The virtues of rubbish research: A novel way of measuring the impact of crime prevention interventions in public spaces

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Over the past three years Nick Tilley has spent a considerable amount of time at Griffith University, Australia. He has endeared himself to academic staff, assisting in the supervision of PhD students, co-authoring papers and working on a program of research[1] designed to prevent youth sexual violence in two discrete Indigenous communities in Queensland (Tilley et al., 2014). In this chapter, we focus on a unique contribution that Nick made to the data collection for a component of this program of research. Specifically, we discuss how Nick introduced us to "rubbish research" – using information about the rubbish left in public spaces to measure the behaviours of people using the public space.

This chapter is divided into four sections. In accordance with the Tilley tradition, we begin by describing the context of the intervention. First, we describe the problem of youth sexual violence in two Indigenous Australian communities. Second, we describe the program of research we developed to reduce this sexual violence, and in particular our design and implementation of time-limited pulse police patrols to reduce youth sexual violence in one of the two communities. Third, we describe the use of rubbish data as an innovative outcome measure to answer the research question: *Do police patrols reduce youth sexual behaviour in public spaces?* Finally, we conclude by exploring the utility of the rubbish data and consider whether this form of data is a worthwhile way of assessing how public spaces are used and the design and impact of interventions.

Background and context of intervention

Youth sexual violence is a serious problem. At Griffith University we house the Griffith Youth Forensic Service (GYFS), a professional therapeutic service funded by the Queensland Government to provide specialised treatment for court adjudicated young people on community based orders for serious sexual offending. Based on their clinical work, GYFS clinicians suggested that youth sexual violence was particularly problematic in two Queensland communities, Aurukun and West Cairns. Aurukun is a remote Indigenous community of approximately 1,500 residents who are among the most structurally

[1] The Griffith Youth Forensic Service Neighbourhoods Project received AUS $2.2 million funding between 2013-2016 from the Indigenous Justice Program, within the Department of Prime Minister and Cabinet. The principal investigators on this project were Stephen Smallbone, Sue Rayment-McHugh, Dimity Adams, Troy Allard, Anna Stewart, Ross Homel, Nick Tilley, Richard Wortley and Donald Findlater.

disadvantaged in Australia and have very limited access to services (ABS, 2006). In contrast, West Cairns includes three suburbs of Cairns, a regional centre in North Queensland (estimated residential population of 180,285 persons, 30 June 2015). This West Cairns community comprises 21,662 residents, and is also structurally disadvantaged including a population characterised by high concentrations of social housing, high proportions of single parent families and significant sections of the population reliant on welfare (ABS, 2016).

In 2013, researchers from Griffith University investigated the scope and dynamics of youth sexual violence in these two communities (Smallbone, Rayment-McHugh & Smith, 2013). They found that sexual offences were much more likely to be reported to police in these communities than the Queensland average (128 per 100,000), with an annual rate of 593.8 per 100,000 individuals in Aurukun and 234.8 per 100,000 in West Cairns. Other evidence (site observations, interviews with professionals and community members) pointed to the occurrence of serious and pervasive sexual violence, often peer-on-peer abuse, that was not reported to the police. Subsequently, the GYFS Neighbourhoods project was funded over three years by the Commonwealth government to develop and implement a suite of interventions sensitive to the local conditions and addressing particular aspects of the larger problem to prevent youth perpetrated sexual violence and abuse. A realist evaluation framework was adopted for this complex program (Pawson & Tilley, 1997).

Both target sites posed unique complications for the research team, particularly in relation to understanding the problems, monitoring, and evaluating the interventions put in place. Aurukun, a remote and isolated community, was a contained location and more amenable to conventional data collection techniques such as observation and interviews. The West Cairns context, however, required innovation in the data collection methodology. As a result, the Neighbourhood Project implemented Nick's rubbish data approach in this location to measure how people use public space and how this changed over time.

As part of the earlier 2013 investigation, researchers conducted direct site observations (during June through to November, 2012) of the public spaces around West Cairns. This investigation identified that groups of young people frequently congregated in public spaces late at night, to consume alcohol and drugs, and engage in sexual behaviour. As West Cairns

was built based on the American Radburn residential design (Colquhoun, 2004; Nottingham City Council, 2009), these public spaces were characterised by low levels of guardianship. Many houses in West Cairns lead on to common parklands and open spaces connected by pathways. At night these spaces are poorly lit and hidden from public view. Interviews with professionals and community members indicated that in these areas, sexual assaults (including rapes of intoxicated girls and group rapes) were occurring. Observations identified 'hot times' when these behaviours occurred, and smaller areas within the 'hot' locations in which the behaviour was typically concentrated.

