Mental Health and Wellbeing Needs Assessment: Special Research Report:

Use of New Psychoactive Substance in North East Lincolnshire

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1 Introduction

Since 2008, an increasing range of new psychoactive substances (NPS) have emerged in the UK, posing considerable challenges for public health and policy makers. NPS is a general term for synthetic substances that are designed to mimic the effects of traditional illicit drugs such as cannabis, cocaine and ecstasy, in order to circumvent legislation (Drugwise, 2017). Commonly known as 'legal highs' or 'spice', NPS has gained considerable media attention, generating concern from public and professionals alike (Bright et al., 2013; Forsyth, 2012).

Due to the increasing number of substances and their associated harm, the UK government introduced the Psychoactive Substances Act 2016, criminalising the production and supply of NPS (Great Britain, 2016). Its Introduction followed previous attempts to control the availability and use of NPS through other legislation, suggesting that these were ineffective due to the ability to quickly adapt substances when legislation changed (Home Office, 2015). The number of NPS has increased since 2008, with 670 different types of NPS being monitored by the end of 2017, of which, nearly 70% were identified in the last five years (EMCDDA, 2018).

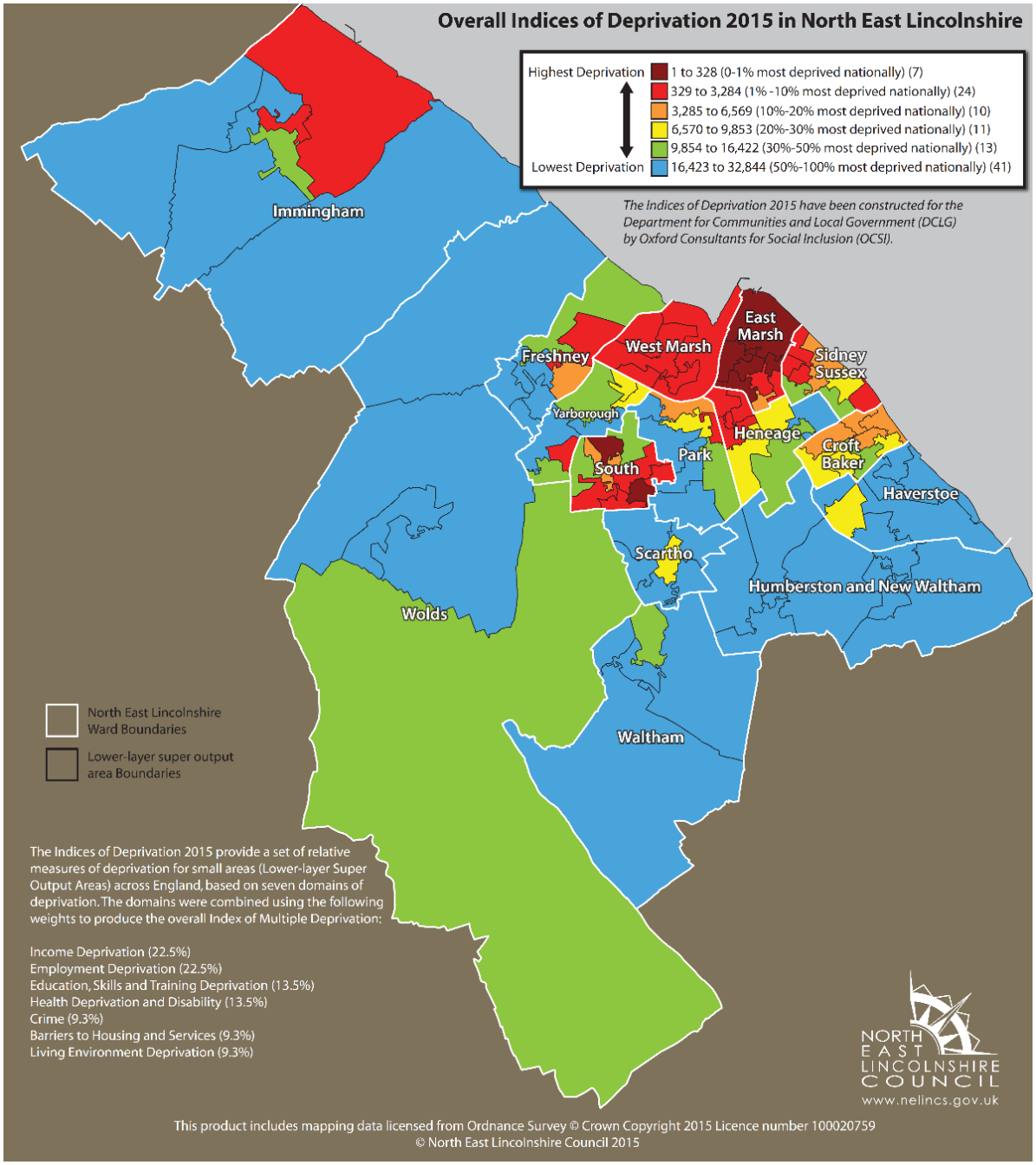
NPS use in the general population is low, estimating 0.4% of adults used NPS in the past year (Home Office, 2018). However, there is limited reliable quantifiable data. NPS use is understood to be more prevalent in marginalised populations such as people who are homeless, have mental health (MH) problems, prisoners and traditional illicit substance users which general population estimates often omit (Addison et al., 2017; Pirona et al., 2017 Shafi et al., 2017; Shapiro, 2016). Health and welfare services are reporting that NPS use within these subpopulations is increasing and problematic, impacting on services. The 2017 Drug Strategy emphasised a need for a targeted approach to these most vulnerable groups of society (HM Government, 2017). Reuter (2011) claimed NPS 'problems' are context specific, thus there is a need to identify any issues specific to local areas. Public Health England (PHE; 2014) stated that all local authorities (LAs) in England should determine the scale of NPS use and harm in their area to inform response.

