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Use of commercial filters among a sample of people who regularly inject drugs: Findings from the Illicit Drug Reporting System, 2016-2020

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Key findings:

- Filtering drug solutions with commercial cotton filters (such as Sterifilt) is an effective way to reduce potential harm by removing insoluble particles. Use of wheel filters offers additional protection by removing large bacteria.
- There have been significant increases in past month filter use among IDRS participants over the past five years, with nearly six in ten participants reporting some commercial filter use in 2020 compared to around three in ten in 2016.
- Use of the most effective filters (i.e., wheel filters) has increased in this time but remains relatively low (around one in seven in 2020). Uptake of wheel filters is greater among people more frequently injecting pharmaceutical tablets.
- There remains a large gap in filter uptake which can be addressed through health and peer interventions.

Introduction

Drug solutions prepared for injection contain bacteria and particles that are introduced from handling, preparation, cutting processes and the general environment. Likewise, pharmaceutical drugs can accrue bacteria from handling and contain many inactive components such as talc that provide tablets with bulk and function.

Bacteria introduced to the body during injections are a common cause of infections (1-3). For example, staphylococcus aureus commonly resides in the skin or nose; and streptococci may be present in the respiratory system. They are commonly involved in soft tissue infections such as abscesses and cellulitis if introduced into the body during injection. These bacteria are around 0.6µm in size.

Pharmaceutical preparations of drugs like morphine and oxycontin contain many inactive ingredients such as talc, magnesium stearate, corn starch, and povidone that bulk out tablets or are part of their binding. These ingredients do not dissolve in water and some gel together under heat. These particles can range from 2-200µm in size (4). If these are introduced into the bloodstream by injection they will travel through the circulatory system: small particles will eventually be flushed out of the body but larger particles can cause blockages, particularly in the microcirculation where capillaries are 5-10µm, and the lungs where arteries are 300-400µm. In the lungs, these insoluble particles may accumulate, and trigger an immune response to their presence (granuloma), which in turn creates scar tissue in the lungs. This can cause restrictive lung disease and subsequent pulmonary hypertension (5).

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Filtering injection solutions is an effective way to reduce these potential harms (4). Commercial filters exist, such as 'wheel filters' designed for hospital use which are sold in a range of sizes (typically with filter membranes of 0.22 µm or 0.45 µm). Filters specifically designed for people who use drugs have been manufactured (Sterifilt) and have a membrane size of approximately 10 µm. Cotton filters, such as scrunched up balls of cotton or filters made for cigarettes are sometimes used and typically can block particles of approximately 50 µm or greater from solutions.

International research (6), including our own (7-9), has demonstrated that these filters are highly effective at reducing particulate contamination, and, for the wheel filters, effective at removing large bacteria (1). However, wheel filters are designed for solutions with little impurity rather than the heavily contaminated solutions that arise from tablet preparations, and so can take several steps to produce clean solutions without losing the active drug (9). Reuse and sharing of filters is not recommended as rupture of the filter membrane can occur, undermining the effectiveness of the filter, and bacteria can also grow on filters between uses (1).

In this bulletin, we wanted to examine the extent of commerical filter use among people who inject drugs that participated in the Illicit Drug Reporting System (IDRS) over the past five years, from 2016-2020. We also wanted to examine whether filtering practices differed according to jurisdiction and by the type of drugs that people were using.

Method

Data from IDRS interviews between 2016 and 2020 were used in this bulletin (N=850-940 per annum). In this time questions about filter use have asked about past month use of wheel filters; 'commercial cotton filters (e.g. Sterifilt)' and, for 2019 and 2020 'other' filters (e.g. cigarette filters). Because 'other filters' was only examined for two years, it will not be included in this bulletin. It should be noted that it is possible that some interviewers may have considered cigarette filters to fall into the 'commercial cotton filter' category, however this is unlikely as in 2019 and 2020 when the 'other' category was introduced, there was an increase (more than a doubling) in the reports of commercial cotton filter use rather than a decrease that would be expected if cigarette filters were miscategorised.