As part of the GYFS Neighbourhoods Project a problem solving approach was used to develop two strategies to reduce sexual violence and related problems in West Cairns. First, safety audits were conducted based on the principles of situational crime prevention and a workshop was held with various local stakeholders, including the Cairns City Council about how to reduce the opportunities for sexual violence and abuse within these locations across the 'hot' times. The resulting recommendations focused on controlling access (e.g., convert some public into private spaces, and construction of fences), improving visibility (e.g., improved lighting, install CCTV, remove or prune vegetation) and redefining use (e.g., install or improve playground equipment, create designated parking spaces, installation of signage indicating alcohol free zone). At the time of writing, the Cairns City Council is considering the recommendations by the Neighbourhoods Project as part of its broader community safety agenda.

The second strategy recognised the need to disperse or disrupt the behaviour of young people who congregated in public spaces late at night and engaged in sexual behaviour and/or consumed alcohol or drugs. Evidence supports the use of hot spot policing as an effective intervention to reduce crime (Braga, 2005; Braga, Papachristos & Hureau, 2012; Sherman et al., 2014; Weisburd, 2005; Weisburd & Eck, 2004; Weisburd, Telep, Hinkle & Eck, 2008). The use of time-limited pulse patrols was considered the most viable option given the limits on available policing resources, which had been largely used to reactively respond to issues and offences. The public often distrusted and had negative views of police, which could possibly also be improved through enhanced positive engagement (Smallbone, Rayment-McHugh & Smith, 2013). Implementing the patrols was also

considered suitable given that they can have a deterrent impact (Koper, 2006; Sherman et al., 2014)[2]. In the remainder of this chapter, we describe the version of pulse patrols implemented in West Cairns and describe the rubbish data collection - an innovative way of assessing the impact of this intervention in public spaces.

Time-limited pulse patrols

Background

The GYFS Neighbourhoods Project's version of targeted police patrols was informed by hot-spot policing. Hot-spot policing adopts a targeted approach to identifiable areas where crime is highly congregated (Newburn, 2013). This approach recognises that even within crime-prone communities, identifiable locations referred to as hot-spots, are disproportionately responsible for crime (Byrne & Pease, 2008; Newburn, 2013). From a deterrence perspective, focused policing is assumed to prevent crime as potential offenders perceive that there is a greater chance of detection if they commit an offence (Decker & Kohfeld, 1985; Kohfeld & Sprague, 1990; Marvell & Moody, 1996). Hot spots policing has received validation through empirical work, including specification of an optimal time of 15 minutes for patrols at each site, after which time diminishing marginal returns on police time have been observed (Koper, 2006; Newburn, 2013; Sherman et al., 2014).

Study Design

In West Cairns, the patrols were implemented at five hot spots - sites identified as particularly problematic. Three sites (O'Hara Reserve, Moody Creek Reserve and Frances Street Park) were identified from the direct observations undertaken in the initial scoping research (Smallbone, Rayment-McHugh & Smith, 2013). For the GYFS Neighbourhoods Project, these sites were confirmed through discussions with stakeholders (police, council,

[2] Two other strategies were also explored, instigating community patrols and gating the areas to prevent access at night. Neither of these strategies were viewed as viable. Community patrols had been previously implemented in West Cains. However, a lack of community support suggested such patrols were not sustainable. Gating was problematic because of the large size of the public spaces with the many entry/exit points. Gating would have severely restricted pedestrian movement and the prosocial use of the public spaces by West Cairns residents. In addition, the periodic flooding typically associated with these areas due to tropical rain events meant gating represented a potential hazard

youth justice and community members). In addition, the stakeholders identified two additional sites (Lions Street Park and Lennon Street Park) as problematic. A picture of each site is provided in Figure 1. The sites that are reserves include the area located within the boundaries highlighted in red.

O'Hara Reserve

Moody Creek Reserve

Lions Park

Lennon Street Park

Frances Street Park

Figure 1: The sites were the pulse police patrols were implemented during the two phases

Two out of the five sites (O'Hara and Moody Creek Reserve) are common parklands, characterised by open spaces and laneways that back onto residential properties. These sites are largely inaccessible by vehicular traffic, contain a creek or waterway through the length of the site and are heavily vegetated resulting in blind spots and dark areas at night.

Two of the sites (Lions and Lennon Street Park) are parks with facilities such as a toilet block, playground, barbeques and gazebos that are illuminated at night. However, there are also large open spaces that are poorly lit. The remaining site (Frances Street Park) is a smaller park that contains a bridge over a creek that pedestrians used as a thoroughfare to O'Hara Reserve.

The key components of the time-limited pulse patrols implemented at five identified hot spot sites in West Cairns were:

- Dosage: 15 minutes, including a walk through the site to maximise visibility.
- Frequency: At least once, preferably twice, per site each night.
- Intermittency: Randomised during hot times, which has been found to maximise the level of uncertainty among offenders about when patrols will be undertaken and thereby increase the deterrent effect (Koper, 2006; Sherman et al., 2014).
- Engagement: Officers initiate conversations with community members who were at the site. This was important given the benefits of police initiated engagement and the existing tenuous police-citizen relationships in these communities (Sherman et al., 2014).