1.1 North East Lincolnshire

North East Lincolnshire (NEL) is a small unitary authority with an area of 192km, and a population of approximately 159,826 people (ONS, 2017). Located on the east coast of England on the south bank of the Humber Estuary, within the Yorkshire and the Humber region.

NEL has high levels of deprivation. According to the Index of Multiple Deprivation (2015) NEL is in the 20% most deprived areas of England. Within NEL there are significant inequalities; 29.3% of lower super output areas (LSOAs) are in the most deprived 10% of neighbourhoods nationally (Figure 1). East Marsh, West Marsh and South wards have the highest levels of deprivation.

Figure 1 Indices of Deprivation 2015 in North East Lincolnshire (NELC, 2015)



In 2017/18 the estimated economic inactivity rate for NEL was 23.5%, slightly higher than regional and national rates (ONS, 2018a). More people in NEL are income deprived (20.4%) than employment deprived (9.5%; IMD, 2015). In 2017/18, 360 people were identified as homeless (Ministry of Housing 2018). Moreover, the estimated number of rough sleepers in 2017 was 22, an increase from 13 in 2016.

The NEL Substance Misuse Needs Assessment reported anecdotal accounts from services in NEL that NPS use was increasing and problematic (NELC, 2017). National Data Treatment Monitoring Statistics (NDTMS), the most readily available routine data source on NPS use, identified that the number of

people in treatment for NPS is low with less than five people in treatment in 2016/17, although there have been increases in clients accessing treatment for mephedrone use. However, this is unlikely to represent the scale of use; NPS users seldom engage with treatment (Ralphs & Gray, 2017).

Client records held by the MH provider in NEL (Navigo) identified 21 clients had disclosed NPS use over the last 3 years (NELC, 2017). However, this may not be a true reflection as there is no standardised detection method for NPS. Of those clients that disclosed using NPS, 81% had a crisis referral over the last 3 years, with an average of four crisis referrals per person over this period.

In NEL most clients in treatment are opiate users and there are a higher percentage of complex clients[1] in treatment than nationally (41% vs 31%; NELC, 2017). The higher percentage is suggested to be due to ageing heroin users in the area, thus this figure is predicted to rise. Ralphs and Gray (2017) highlighted that problematic heroin users in Manchester are using synthetic cannabinoids, therefore a need to address whether this is occurring in NEL. In 2016/17, 38.5% of opiate users in NEL were estimated to not be in treatment (NELC, 2017). In NEL between 2015 and 2017 there were 7.5 deaths per 100,000 population from drug misuse, this was significantly higher than England's rate of 4.3 per 100,000 (PHE, 2017).

The NEL Substance Misuse Needs Assessment community survey found 95.5% of respondents had heard of 'legal highs', with some stating that it is a significant problem in the area (NELC, 2017). There is a lack of NPS specific data. The needs assessment highlighted future work should investigate the use of NPS and the impacts that this is having on local services (NELC, 2017). Mdege et al., (2017) reported that more research is needed to understand why people use NPS, and engagement with frontline staff to explore problems they are dealing with relating to NPS use. This research seeks to develop the understanding of NPS in NEL and explore the impacts that it is having on vulnerable populations and health and welfare services.

1.2 Research Questions

- What is the extent of use of New Psychoactive Substances NEL?
- What is the impact of the use of NPS on health and welfare organisations in NEL?
- What factors contribute to NEL health and welfare services staff perceptions of the level of NPS use?

[1] Complexity factors include housing risk, poor education or employment status, poor quality of life scores, levels of social support, and physical and MH problems and opiate misusers who are likely to be chronic misusers.

1.3 Research Aims

- To explore and improve the understanding of NPS use in North East Lincolnshire.
- Identify issues and concerns of NPS use perceived by health and welfare services

1.4 Research Objectives

- To conduct a survey to investigate the nature of NPS use in NEL particularly targeting sub-populations.
- To interview professionals working in various services/agencies to understand the impact NPS use has on them/their service.
- To interpret the findings collectively and identify implications of the research.

2 Literature Review

A literature search was completed to provide background context and understanding of NPS, their effects and implications. Although, not a systematic review, a systematic approach was taken. Databases Web of Science, PubMed, The Cochrane Library, Google Scholar and StarPlus were searched to identify relevant literature in English. Search terms included 'new psychoactive substance', 'legal highs', 'synthetic cannabinoid', 'spice' and other common names for NPS. Results were reviewed by relevance of title then by abstract. Additional searches were conducted to identify grey literature such as Government reports that were relevant. Some authors identified in the literature were searched for independently.

The literature search identified a range of issues surrounding NPS. The chemical composition of NPS is dominant in the literature, these were excluded as this was not the focus of the research. Key issues identified included definition of NPS, legislation and media influences, who uses NPS, adverse effects and implications for services.