Self reports of sharing another person's used filter, as well as re-use of one's own used filter were examined, among those that had used a filter in the past month. Due to small numbers, both wheel filter and commercial cotton filters (e.g. Sterifilt) were collapsed into a single category.

To examine whether use of filters was greater among those at greater risk of harms from insoluble particles, frequency of injection of pharmaceuticals was calculated by summing the total days that participants reported injecting pharmaceutical opioid and/or benzodiazepine tablets. It is possible that the total days injected derived from this method may overestimate use if a person injected multiple different types of pharmaceuticals on a single day. To minimise this impact, only broad categories have been used: 'none', 'less than weekly', 'weekly or more, but less than daily' and 'daily'.

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Results

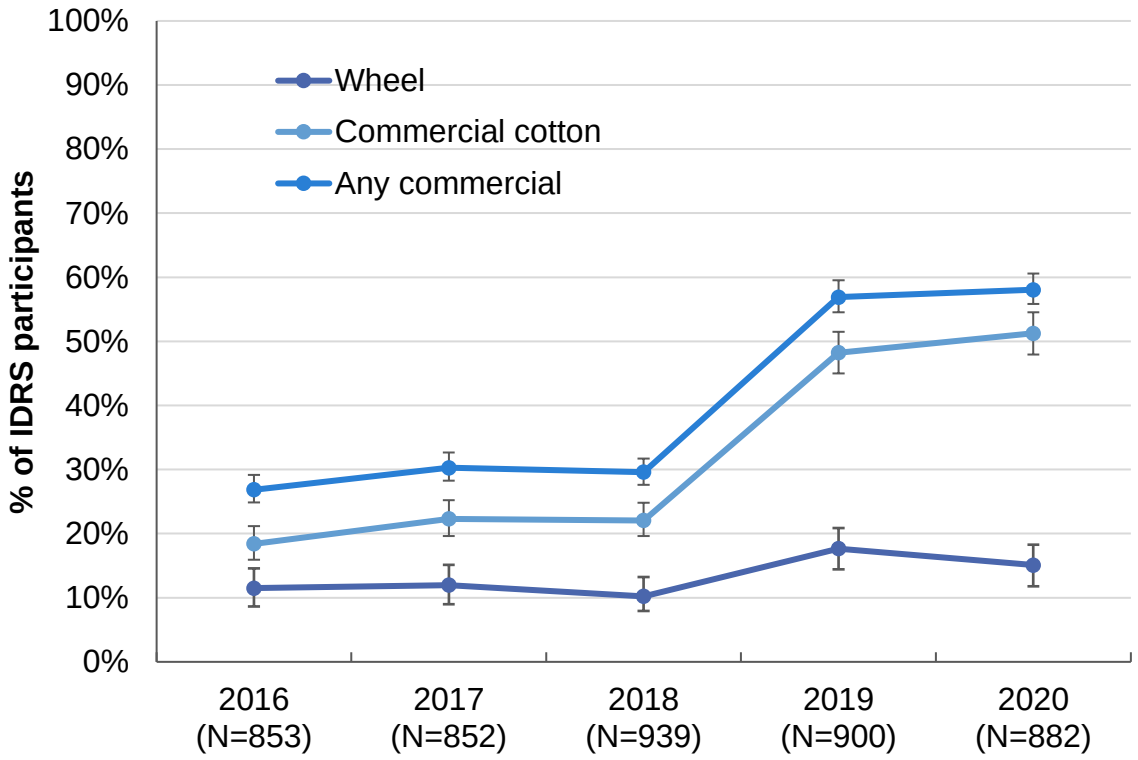

Figure 1. Use of commercial filters in the past month among the IDRS sample, nationally, 2016-2020 (with 95% confidence intervals (CIs)) [N>850 p.a.]

- Approximately 1 in 7 of the people taking part in the IDRS in 2020 used a wheel filter in the month prior to interview.
- While past month use of wheel filters has increased by only a small amount since 2016 (11%), the percentage in 2020 is a statistically significant increase ($\chi^2_{(1)}$ =4.86, p=0.028).
- The majority of filter use comprises the less effective commercial cotton filters (such as Sterifilt filters), with half of the participants in 2020 using these in the month prior to interview.
- There was a substantial increase in use of commercial cotton filters between 2018 and 2019 (from 22% to 48%: $\chi^2_{(1)}$=138.9, p<0.001), with these levels of use retained in 2020.
- Overall, nearly six in ten (58%, 95%CI 55-61%) participants in the 2020 IDRS used some kind of commercial filter in the month prior to interview.