The pulse patrol interventions were carried out in two phases over a nine-month period. The phased approach was necessary to work within the operational demands of the local police agencies. In Phase 1 the police patrols were carried out at three sites for four months (4/8/2015 to 4/12/2015; O'Hara Reserve, Lions Park and Frances Street Park). After a break of three months and an interim evaluation, Phase 2 was implemented for a two and one-half month period over three sites (15/3/2016 to 30/5/2016; O'Hara Reserve, Lennon Street Park and Moody Creek Reserve). In each phase the sites were alternated. This design enabled the use of two comparison groups. First, we could monitor activity occurring at the same time comparing sites with and without police patrols. Second, we could monitor activity occurring over time within the same site, comparing when the police patrols were active versus not active.

Procedure

A partnership was formed between the GYFS Neighbourhoods Project team and the Queensland Police Service (QPS), with a Senior Sergeant seconded to the project to promote buy-in and help implement the patrols. Briefings were conducted with executive, middle management and police officers prior to implementation. Oral briefings and repeated updates were also delivered throughout the intervention to regional officers, designed to reinforce the need for patrols to conform to the project's patrol specifications. Indeed, findings suggest that officers may be more likely to patrol outside of predetermined areas as the length of time that they undertake the activity increases (Sorg, Wood, Groof & Ratcliffe, 2016). Additionally, project team members participated in several of the initial patrols and provided officers with direct guidance.

In the Cairns police division general duties officers are dispatched by the Communications Coordinator (COMCO) using the Queensland Computer Aided Dispatch (QCAD) system. During each of the intervention phases the COMCO dispatched general duties officers to patrol the designated intervention sites based on the key components of the pulse patrols. During the intervention at least one patrol was dispatched to the intervention site between 9pm and 3am – the identified 'hot times'.

At the end of both Phase 1 and 2, interviews were conducted with 54 police officers involved in the pulse patrols. These interviews indicated two issues impacting on program fidelity. First, officers did not always leave their vehicle to walk through the site to maximise visibility or engage with the young people. Second, officers were sometimes diverted from the patrols to undertake other duties. While similar issues have been observed with patrols conducted elsewhere (see for example, Wood et al., 2014), attempts were made by the project team to rectify these issues at the end of phase 1. However, evidence suggested that these issues were still experienced during Phase 2.

Measuring outcomes

Measuring youth sexual violence and abuse in public locations is extraordinarily difficult. These behaviours are sporadic, hidden from view and rarely reported to the police. During the intervention periods, there were 182 sexual and violent offences recorded in the whole

Cairns police division (a rate of 840 offences per 100,000 population). Consequently it was not possible to use official data sources to ascertain the impact of the police patrols on the target behaviour. Three additional sources of data were identified.[3]

Two data sources were administrative data collected by the QPS. They provided monthly data for a 24 month period from July 2014 to June 2016. These data included the name of the street and setting (e.g., bushland, open space, recreational or rest area), thereby enabling a comparison to be made about the number of offences reported and street checks that occurred at the sites or on streets adjoining the sites before and during the patrols. For Phase 1, this provided 13 months of data prior to implementation of the patrols and for Phase 2 this provided 20 months of data prior to implementation of the patrols.

The first QPS data source was reported offences data. All criminal offences were included (personal, property, drug and other offences) to assess whether there were changes in the total number of offences when the patrols were operational compared to when they were not operational. This is important given the Tilley tradition, as the mechanism through which the patrols were expected to have an effect (deterrence) could also reduce other offence types. Unfortunately, there were very few reported offences occurring at the intervention sites. In Phase 1 there were 0.8 reported offences per month in the 13 months prior to implementation. During the patrols this dropped to 0.5 reported offences per month (4 months during implementation). In Phase 2 the number of reported offences increased from 0.6 per month (20 months prior to implementation) to 1 offence per month (3 months during implementation). With so few reported offences it was not possible to draw conclusions about the impact of the patrols on all reported offences let alone the distinct categories of youth sexual offences.

The second QPS data source was street check data. Street check data are intelligence data collected by police about individuals who are in a particular area. Every time a person is

[3] Attempts were made to use two additional measures. Direct site observations of behaviours related to sexual violence (sexual behaviour, alcohol consumption and drug use) were not particularly suited to assessing changes over time at multiple sites because of the resources required. Interviews with local community members at the sites aimed at assessing patrol visibility, local deterrence and to generate emerging theories about impacts also proved problematic, as participation levels were extremely low.

stopped police collect information about the location (e.g., street), name, gender, age and ethnicity of the person. In Phase 1 the number of street checks increased from 11.9 (13 months prior to implementation) to 15.3 per month (4 months during implementation). In Phase 2, the number of street checks increased from 14.9 (20 months prior to implementation) to 27.3 per month (2.5 months during implementation). These results indicated an *increase in police activity* when the patrols operated on the streets that adjoined the sites. However, we had no evidence concerning whether this increase in activity led to a reduction in youth sexual offences.