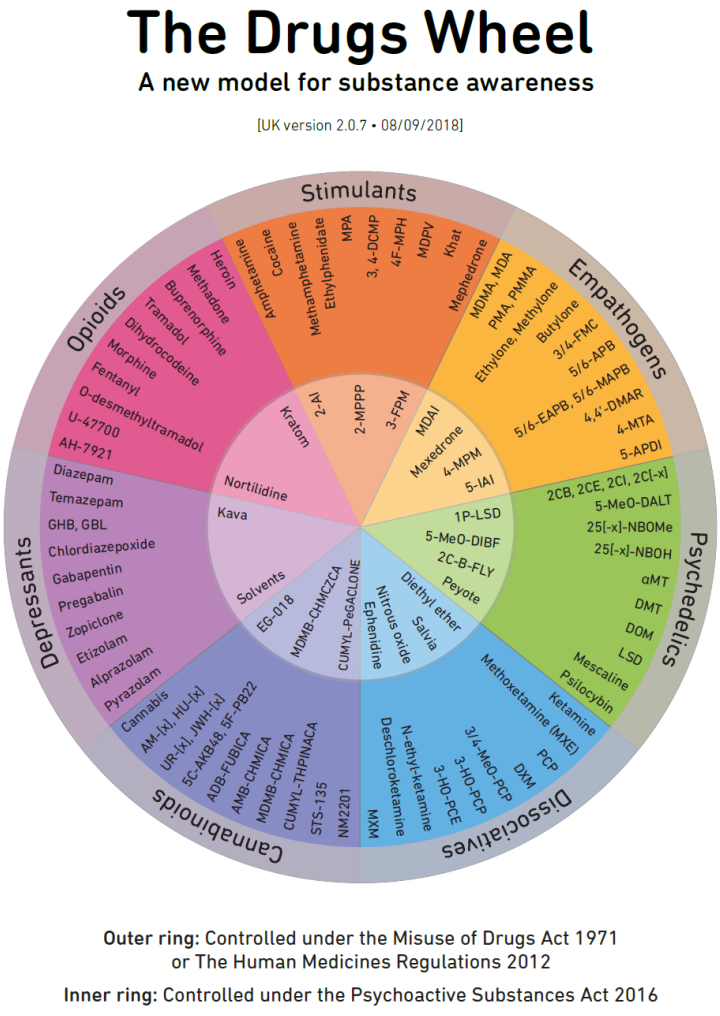
2.1 Defining and Categorising NPS

The definition and categorisation of NPS is complex, since it encompasses a wide range of different substances, with varying effects (Potter & Chatwin, 2018). This is confusing for both professionals and public. There is neither a definitive list of NPS nor a universally agreed way to define or categorise NPS (Ralphs, Gray & Norton, 2017; Sutherland et al., 2017). In 2014, a Home Office Expert Review Panel defined NPS as "newly available in the UK, which are not prohibited by the United Nations Drug Conventions but which may pose a public health threat comparable to that posed by substances listed in these conventions" (Home Office, 2014, p6). A 'psychoactive substance' is a substance which can stimulate or depress the central nervous system, resulting in a state of dependency and harm that is comparable to traditional drugs.

The Drug Wheel (Figure 2) categorises both traditional substances and NPS into seven groups according to their effects (Adley, 2018). However, PHE (2017a) and NEPTUNE clinical guidance groups NPS into four categories: stimulant, depressive, hallucinogenic and synthetic cannabinoids (Abdulrahim & Bowden-Jones, 2015). See Appendix 1 for additional information. Frequently called 'spice', 'pandora's box' or 'black mamba', synthetic cannabinoids (or Synthetic Cannabinoid Receptor Agonists; SCRAs) are the largest group of NPS (EMCDDA, 2018). Intended to mimic cannabis SCRAs are a chemical typically sprayed onto herbal mixtures and smoked (Tracy, Wood & Baumeister, 2017a). Stimulant NPS (or synthetic cathinones) commonly called mephedrone are the second largest group of NPS, intended to mimic substances such as MDMA or cocaine.

The term ‘New Psychoactive Substance’ has been criticised. The use of ‘new’ implies NPS are newly created despite some substances being synthesised many years ago, thus, more correctly, ‘newly available’ or ‘newly misused’ (Home Office, 2014; Khaled et al., 2016). Potter and Chatwin (2018) questioned “how long does something remain new for?” arguing that there are inconsistencies in categorising NPS, with some newer synthetic substances not labelled NPS (e.g. MDMA). Grouping NPS separately from traditional substances is thought to exaggerate issues, hindering the wider context of drug misuse (Potter & Chatwin, 2018; King & Nutt; 2014). Nonetheless, it is currently agreed useful to group NPS together due to uncertainty of their effects and health implications (Clinical Guidelines on Drug Misuse and Dependence Update, 2017).

Figure 2 The Drugs Wheel (Adley, 2018)



2.2 UK Context of NPS: Legislation, Media Influences and the Rise of NPS

2.2.1 Legality of NPS

The legality of NPS in the UK is complicated. When NPS emerged, they were not regulated and were openly sold in headshops (shops legally selling NPS) and online, labelled "not for consumption" or "for research purposes only" to circumvent legislation (Baumeister, Tojo & Tracy, 2015).

Since 2008, the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA; 2018) witnessed a yearly increase of new substances identified through the European Union Early Warning System (EWS), reaching a peak in 2014 and 2015, with approximately 100 new substances detected each year. Despite the UK Government's efforts to prohibit NPS through amendments to the Misuse of Drugs Act (MDA; 1971) and subsequently introducing Temporary Class Drug Orders (TCDO) to quickly control substances, they were inadequate to control their unprecedented growth (Home Office, 2015). These solutions were reactive, with delays in implementation allowing substances with slight differences to be developed (Haden, Wood & Dargan, 2017). However, reports of significant harm from use of NPS, caused increasing safety concerns. Thus, the Psychoactive Substances Act (PSA) was introduced in 2016 as a 'blanket ban' of all psychoactive substances (Great Britain, 2016). The PSA makes it an offence to produce, supply, possess with intent to supply and import any psychoactive substances intended for human consumption not already controlled by The MDA (1971) or exempt, for example, coffee, nicotine and alcohol. Although possession is not an offence, possession in a custodial setting is. Some substances, including synthetic cathinone and SCRA variants have now been reclassified under the MDA (1971) as Class B substances (Drugwise, 2018).