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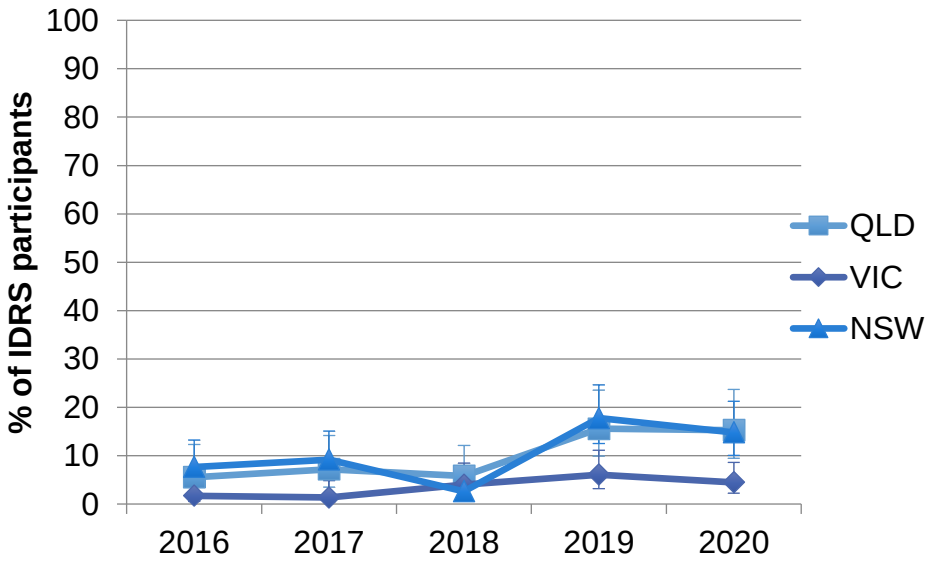

Figure 2. Use of wheel filters in the past month among the IDRS sample in QLD, VIC and NSW, 2016-2020 (with 95% CIs)

Use of wheel filters across jurisdictions 2016-2020

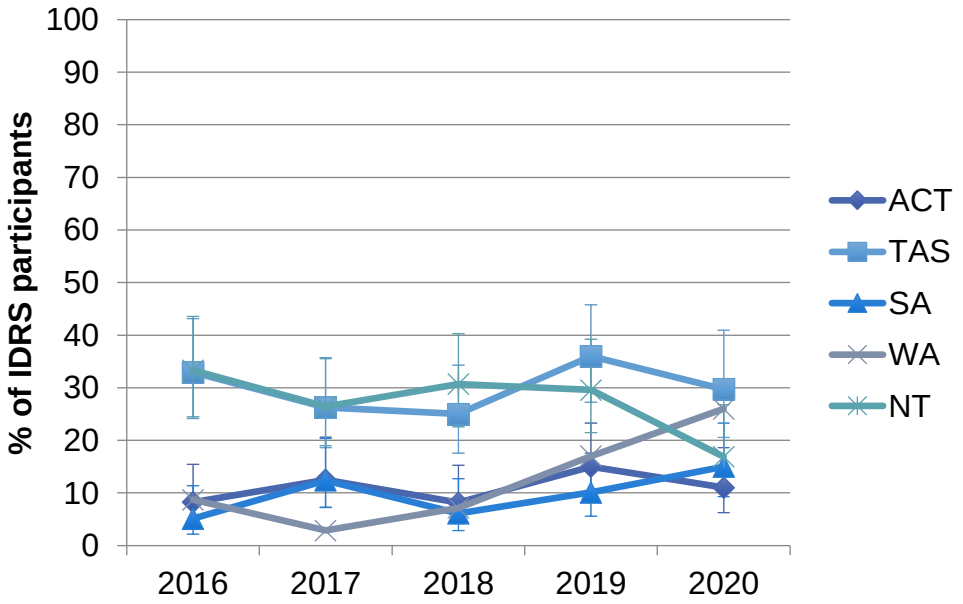

Figure 3. Use of wheel filters in the past month among the IDRS sample in ACT, TAS, WA, NT, and SA , 2016-2020 (with 95% CIs)