Not surprisingly, official QPS data provided very little information about the effectiveness of the pulse patrols for preventing or reducing youth sexual violence and abuse. When designing the interventions we were aware of the difficulties of using such data for measuring sporadic and clandestine behaviours. However, identifying alternative data sources was challenging. At one brainstorming session Nick discussed the idea of 'rubbish research', an unobtrusive measure that could be used to assess behaviours occurring in public spaces that were viewed as being related to sexual violence, including alcohol consumption, drug use and sexual behaviour. The next section will provide an overview of rubbish data and its use in science, before examining how the data were collected for the current project, analysed and presented as translatable findings.

Rubbish Data

Rubbish data is taken here to refer to the systematic recording of the types and amounts of rubbish that is left behind on the ground by users of space. It differs from garbage or refuse collection, which typically involves the collection of waste that has been disposed of in bins (Powers, Osbourne & Anderson, 1973; Robinson, 1976).

While the use rubbish data is innovative within the field of criminology, its use is not without precedent in other fields. Two examples can be found in archaeological and environmental science literature. Within the field of archaeology, buried rubbish over significant periods of time is viewed as an important source of evidence for assessing the "character, organization and history of a site" (Needham & Spence, 1997, p. 77). This literature identifies three important stages that result in the creation of 'refuse-rich'

contexts. First, *refuse generation* is determined by factors such as who the users of the space were, the duration they were in the space and the types of activities they were engaged in. Seasonality is an important aspect to be considered when examining refuse generation as certain refuse-generating activities may occur at specific times and/or result from changes in the population at specific times of the year. Second, *accumulation* may be impacted by whether refuse is used or moved from the original site. Third, *refuse survival* relates to whether deposits survive over time or whether they biodegrade.

Environmental scientists frequently measure the impact of rubbish on the environment and associated clean-up costs. For example, numerous field experiments have examined the impact of specific interventions on rubbish caused by littering, such as the availability of litter bins, litterbags and litter signs (Powers, Osbourne & Anderson, 1973; Robinson, 1976). This research has measured rubbish in several ways, including self-reports, the weight of rubbish and the number of pieces of rubbish (Huffman, Crossnickle, Cope & Huffman, 1995). Others have disaggregated the rubbish collected from sites based on its type; counting the number of cans (e.g., beer, soft drink), bottles (e.g., liquor, beer) and paper items (e.g., newspaper, containers) (Finnie, 1973). This more nuanced approach has enabled assessments to be made about the impact of interventions on specific types of littering.

We identified three potential benefits of using rubbish data to assess behaviours and any impact of the patrols. First, rubbish data is unobtrusive. It is collected without the researcher intruding into the research context or interfering in participants' lives (Bryman, 2012; Trochim, 2006). Consequently, it is not subject to many of the biases typically introduced into measurement by researchers and participants. Second, no ethical or privacy concerns exist, which is rare for a project focused on youth sexual violence and abuse. Rubbish is discarded in public spaces and is already collected by council workers, so there are few additional risks and no presumed right to privacy. Third, the data can be collected on a prospective and longitudinal basis, facilitating an assessment of impact over time.

Data collection

A partnership was formed between the researchers and the local council workers whose job is to collect rubbish from the ground in parks throughout West Cairns. Initial meetings were

held to explore how the rubbish data from the intervention sites could be collected and systematically recorded, focusing on what rubbish was collected and what rubbish was indicative of particular types of human behaviour. Two possible options were identified to collect the rubbish data. The first option involved council workers 'bagging and tagging' the rubbish collected from the sites and a researcher attending the local council depot on a regular basis to sift through and record pertinent information about the collected rubbish. The second option involved council workers recording the types and amounts of rubbish as they collected it from the ground at the sites. After considering the cost, time-commitment, hygiene implications and possible impacts on validity, we decided that the second option was the most viable.

We developed a rubbish data collection instrument with the council workers to be completed each time they visited one of the intervention sites. This instrument enabled the total amount of rubbish that was collected from the ground to be assessed (e.g., 1 ½ bags) and a categorisation of the collected items as indicative of one of three types of behaviour related to sexual violence and abuse in the public spaces (Table 1). In developing this categorisation scheme the council workers provided valuable information and insights about the use of various types of rubbish and their relationship to target behaviours. For example, large clip bags are usually found next to deodorant cans as they are used to inhale the deodorant. Scissors are typically found near bongs, as they are an essential tool used to create bongs and refine the marijuana prior to smoking. Other rubbish that was collected on a regular basis included clothing items and dirty nappies. Council workers visited the site, collected the rubbish off the ground, categorised it, counted it and completed the data collection instrument.