In 2017, post PSA, the number of new substances identified by the EWS declined to 51 (EMCDDA, 2018). While these figures include all European countries, some of whom have similar legislations, it suggests the impact of regulation. The PSA's main success was the closure of headshops resulting in a perceived reduction in availability of NPS (UK Home Office, 2016). However, it is believed to have displaced the sale of NPS to the traditional illicit drug market (Stevens et al., 2015), leading to traditional substances being mixed with NPS, resulting in substantial harms (Abdulrahim & Bowden-Jones, 2015). Shapiro and Daly (2017) argue that this has made NPS (mainly SCRAs) more problematic amongst homeless communities.

2.2.2 Media

It is believed the media attention NPS has received contributed to its growth, moral panic and policy decisions (Bright et al., 2013; Forsyth, 2012). The media commonly call NPS 'legal highs' although

inaccurate and ambiguous (Corazza et al., 2013). This has detrimental consequences, misleading people, believing they are 'safe' with no criminal or health risks (Corazza et al., 2011; Reuter & Pardo, 2017; Soussan et al., 2017). This was witnessed in 2009, when mephedrone received significant media attention. Despite stories of multiple deaths allegedly from mephedrone heightening public concern, the reporting was found to actually *increase* the interest in the substance (Forsyth, 2012). This 'media scare' was identified as a catalyst for the government banning mephedrone in 2010 under an amendment to the MDA (1971), despite little evidence detailing harms (Forsyth, 2012; Sare, 2011).

Since the introduction of the 2016 PSA, the media portrayal of NPS has changed. Reporting SCRAs users as 'Zombies', highlighting them as vulnerable groups which is a stark contrast to how methedrone was portrayed prior to the ban: a danger to naive young people (Alexandrescu, 2018). Alexandrescu (2017) argued media reporting of NPS is related to structural inequalities of society and is influential on policy decisions, creating panic from the public, isolating marginalised groups.

The media attention, rapid changes to legislation and the rising number of NPS has portrayed NPS as a serious problem, thus it is important to understand the prevalence of NPS use.

2.3 Prevalence of NPS Use

As discussed, monitoring of NPS use is poor. The Crime Survey for England and Wales (CSEW) collects data from a nationally representative sample of adults aged 16-59. In 2017/18, 2.5% of respondents reported using NPS in their lifetime (Home Office, 2017). Furthermore, 0.4% reported using NPS in the past year, the same as the previous year (2016/17) but a reduction from 0.7% in 2015/16. Of people reporting NPS use in the past year, 23% used at least monthly and 6% used at least weekly. The most commonly used NPS was SCRAs. Mephedrone use has declined since its ban in 2010; from 1.4% in 2010/11 to 0.1% in 2016/17. Sixteen to 24 year olds were approximately three times more likely than all adults to have used NPS in the previous year with over half of all NPS users being aged 16 to 24 years.

Despite the CSEW using a nationally representative sample, it does not capture data from some hidden populations, thus likely to underestimate NPS use across the whole population. (Pirona et al., 2017; Shapiro, 2016).

2.4 Use of NPS in Subpopulations

Several overlapping subpopulations have been identified as having a high prevalence of NPS use. Research has focussed predominantly on students, club-goers and lesbian gay bisexual and

transgender (LGBTQ+) communities, however there is limited (though emerging) research about use of NPS in other vulnerable groups such as people who are homeless (Ralphs & Gray, 2017), in the criminal justice system (HM Inspectorate of Prisons, 2017) or people with severe mental illness (SMI: Pirona et al., 2017; PHE, 2017). This is a significant public health challenge and thus a focus of this research.

A survey by Homeless Link in Manchester found 93% of rough sleepers had used SCRAs in the past year compared to 64% of non-rough sleepers (Ralphs, Gray & Norton, 2017). Furthermore, 64% reported taking NPS every day, and 90% had taken another substance. Additionally, Rob, Gray and Norton (2017) conducted qualitative interviews with professionals working in homelessness, who believed NPS use was higher in homeless communities than the survey reported. They also interviewed homeless people; some reported starting using SCRAs in prison, and some started after becoming homeless due to 'social norm'. The use of SCRAs is believed to be occurring in groups traditionally associated with the use of heroin and cocaine (Ralphs & Gray, 2017).

'Spice' use amongst prisoners is increasing (HMIP, 2017). In 2016/17, 8.1% of adults in prison presented for treatment for problematic NPS use, an increase from 6% in the previous year (PHE, 2018). However, a prisoner survey found that one in three prisoners had taken 'spice' in the previous month, although reports are inconsistent with estimates varying from 15% to 90% (User Voice, 2016). More concerning for this research is prisoners released 'addicted' to 'spice'. Research from ten North West prisons identified 16% of prisoners tested positive for SCRAs on release compared to 9% on arrival (LGC, 2017). HMIP (2017) found there to be a lack of communication between probation and prison staff about the use of NPS by offenders.

Research suggests people with SMI are more likely to use NPS than the general population (Acciavatti et al., 2017). PHE (2017a) conducted a review of NPS use in 66 secure settings and identified that current use of NPS was low, with 11 units reporting 1.1% of current patients using NPS. However, 12.1% of current patients reported using NPS prior to admission. SCRAs were the most reported substance used followed by stimulant NPS.

In 2016/17, 1450 new clients presented to Substance Misuse Service (SMS) in England with problematic NPS use; this is low in comparison to traditional substances (PHE, 2018). Furthermore, those attending for NPS use were more likely to be homeless (18% vs 7%). However, NPS use is believed to be high among individuals accessing SMS (Bowden-Jones, 2014). Gittins et al., (2018) identified from a qualitative study with people engaged with SMS in Cornwall, UK that use of NPS was high amongst SMS clients interviewed, which was not reflected on the recording system.