- In 2020, past month wheel filter use was reported by more than 25% of participants in TAS and WA; between 10-20% of participants in NSW, QLD, SA, NT and ACT; and less than 5% of participants in VIC.
- Past month use of wheel filters in NT significantly declined in 2020 compared to 2016 ($\chi^2_{(1)}$=5.80, p=0.016), while use in WA increased in 2020 compared to 2016 ($\chi^2_{(1)}$ =7.91, p<0.001).
- Smaller magnitude, but still significant, increases in past month wheel filter use occurred over the past five years among participants in NSW ($\chi^2_{(1)}$ =3.70, p=0.054) and QLD ($\chi^2_{(1)}$ =4.61, p=0.031).

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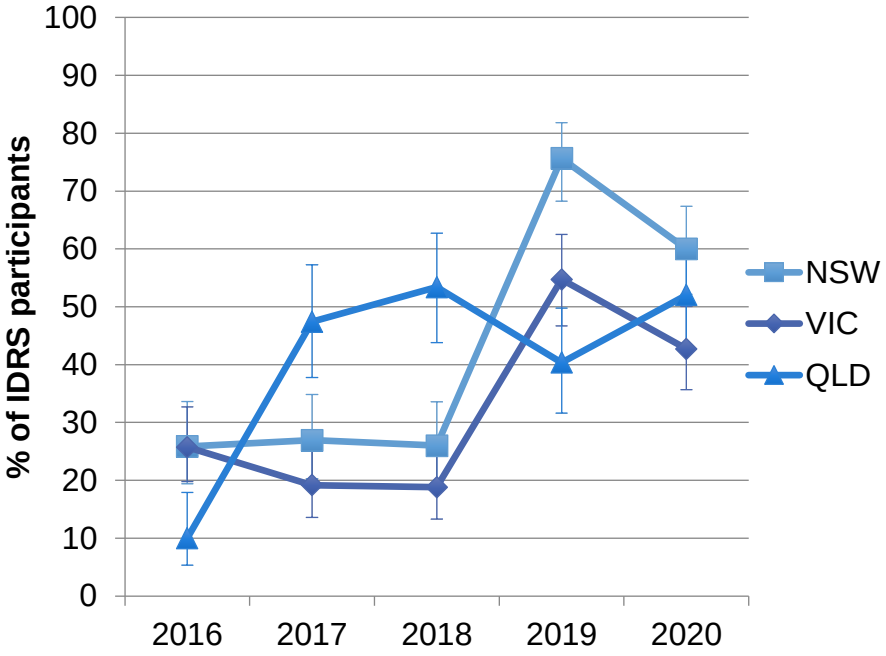

Figure 4. Use of commercial cotton filters in the past month among the IDRS sample in NSW, VIC and QLD, 2016-2020 (with 95% CIs)