Table 1: Categorisation of specific rubbish items into one of three target behaviours

Alcohol consumption	**Drug use**	**Sexual behaviour**
Beer cans	Syringes	Condoms
Spirit cans	Bongs	Condom packets
Glass beer bottles	Pieces of garden hose	Lubrication bottles/wrappers
Alco-pop bottles (Brezzer, Cruiser)	Small clip seal bags	
Glass spirit bottles	Large clip seal bags	
Glass wine bottles	Small pieces of foil	
Cask wine cartons, 'goon bags' or 'silver pillows'	Cut of chopped straws	
Brown paper bag from liquor store	Spoon with burn marks	
Beer or other alcohol cartons	Spray paint cans	
Beer bottle caps	Deodorant cans	
Wine corks or screws	Plastic drink bottles with paint stains	
	Glue/silicon container	
	Scissors	

The 'rubbish data' collection strategy was consistently employed over an 18 month period (January 2015 to June 2016). Data collection commenced seven months before the implementation of Phase 1 and 14 months before Phase 2 of the police patrols. There were four council workers, who worked in two crews, involved in the data collection. The council workers knew that we were using the rubbish data to evaluate an intervention. However, they did not know specific details such as when or at which site an intervention was implemented.

Table 2 identifies the number of times that rubbish was collected from each of the sites over the 18 month period. The number of times each site was visited varied greatly depending on the amount of rubbish (and therefore the level of activity) at that site. Frances Street Park had very few rubbish collections. In contrast Lions Park was visited an average of 2.6 times a week for the 18 month period. While the number of times that council workers visited sites was related to the amount of rubbish at the sites, there is the possibility that rubbish

may have been displaced or lost before it was collected, particularly for those sites that were visited less frequently.

Table 2: Number of times rubbish was collected at the sites over an 18 month period

Site	Number of times rubbish collected from ground
O'Hara Reserve	21
Moody Creek Reserve	31
Lions Park	185
Lennon Street Park	136
Frances Street Park	2

Meetings were held with the council workers on an intermittent basis and a preliminary presentation about the data that were collected was given about half way through the data collection phase. At these meetings, council workers revealed two critical practice factors. First, they only completed the instrument for rubbish they collected from the ground, and second, rubbish deposited in bins was not included in the data collection. The council workers were particularly enthusiastic about the project, seeing the potential usefulness of the rubbish data across a variety of contexts. They were therefore engaged in the data collection process, and regularly emailed the researchers pictures of interesting, new and/or intriguing rubbish that they had collected.

Data

The rubbish data was an entirely novel data source. Consequently, there were challenges in identifying an appropriate analytic strategy. Over the 18 month period a total of 9,230 items were classified as indicative of alcohol consumption, 1,723 items indicative of drug use and 351 items indicative of sexual behaviour (Table 3).

Table 3: Total number of rubbish items collected over the 18 month period by site

Site	No of collections	No of rubbish bags	Alcohol Consumption		Drug Use		Sexual Behaviour		Total	
			N	%	n	%	n	%	n	%
O'Hara Reserve	21	156	2,788	89.5	287	9.2	39	1.3	3,114	27.5
Moody Creek Reserve	31	65	1,809	69.0	698	26.6	115	4.4	2,622	23.2
Lions Park	185	220	1,360	77.1	329	18.6	76	4.3	1,765	15.6
Lennon Street Park	136	242	3,252	86.4	394	10.5	119	3.2	3,765	33.3
Frances Street Park	2	6.25	21	55.3	15	39.5	2	5.3	38	0.3
Total	375	689.3	9,230	81.7	1,723	15.2	351	3.1	11,304	100

Rubbish was collected most frequently from Lions Park. However, this park had the lowest proportion of items that were indicative of the antisocial behaviours being targeted. Lennon Street Park had the highest number of rubbish bags filled and total items indicative of antisocial behaviour. Interestingly, the proportional distribution of items indicative of antisocial behaviour varied across the sites. Items indicative of alcohol consumption were proportionally the highest with almost 82% of items categorised into this category. However, O'Hara Reserve had the highest proportion (89.5%) and Moody Creek Reserve (69%) and Frances Street Park (55.3%) the lowest proportion of alcohol items. These two sites had proportionally higher drug use items (26.6% and 39.5% respectively) and also the highest proportion of items indicative of sexual activity (4.4% and 5.3%).

When the number of items for each antisocial behaviour were plotted by month it was apparent that there was some seasonal variation in the activity in the parks (Figure 2). May, June, July, August and September were the months with peak activity in the parks. These winter months coincided with the dry season in Cairns. Cairns is located in the tropics and

has two distinct seasons, warm and dry and hot and wet (including monsoons and tropical cyclones). In the wet season, November to March, the average maximum daytime temperature exceeds 31 degree Celsius and the average monthly rainfall is 383 millimetres (ranges from 180 millimetres to 453 millimetres). In the dry season, the monthly rainfall averages 46 millimetres and the average max temperature is 27 degrees Celsius (ABM, 2017). In addition, the Queensland school holiday calendar includes two weeks in April, July and September. The main summer holidays (six weeks) are in December and January. The weather appears to have the strongest seasonal influence on antisocial activity in the park. During the hot and wet season, activity drops off. During the warm and dry season, activity increases. However, there is also some evidence of school holidays increasing activity (during the dry season).