NPS types, and reasons for their use, vary across these subpopulations (Ralphs Gray & Norton., 2017; Soussan et al., 2017; Sutherland, 2017). The changing use of NPS, from mephedrone to the SCRAs in vulnerable groups, has triggered widespread concern (Blackman & Bradley, 2017; Drug Scope, 2014). Problematic NPS use is believed to be associated with deprivation and social inequality (Addison et al; 2017; Potter & Chatwin, 2018). Research suggests vulnerable groups take NPS as 'escapism' from reality (Gittins et al., 2018; User Voice, 2016; Ralphs & Gray, 2017; Ralphs, Gray & Norton, 2017) and is perceived to be a "solution" rather than a "symptom" to users' situations (Addison et al., 2017). The price, accessibility and limited detectability are all thought to be the motivating factors for using NPS (Abdulrahim & Bowden-Jones, 2015). Furthermore, 'Spice' is supposedly stronger and cheaper than traditional substances such a heroin.

2.5 Adverse Effects of NPS

There is growing evidence suggesting that using NPS can have significant adverse effects, different to the substances they are intended to mimic (Tracy, Wood & Baumeister, 2017a). A wide variety of acute and chronic harms can occur from the use of NPS, which can be affected by characteristics and vulnerabilities of the user, environment, dosage, toxicity, administration and polysubstance use (Claire et al., 2018; Van Hout et al., 2018). The continual changing nature of NPS makes it difficult to predict drug reactions in the same ways as traditional substances (Campbell, O'Neil & Higgins, 2017). The production of NPS contributes to this, as the strength of the substance can be inconsistent, even within the same 'batch' and smaller doses can produce greater effects (Abdulrahim & Bowden-Jones, 2015).

Physical health effects of NPS can cause issues with sleep; excessive sweating; loss of appetite, severe stomach cramps; diarrhoea; vomiting and fitting (PHE, 2017a), and kidney problems (Hermanns-Clausen et al., 2013). Users of SCRAs and stimulant NPS have reported respiratory and cardiovascular problems (Weinstein et al., 2017).

NPS have been reported to induce and exacerbate psychological symptoms such as anxiety, depression, paranoia and psychosis (Gray et al., 2016; Tait et al., 2016). A review by PHE (2017) found that NPS contributed to psychosis in MH patients and induced psychosis in those with no prior history. Self-harming is associated with use of SCRAs, being reported in custodial settings (HMIP, 2016) and homeless populations (Ralphs & Gray, 2017). SCRAs effects are believed to be much greater and longer lasting than cannabis. Unlike cannabis, SCRAs do not contain Cannabidiol, resulting in undesirable effects, such as psychosis and violence (Shafi et al., 2017, Van Amsterdam, Brunt, & Brink 2015).

Addiction and withdrawal from NPS has been highlighted as being challenging. Ralphs and Gray (2017) found that some SCRA dependant users with an extensive history with traditional substances, reported 'spice' to be more addictive than substances previously used. SCRAs were used daily to prevent withdrawal effects such as sleep issues, sweats, hallucinations, paranoia and vomiting.

In England the number of drug-related deaths where NPS were present was 58 in 2017 (ONS, 2018b). King and Nutt (2014) argue deaths from NPS are misrepresented as it is difficult to ascertain whether the deaths were actually associated or even caused by NPS, due to high polysubstance use and lack of agreed definition. However, in 2017 there were 29 deaths which NPS was the single substance that was the underlying cause of death (although alcohol may have been used; ONS, 2018b).

Although increasing, there is limited research on the adverse behavioural effects of NPS. HMIP (2014) documented that violence within prisons is a significant issue related to 'spice' use. Additionally, Shafi et al., (2017) compared characteristics of NPS misusers and non-NPS substance misusers in acute MH service in London, and identified that NPS misusers were more likely to be violent. More research is needed to understand other behavioural effects such as criminal activity in users of NPS (Ralphs, Gray & Norton, 2017).

A recent review identified that chronic use of SCRAs impairs working and long-term memories considerably more than cannabis use (Cohen et al., 2018). More research is required to increase understanding of long-term consequences. Effects of NPS can significantly impact on an individual, services, and the wider community (Gittins et al., 2018).

2.6 Implications for Services

The management of NPS users is a significant challenge for various services due to the changeable nature of substances and their side effects (Addison et al., 2018; PHE, 2016). Treatment pathways for NPS users have been reported to be unclear (Chatwin, Blackman & O'Brien, 2018; Ralphs & Gray, 2017).

NPS users are more likely to require emergency medical treatment, than traditional substance users (Winstock et al., 2015). However, Fitzpatrick et al., (2017) found that users of NPS often refuse to go to Emergency Departments (ED) when attended by an ambulance. Webb et al., (2018) identified that in a London ED the number of NPS presentations did not changed after the implementation of the PSA but the NPS type did, with an increase in SCRAs and decrease in cathinones. This changing nature of NPS has consequences for services who may not be able to test for NPS to treat patients appropriately.

Patients experiencing NPS induced MH symptoms, are more likely to present at ED and/or have police involvement prior to admission to a MH hospital (PHE, 2017; Shafi et al., 2017). In England, 40 MH units (out of 66) reported use of NPS had been a contributory factor for admission in at least one patient in the past year (PHE, 2017). Shafi et al., (2017) identified that patients admitted to a MH facility who had used SCRAs had a longer stay, more significant symptoms and a higher re-admission rate compared with non-NPS users. Some research suggests that MH services are hesitant to engage with NPS users due to their challenging nature (Campbell O'Neil, & Higgins, 2017; Ralphs et al., 2017).

Interviews with frontline professionals identified managing users of NPS has significant resource implications, particularly at night when less staff are available (Ralphs, Gray & Norton, 2017). Police Officers in Addison et al., (2017) also discussed this, suggesting that behaviours and health risks associated with NPS use resulted in increased resources to monitor users in custody. Ralphs, Gray and Norton (2017) highlighted that peer groups often take NPS together, so services frequently deal with multiple users at the same time, or none at all. This was supported by NHS Tayside (2014) who found workloads were unpredictable due to variabilities in NPS use and staff often felt unsafe due to NPS users' behaviours.