Use of commercial cotton filters across jurisdictions 2016-2020

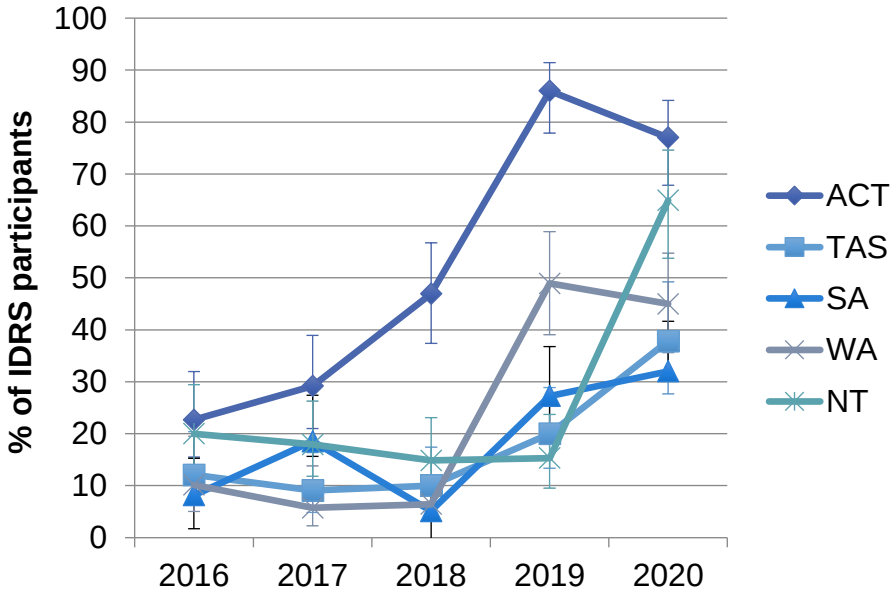

Figure 5. Use of commercial cotton filters in the past month among the IDRS sample in ACT, TAS, SA, WA and NT, 2016-2020 (with 95% CIs

- In 2020, past month commercial cotton filter use was reported by more than 50% of participants in QLD, NSW, ACT and the NT; with between one third and one half of participants in all other jurisdictions reporting past month use.

- There have been statistically significant increases in past month use of commercial cotton filters in participants from all jurisdictions in the past five years (i.e., 2020 compared to 2016).

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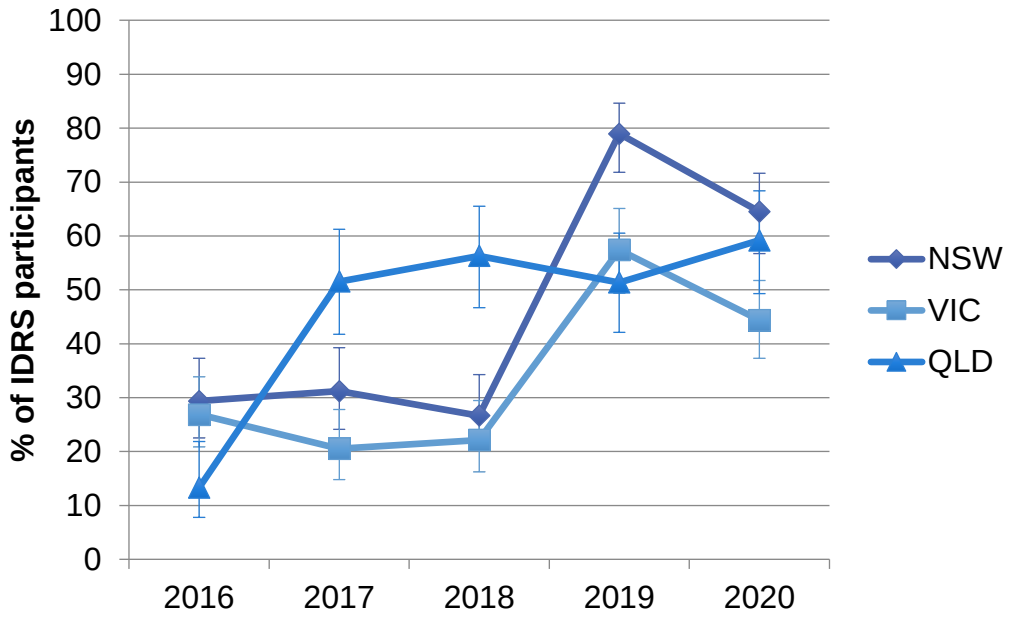

Use of any commercial filter across jurisdictions 2016-2020

Figure 6. Use of any commercial filters in the past month among the IDRS sample in NSW, VIC and QLD, 2016-2020 (with 95% CIs)

