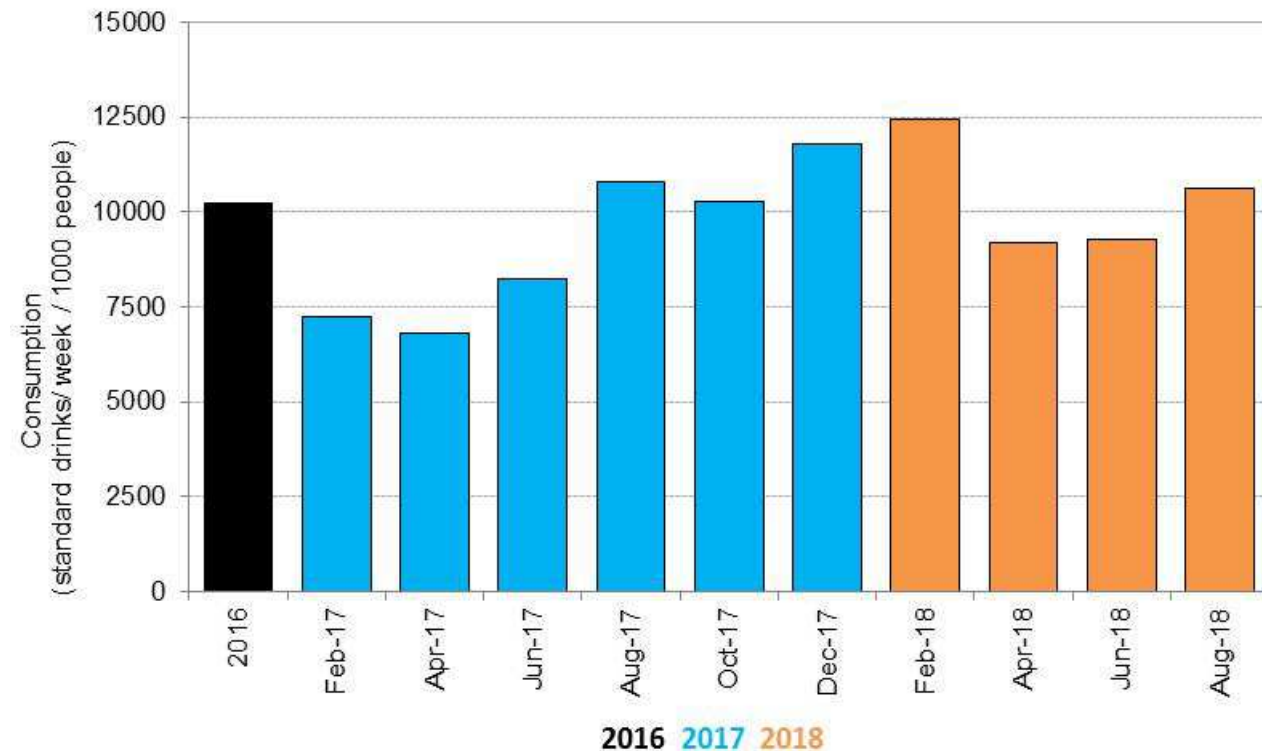


Average excretion (mg excreted/week/1000 people) from 2015-2016 (2015 includes December only). Weekly excretion (mg excreted/week/1000 people) bi-monthly from February 2017. As yet there is no excretion rate to convert to number of cigarettes smoked.

\*Tobacco specific alkaloid

# Alcohol

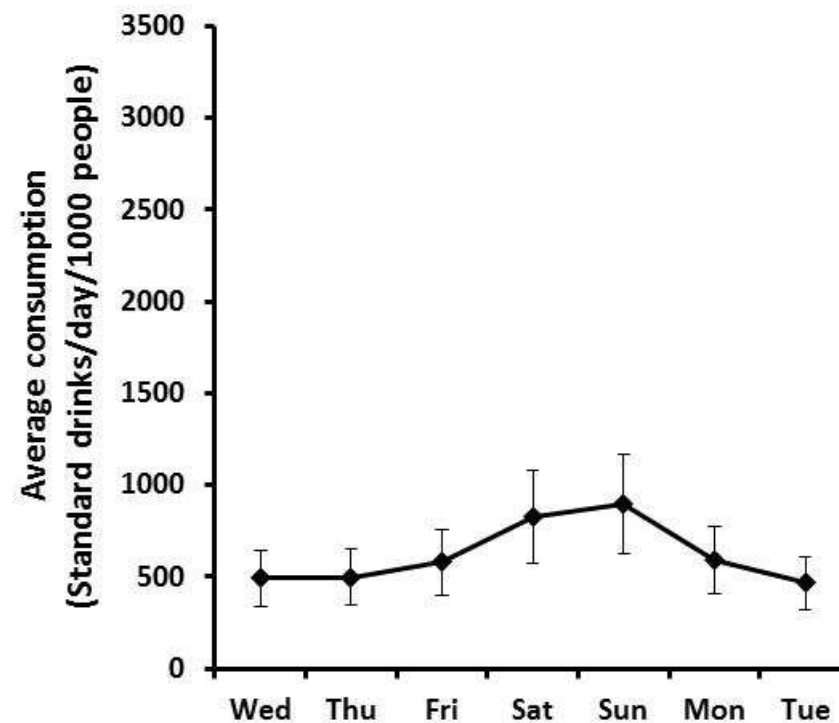
Alcohol consumption levels have fluctuated, with decreases in early 2017 followed by increases up until February 2018.



Average consumption (standard drinks/week/1000 people) in 2016 (excludes February). Weekly consumption (standard drinks/week/1000 people) bi-monthly from February 2017. Ethanol excretion = 0.012 % of ethanol consumption, 10g ethanol per standard drink.

# Alcohol

Alcohol consumption levels are higher on weekends.



Average daily consumption (standard drinks/day/1000 people) of ethanol over the week. Dose = 10g ethanol per standard drink.

Drug and Alcohol Services South Australia



## Summary

- > Methamphetamine is the predominant stimulant consumed in metropolitan Adelaide and has shown a steady increase in consumption levels since 2012. Decreases seen in the first half of 2017 were not sustained, until April 2018 when there was a substantial drop, which remained stable in June and August.
- > Other stimulants are consumed at much lower levels; MDMA has shown decreases in 2018.
- > Stimulant consumption levels increase on the weekends.
- > Opioid consumption levels are relatively constant across the week.



## Summary (continued)

- > Oxycodone and fentanyl consumption levels increased to 2015, and have decreased since that time.
- > Cannabis consumption levels showed a downward trend between 2012 and 2017, with small increases in 2018; it is used consistently over the week.
- > Nicotine consumption levels have shown a very gradual decline over the sampling period and are fairly constant over the week.
- > Anabesine consumption levels have also shown a decline over the reporting period.
- > Alcohol consumption levels have fluctuated, with decreases in early 2017 followed by increases up until February 2018.