As previously acknowledged, SMS are not experiencing the same pressures from NPS users. The low numbers have been attributed to the awareness of services, stigma and the lack of substitute medication (Blackman & Bradley, 2017; Ralphs & Gray, 2017). Gittins et al., (2017) argued that SMS should improve drug tests to detect NPS, however, this may be difficult due to the evolving nature of NPS. Lack of engagement with SMS is potentially resulting in users to present at other services (Hagan & Smith, 2017).

Studies have identified that professionals working with NPS users have inadequate knowledge/training and lack confidence in managing users of NPS, compared to traditional substances (Addison et al., 2017; Campbell, O'Neil, & Higgins, 2017; HMIP, 2017; Pirona et al., 2017; Ralphs, Gray & Norton, 2017; Simonato et al., 2013; Wood, Ceronie & Dargan, 2016). Furthermore, Campbell, O'Neil, and Higgins (2017) investigated frontline health and social care workers perceptions of NPS use in Northern Ireland and found 89% were aware of regular NPS users amongst their clients, but reported limited training, with staff learning about NPS through experiences with clients and adapting knowledge of traditional substances. Guidance on the management of NPS has been developed to support professionals who come into contact with users of NPS (Abdulrahim & Bowden-Jones, 2015; Clinical Guidelines on Drug Misuse and Dependence Update, 2017). Effects of NPS use are reported to be similar, thus transferable knowledge and skills from traditional substance

use can be applied to NPS use (Tracy, Wood, & Baumeister, 2017b). Conversely, due to the challenging and unpredictable effects of NPS, specifically SCRAs, there have been suggestions that they should not be treated similarly to other substances (Campbell, O'Neil & Higgins, 2017). The Rough Sleeping Strategy 2018 has committed to providing training to frontline staff working with homeless populations on the management of NPS use by clients (Ministry of Housing, 2018).The monitoring system Report Illicit Drug Reaction (RIDR) launched in March 2017 as a pilot by PHE (Greener, 2018), enabling frontline healthcare professionals to input information anonymously about new substances encountered and their harms (PHE, 2017b). RIDR is not mandatory, potentially causing inconsistencies in knowledge between services if information is not shared.

2.7 Summary

Research about NPS, although growing, is still limited, the development of new substances and their varying effects creates a difficult landscape for research. The evidence suggests that there is a significant burden from NPS use on services, with lack of knowledge and the unpredictable nature of these substances. However, NPS use has been reported as localised and specific; challenges that are occurring in one area might not be reflected in another (Reuter, 2011). Thus, a need to develop the understanding of the problems being faced in NEL due to NPS, and ascertain whether these are similar to what is occurring elsewhere.

3 Methodology

This chapter describes the research design and its justification, participants, sampling, data collection and analysis for the mixed methods design.

3.1 Research Design

A pragmatic approach was taken to answer the research questions, utilising a non-experimental mixed method research design. Despite debate over using both quantitative and qualitative methodologies in a single study due to their differences, many researchers believe that utilising mixed methods can add value to research and help to resolve some weaknesses of using quantitative or qualitative methodologies in isolation (Creswell & Plano Clark, 2011; Burke-Johnson & Onwuegbuzie, 2004). A pragmatic approach applies the viewpoint of 'what works', allowing researchers freedom to use the most appropriate methods to answer research questions. Pragmatism is problem focused, aiming to understand and solve real world problems by obtaining actionable findings (Creswell & Plano Clark, 2011). Furthermore, mixed methods are beneficial when researching complex health issues, (such as NPS use) as it allows for greater exploration of the topic and assess multiple viewpoints (Creswell, 2009; Creswell & Plano Clark, 2011).

A concurrent triangulation approach was used; quantitative and qualitative data were collected simultaneously (Creswell, 2009). The two methods were complementary, aiming to achieve a holistic view, which is also a key aspect of pragmatism (Creswell & Plano Clark, 2011). Qualitative interviews were conducted with frontline staff from various health and welfare organisations to explore their perceptions of NPS use by their clients and identify its implications. Qualitative methods help obtain detailed insights into real world experiences and peoples' thoughts and attitudes (Sutton & Austin, 2015). Complementary to the interviews, a cross-sectional survey was conducted collecting quantitative data on the use of NPS from users of health and welfare services in NEL. Quantitative data does not provide the same level of detail that qualitative does, however, it provides objective data. Conducting research in this way is beneficial as allows for traditional methods of both quantitative and qualitative analysis to be utilised and draw conclusions together. The methods for each study component will be explained individually.

3.2 Qualitative Component: Interviews

3.2.1 Participants and Sampling

The target population for the qualitative aspect of the study were frontline staff from health and welfare organisations based in NEL. A sampling frame was used to identify organisations that could

take part in the research, and the organisations in NEL which fit the identified categories. Participants were recruited between July and August 2018, using purposive and snowballing sampling techniques, to ensure that professionals from organisations identified in the sampling frame were included.

To recruit participants, an email invitation was sent to either, a manager within the organisation to cascade to frontline staff, or directly to potential participants, advising those interested to contact the researcher. The invitation email included an overview of the research and the participant information sheet detailing the research.

Qualitative sampling is concerned with depth of information thus must be sufficient to provide a range of insight, but not large quantities of data that are difficult to analyse thoroughly. Additionally, 'theoretical saturation', can occur where no new information arises from further interviews (Morse, 2004). Guest et al. (2006) found that this can occur after six interviews.