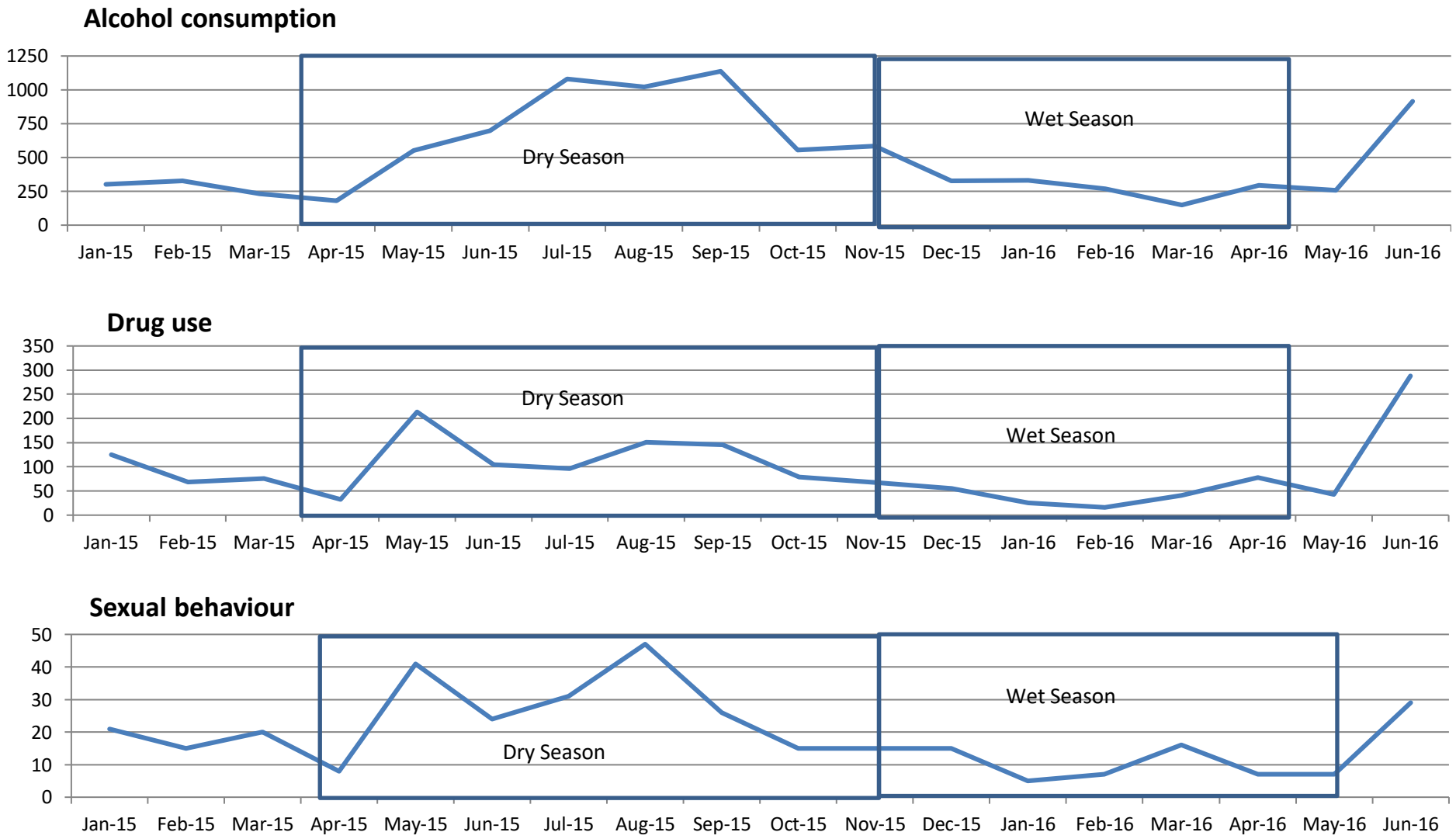


Figure 2: Total number of items across all sites indicative of alcohol consumption, drug use and sexual behaviour by month

Addressing the research question: Do the police patrols reduce youth sexual behaviour in public spaces?