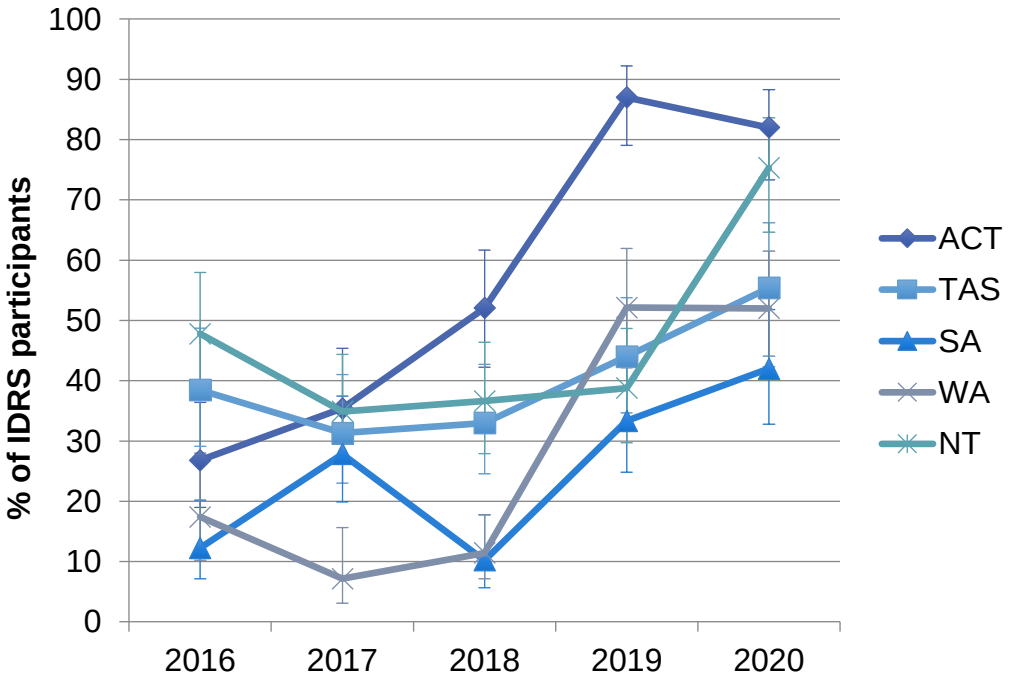

Figure 7. Use of any commercial filters in the past month among the IDRS sample in ACT, TAS, SA, WA and NT, 2016-2020 (with 95% CIs)

- In 2020, more than three quarters of participants in the ACT and NT reported use of any type of commercial filter (wheel or cotton) in the past month, and use in TAS, WA, QLD and NSW was above 50%. Around 4 in 10 participants in SA and VIC reported using some form of commercial filter in the past month.

- There have been statistically significant increases in past month use of commercial filters in participants from all jurisdictions in the past five years (i.e., 2020 compared to 2016).