3.2.2 Data Collection

In total ten interviews were completed, all by the same researcher. Interviews were conducted one-to-one. Due to time availability two participants took part in the same interview, so 11 participants took part. Representatives of the following organisations were interviewed:

- Homeless charity (2)
- Supported Accommodation (2)
- Police (2)
- Mental health service (2)
- NELC Housing support
- NELC Family Services
- Substance misuse service

All interviews took place in the interviewees' workplace in a private space. Before interviews commenced participants were asked to read the participant information sheet and were able to ask the researcher any questions. If the participant was happy to proceed they were asked to complete a consent form before the interview began. Interviews lasted between 20 and 40 minutes and were audio recorded.

Semi-structured interviews were used to provide a framework to the interview, providing a focus to help answer the research questions whilst allowing for the flexibility to elaborate and clarify participant responses. NPS is a relatively new topic with limited research on the implications of their

use, new areas of discussion, unknown to the researcher, may arise (Gaskell, 2000). An interview schedule was developed utilising existing literature to formulate questions. An interview guide enables comparisons between interviews to be made more easily during analysis, for example comparing the impacts of NPS between the services interviewed.

3.2.3 Data Analysis

All interview audio recordings were fully transcribed. To ensure anonymity, all identifiable information was retracted from the transcripts.

Using Nvivo 12 Pro (qualitative analysis software), transcripts were analysed thematically; a method of identifying patterns or themes within the data (Braun & Clarke, 2006). Transcripts were coded systematically. Broader themes related to the research question were then identified, categorising initial codes under these themes. Both inductive and deductive analysis was used during coding and theme development. Deductive using pre-existing knowledge of the topic area and inductive to identify novel views discussed (Boyatzis, 1998). The development of codes and themes was an iterative process; codes and themes were reviewed and refined to ensure the data were organised well within the themes.

3.3 Quantitative Component: Survey

A cross-sectional survey was developed to ask users of services about their NPS use, aiming to develop the available data on NPS use in NEL. This method was used as it is an efficient data collection method, and could reach a large number of respondents who use different services.

3.3.1 Population and Sampling

The population for the survey was adults (aged 18+), who lived in NEL, and attended health and welfare services. Due to the predominant use of NPS amongst certain sub-populations, a targeted approach was used, to better assess NPS use (Pirona et al., 2017). Organisations contacted for the interviews were asked to distribute the survey on the researcher's behalf. Three organisations took part; SMS, a homeless organisation and the Local Authority Homeless Service. Some services were unable to take part, either due to requiring further ethical approval (NHS/Government), which did not fit within the time constraints of this study, or the service feeling they were unable to participate due to practical reasons.

Participants were recruited by opportunistic sampling, whereby the organisations distributing the survey were asked to make their clients aware of the study and ask them to complete the survey when they attended the service.

3.3.2 Data Collection

Surveys were administered by the organisations in paper format across a two week period in September. A participant information sheet was attached to the front of the survey clearly explaining the study. Staff at the organisations were briefed about the study to help explain the purpose to their clients. Implied consent was obtained by participants completing the survey and returning it into the allocated box, this was clearly stated on the information sheet. All responses were anonymous and participation was voluntary, participants were able to stop at any point. Once participants submitted their survey they were unable to withdraw their response as they would not have been identifiable.

The survey structure consisted of mainly closed questions with some opportunities for participants to provide additional comments. The survey was short, consisting of two A4 pages, to ensure that the survey was quick and easy to complete.

3.3.3 Data Analysis

The completed questionnaires were coded and responses entered into the Statistical Package of the Social Sciences (SPSS) software 25 for analysis. Descriptive statistics were produced, as well as cross tabulation analyses.

3.4 Ethical Considerations

Ethical integrity of this project was explored thoroughly. Ethical approval was granted for both components of the research by School of Health and Related Research (ScHARR) at the University of Sheffield. Additional approval was sought from the research director and the medical director of the MH service to conduct interviews with their staff. This additional approval was accepted by ScHARR ethics committee. This research was conducted on behalf of NELC, thus, a data sharing agreement was implemented between NELC and the University of Sheffield, to allow for anonymous data to be shared with the Council to use for public health intelligence and planning.

Confidentiality was paramount for all participants throughout the project. This was done by ensuring all audio recordings were uploaded to an encrypted laptop immediately after the interview and

named with the interview number, conducting interviews in private spaces, and not disclosing personal details.

3.5 Reflexivity

Reflexivity is essential in qualitative research which the researcher acknowledges that they cannot be truly objective, thus reflects on their own actions or influences may have bias the research (Green & Thorogood, 2018). Although a professional working in public health at NELC for the previous three years, this was a new topic area to the researcher. The researcher endeavoured to maintain an open manner throughout the interviews utilising open questions and appropriate prompts to develop participants' responses. Initially the researcher found this difficult, due to being a novice interviewer, however, gained confidence in prompting participants after completing the first few interviews. Throughout data collection and analysis a journal of actions was kept to enable reflection on personal influence and ensure validity of findings.

3.6 Dissemination of Findings

The research findings will be disseminated to relevant organisations in NEL (including those who took part). It is important to share findings to inform public health planning and support organisations to be as informed as possible.

4 Qualitative Findings

4.1 Participant Characteristics

Ten semi-structured interviews were conducted with 11 participants, due to participants 3 and 4 participating in the same interview (Table 1). A range of organisations were included and participants had varying experiences working with people who have used NPS. There were similar numbers of males (n=6) and females (n=5).

Table 1 Participant characteristics

Interview No.	Participant ID	Organisation	Gender	Length of time in organisation
1	P 01	Supported Accommodation	Female	2 years
2	P 02	Supported Accommodation	Male	9 years
3	P 03	Homeless charity	Male	14.5 years
3	P 04	Homeless charity	Male	5 years (14 in homeless sector)
4	P 05	Police	Male	1.5 years
5	P 06	NELC Family Services	Male	5 years
6	P 07	Police	Male	1.5 years
7	P 08	Navigo	Female	4 years
8	P 09	Navigo	Female	4.5 years
9	P 10	NELC Homeless team	Female	2.5 years
10	P 11	Addaction (SMS)	Female	30 years

4.2 Key themes

Analysis of the interviews identified three key themes and several subthemes associated with the study's aims. These were perception of NPS use, unpredictability of NPS use and services and treatment pathways (Table 2). To support the themes, anonymous quotes from the interviews will be presented, identified using participants' ID (Table 1). Some crossover occurs between themes, due to participant responses often reflecting several themes.