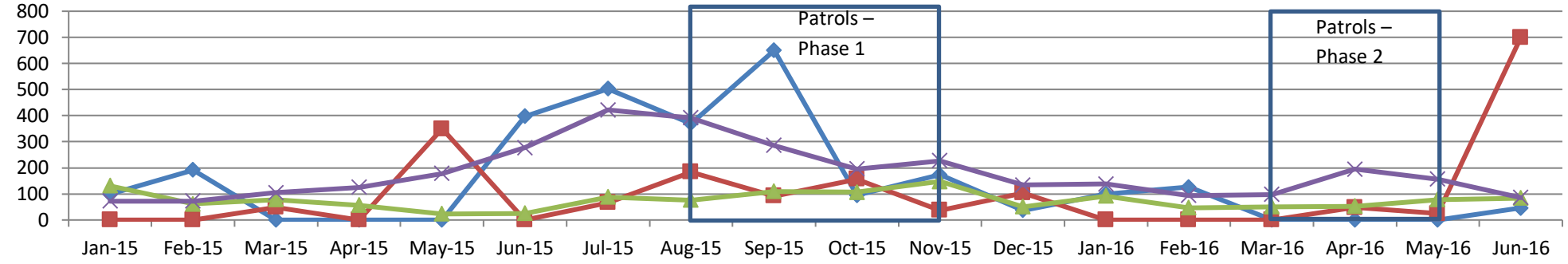
In Figure 3 the number of rubbish items collected each month that were indicative of alcohol consumption, drug use and sexual behaviour by site are presented. Frances Street Park has been excluded from this figure as there were only two data collections over the 18 month period. The time periods when the police patrols occurred are superimposed on the Figure.

In Phase 1, patrols were introduced at O'Hara Reserve and Lions Park. The comparison sites were Moody Creek Reserve and Lennon Street Park. During the four months (August to November) of the police patrols at O'Hara's Reserve there was a spike in items indicative of alcohol consumption and drug use. These both occurred in September at the same time as school holidays. This pattern was not apparent in the items indicative of sexual behaviour. These spikes were also not apparent at the other intervention site (Lions Park), which possessed the least amount of antisocial rubbish. When comparing the Phase 1 intervention sites with the comparison sites over the 4-month intervention period, no evidence exists that the patrols reduced the amount of antisocial items of rubbish.

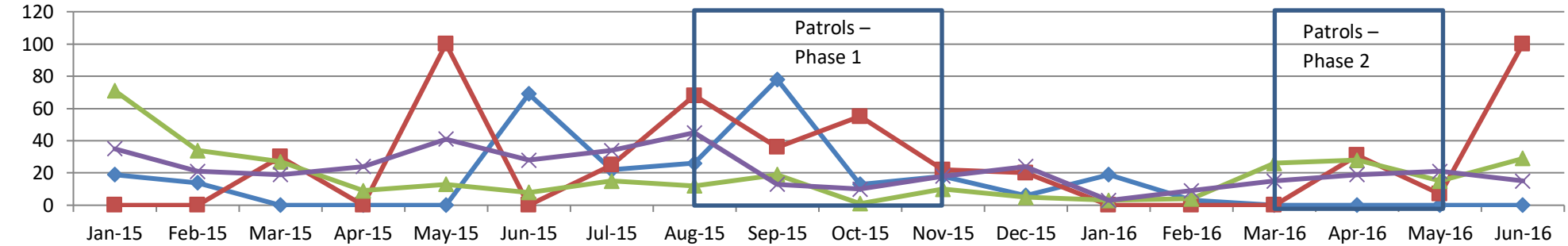
We then examined the amount of rubbish at the two intervention sites prior to the introduction of the intervention and during the intervention. Phase 1 was implemented in the last four months of the dry season. During this time there was an overall drop across all the sites, which appears to be indicative of seasonal variation. Consequently, it is difficult to ascertain if any of this drop was due to the introduction of the police patrols. In September, in O'Hara Reserve, there was a sharp increase in items relating to alcohol and drug use. The Queensland school holidays are in September and typically involve an increase in the number of young people at these locations over hot times that may explain this increase in antisocial behaviour in this park. Overall in O'Hara Reserve there was an increase in antisocial behaviour during the police patrols. In the other intervention site, Lions Park, no evidence existed from the rubbish data to suggest the patrols influenced antisocial behaviour.

In Phase 2, the intervention sites were O'Hara Reserve, Lennon Street Park and Moody Creek Reserve. Lions Park was the only comparison site in Phase 2. When assessing the three intervention sites against the comparison site over the time of the intervention there was no indication from the rubbish data that the police patrols reduced antisocial behaviour. In addition, for the three months prior to the intervention there was limited indication of the sites being used for antisocial behaviour. From this examination of the antisocial rubbish data we concluded that there is no evidence that the police patrols had any impact on the target behaviours.