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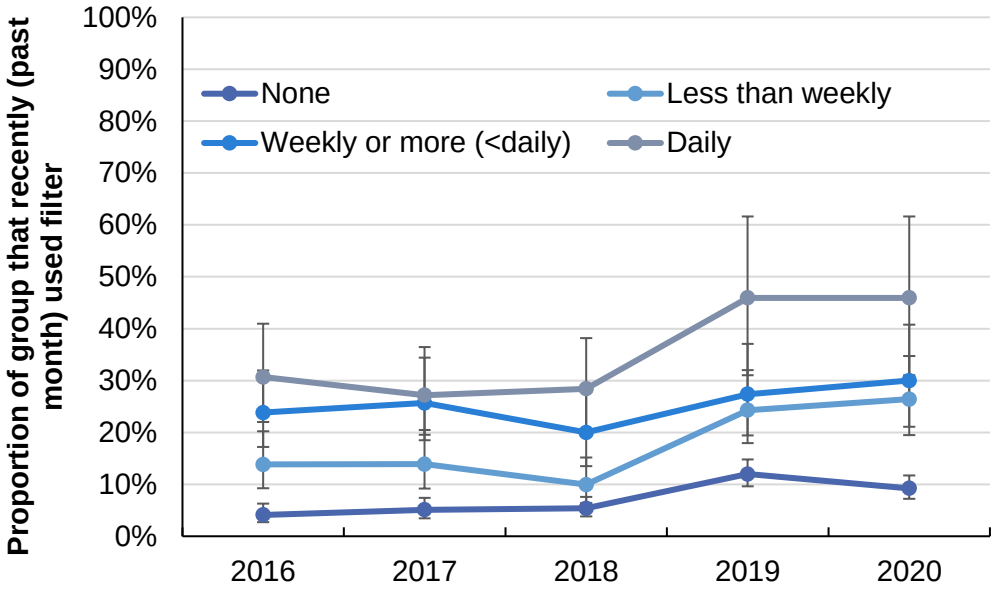
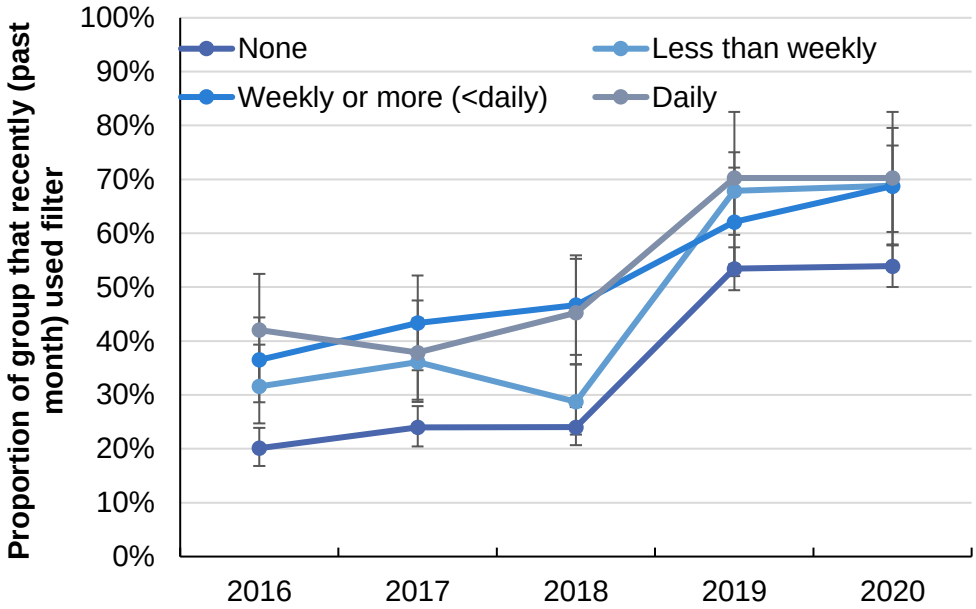


Figure 8. Past month use of wheel filters (with 95% CIs) among IDRS participants with differing frequencies of injection of pharmaceutical tablets, nationally, 2016-2020



Use of filters among people that inject pharmaceutical tablets 2016-2020

Figure 9. Past month use of any commercial filter (with 95% CIs) among IDRS participants with differing frequencies of injection of pharmaceutical tablets, nationally, 2016-2020

- Past month use of wheel filters was more common among people that frequently injected pharmaceutical tablets, with almost half of those injecting tablets daily using a wheel filter in 2020: this was significantly higher than reported by people who did not inject pharmaceutical tablets (9%: $\chi^2_{(1)}$ =47.27, p<0.001).
- Approximately 70% of people who injected pharmaceutical tablets reported past month use of any commercial filter in 2020, a significantly greater proportion than was seen among people who had not injected pharmaceutical tablets, where the percentage was approximately half in 2020 ($\chi^2_{(1)}$ =16.42, p<0.001)