Alcohol consumption



Drug use



Sexual behaviour

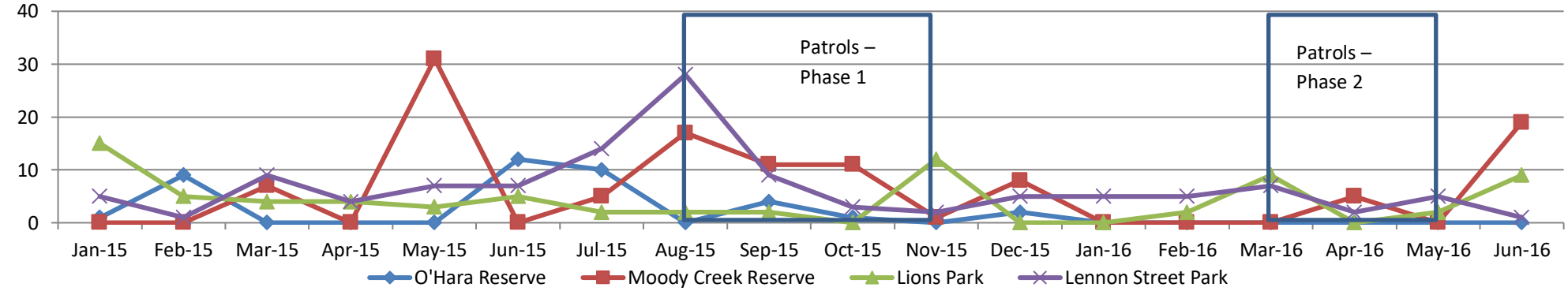


Figure 3: Number of items indicative of alcohol consumption, drug use and sexual behaviour at the sites each month

Discussion and Conclusions

From our results of the rubbish data alone, it was not possible to definitively answer the research question, *Do police patrols reduce youth sexual behaviour in public spaces?* However, by using rubbish research we gained a better understanding of the use of public spaces for antisocial behaviour – the context of the intervention. The intervention sites for the police patrols were identified as problematic by previous observation research and consultation with stakeholders (police, council, youth justice and community members). However, the level and type of antisocial behaviour, as measured by rubbish data, varied substantially across the sites. At O'Hara Street Park the predominant problem was alcohol consumption with little evidence of sexual behaviour. However at Frances Street and Moody Creek Reserve there was evidence of higher levels of drug usage and sexual behaviour than in the other two sites. These were also sites with fewer rubbish items collected, perhaps indicating specialised use in these parks by people involved in antisocial behaviour.

Furthermore, this analysis clearly identified the seasonal variations of behaviour, both antisocial and prosocial, in public spaces such as recreation parks. During the dry season (when the original observation study was conducted) there was more evidence of antisocial behaviour than during the wet season. This information would have been particularly valuable when planning the timing of our police patrols. Unfortunately, it was not possible to detect similar patterns in traditional data sources such as police reported offences, due to the small number of reported offences. Phase 1 of our intervention occurred towards the end of a seasonal peak – a time when the behaviours were already decreasing as the behaviour patterns of young people changed. Our Phase 2 police patrols occurred at a time when the weather discouraged young people from spending time in the park. Additionally, there is indication that there is increased activity in the parks during school holidays, perhaps a time that targeted police or even community patrols should be implemented.

Despite the inconclusive findings of our evaluation, we contend that rubbish research has the potential to provide a useful unobtrusive measure to assess sporadic, hidden antisocial behaviours. However, like all measurement in the social sciences it is extremely important to understand the context under which these measurements are taken. This endeavour also

highlights the role of mixed methods to enhance an overall picture of behaviour, particularly sporadic behaviour not adequately captured by official sources, of which rubbish data provides an interesting dimension in an uncomplicated manner. It is interesting to note that the high variation in the frequency of rubbish collection is not reflected in the quantity of target rubbish items. Is this indicative of a high level of prosocial activity occurring in these sites? If so, when does this prosocial activity occur? How are the parks being used and can a more detailed understanding of park usage provide additional strategies for addressing the anti-social behaviours? These are all questions that can be addressed by additional data collection to complement rubbish data.

There are numerous factors that may impact on the validity and usefulness of using rubbish data. However, there are limitations associated with all data sources used for measuring antisocial or criminal behaviour. Administrative data, such as recorded crime, only measures behaviours that come to the attention of the official agencies. It is fair to say that these data are, in part, reflective of the agency's processes and practices rather than of the underlying behaviours. Self-report data suffers from limitations such as social desirability bias, retrospectivity and difficulty in accessing respondents. Understanding the limitations of each data source and triangulating different data sources is essential to understanding the phenomena investigated. Within this mix, rubbish data should be considered as an additional data source when measuring hidden antisocial behaviour.

We have been very fortunate to work with Nick Tilley and have an opportunity to explore this innovative data collection method, 'rubbish research'. While we have been unable to answer the research question posed within this study and in isolation, this method provided an improved understanding of the context in which we were working. Such understanding facilitates the development of new ways to tackle the continuing problem of youth sexual violence and abuse. Creativity is essential for advancing science, particularly when dealing with vulnerable populations about sensitive social issues, and we have learnt from Nick Tilley's highly innovative ways of thinking.

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