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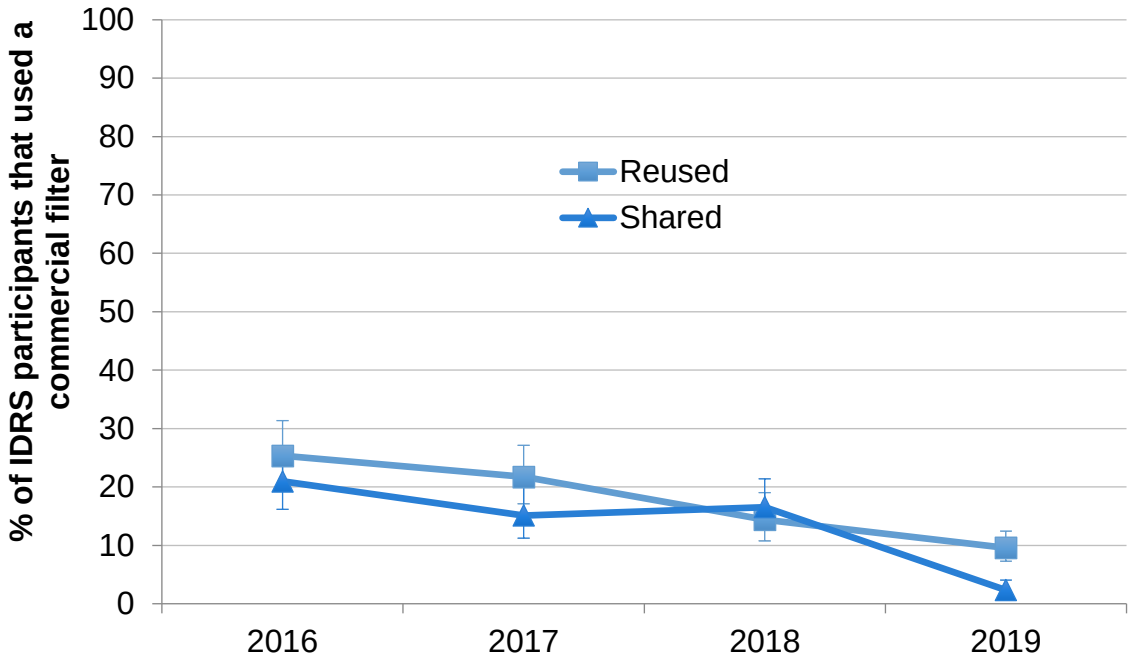

Figure 9. Proportion of the national IDRS sample that had re-used or shared any commercial filter in the past month (among those who reported past month filter use), nationally, 2016-2019 (with 95% CIs)

- Use of commercial filters (either cotton or wheel) after another person had used it (sharing) and reuse of one's own filters were not examined in 2020.
- However, in 2019, sharing (2.3%) and reuse (9.6%) of filters was low (among participants that had used a commercial filter in the past month).
- Rates of sharing have significantly declined between 2016 and 2019 ($\chi^2_{(1)}$ =74.4, p<0.001), as have rates of reuse ($\chi^2_{(1)}$ =31.5, p<0.001).

Conclusion

- There have been significant increases in past month filter use among IDRS participants over the past five years, with nearly six in ten participants reporting some commercial filter use in 2020.
- Use of wheel filters, which are beneficial for removal of both insoluble particles and bacteria, have increased over the past five years but remain relatively low (around one in seven in 2020). However, use among those at greatest risk of experiencing harms from insoluble particles (i.e., people frequently injecting solutions from pharmaceutical tablets) is much higher.
- Sharing and reuse of filters has declined over the past five years. This is important as reuse of filters can undermine their harm reduction benefits if they are damaged.
- While the increasing use of filters is highly encouraging, there remains a substantial gap in coverage, with a substantial proportion of participants injecting substances without commercial filtration (although they may be using other filters, such as cigarette filters).
- Some of this gap may relate to concerns about difficulty, time taken to filter, and (misplaced) concerns about loss of active drug during filtering among consumers (10). However, structured education interventions from health workers (11) or peers (12) have been demonstrated as effective ways to break myths, address concerns and to increase uptake of filtering to reduce potential harm from injection.

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Participating researchers and research centres

The National Drug and Alcohol Research Centre (NDARC), UNSW Australia, coordinated the IDRS. The following researchers and research institutions contributed to IDRS 2020:

- Antonia Karlsson, Julia Uporova, Daisy Gibbs, Rosie Swanton, Olivia Price, Roanna Chan, Professor Louisa Degenhardt, Professor Michael Farrell and Dr Amy Peacock, National Drug and Alcohol Research Centre, University of New South Wales, New South Wales;
- Cristal Hall, Sophie Cameron Krepp, Sarah Eddy, Dr Campbell Aitken and Professor Paul Dietze, Burnet Institute, Victoria;
- Yalei Wilson and Associate Professor Raimondo Bruno, School of Psychology, University of Tasmania, Tasmania;
- Dr Seraina Agramunt and Professor Simon Lenton, National Drug Research Institute, Curtin University, Western Australia;
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