Table 2 Themes and sub-themes

Theme	Subthemes
4.3 Perception of NPS use	4.3.1 Characteristics of NPS users 4.3.2 Circumstances Motivate Use 4.3.3 Media Influences
4.4 Unpredictability of NPS	4.4.1 Unknown Substances 4.4.2 Effects 4.4.3 Testing for NPS
4.5 Services & Treatment pathways	4.5.1 Knowledge and Understanding 4.5.2 Perceptions of available support 4.5.3 MH and NPS use 4.5.4 Service Demand

4.3 Perception of NPS use

> "It's a nightmare, its easily accessible, cheap and absolute chaos." (P10)

4.3.1 Characteristics of NPS Users / Changing Demographic

Most participants reported that the use of NPS was prevalent in their client groups, although this varied between service providers, with some reporting that it was difficult to estimate. Those working in homelessness, MH services and police all reported that the prevalence of NPS use was high, with the MH service reporting:

> "I would say probably, 4 to 5 out of 10 of the people I see are taking NPS." (P09)

On the contrary the SMS and family support services reported a low number of clients who were taking NPS in their service.

In reflection of the services reporting higher use of NPS, participants' believed NPS users were vulnerable populations with "chaotic lives" such as people who are homeless, traditional drug users and/or released from prison.

> "[…] it's homeless people, its people who are prolific drug users and offenders that have used their whole life." (P08)

There were discrepancies between participants' perceptions of who uses NPS. Some reported that traditional substance users were more likely to use NPS. One participant said;

> "It does seem to be the guys who have used the heroin in the past and stuff like the harder drugs, have been shifting towards spice." (P02)

However, others had differing opinions, reporting traditional substance users were often not using NPS due to their adverse effects;

> "the old school drug users, I think some of them have tried it but haven't liked this, so they've stuck with your old school drugs, heroin, crack cocaine, stuff like that. It tends to be, the ones that wasn't into the heroin and crack that've got onto it, or the ones who've been on heroin and they've got clean off that, they've gone back on spice this way" (P04)

> "you do speak to seasoned drug users, who themselves know not to go near to these drugs. Because they've seen people who they would look at themselves as non-seasoned shall we say and seeing what it has done to them straight away" (P07)

Service providers noted a change in the demographic of those taking NPS, reporting that previously mainly young people were using mephedrone and 'm-cat' whereas now they are seeing 'spice' use across a whole age range, with participants reporting ages of users to range between twenty and fifty years old;

> "I would say the age range has slightly shifted, because four five years ago, it was something that all the younger residents were doing as they came through, not all but some. But the older age groups were staying away from it, but I think that's shifted ever so much over the last year or so, eighteen months" (P02)

This change was reported to be because of the language used which has shifted young people's perception of NPS.

> "I think… when we stopped using the term 'legal high', that's where it changed. I think some of the younger ones that have come through since that change don't seem to be touching it as much. "'*Legal high' – that sounds pretty good, let's do it, it's legal*". I think because that has been shifted away to just the street name to just spice." (P02)

> "I think by that time the market had changed to your older users, your people living on the streets and things like that the perception amongst young people changed even quicker than it did with m-cat with the synthetics, they really really, if you go into a classroom now and you mention spice or something like that they will absolutely say that it is the worst thing in the world, they would probably would categorise that right off in the kind of heroin crack cocaine kind of cultural baggage, I think." (P06)

These quotes highlight some of the cultural issues that surround NPS use.

4.3.2 Circumstances Motivates Use

> "It's cheap and readily available" (P02)

Motivation to take NPS was often discussed in the context of users' circumstances. It was reported that most users of NPS lacked financial stability, therefore the cheapness of NPS, particularly in relation to traditional substances, was a motivating factor for using NPS.

> "they [NPS users] think well you know I can get, *is it 50p a bag or something for spice,* whereas cannabis is much more expensive. And spice is supposed to be the alternative to cannabis" (P09)

Furthermore, the strength of spice was frequently reported as being a motivating reason for NPS because it was providing a bigger 'hit' for less money.

> "[NPS is] giving better bang for your buck" (P06)

Participants believed users of NPS were seeking to self-medicate and escape from the realities of their lives due to being homeless, living in poor situations and often lacking social support from family.

> "[…]they have awful lives and they self-medicate" (P08)

Curiosity about spice was reported to be an influential factor in why people start taking NPS, with peer groups often influencing this. This was a significant issue in homeless populations, particularly in supported and temporary accommodation. Participants mentioned specific locations of where

people use 'spice' and other NPS, mainly being described as deprived areas of the borough, such as East Marsh and Freeman Street.

4.3.3 Legislation impact

Participants discussed the impact that the legislation changes has had on NPS use, its availability and perception. Several participants reported that the changes to legislation had increased the use;

> "When it wasn't illegal, there wasn't as many people using it. It wasn't seen as much on the streets. Now it's made illegal you've got more people selling it, everybody's on it." (P04)

Several participants discussed concern over some users expressing lack of understanding of the potential harms of NPS use with users reporting to services that it is *"just spice"*. One service provider reported service users usually say:

> "Well they were '*legal highs'* so they can't be that bad so I will just give it ago." (P09)

The closure of headshops as a result of the legislation was believed to have changed the accessibility of NPS, not reduced it. Resulting in users acquiring their NPS through alternative methods such as street dealers and the internet making it more difficult to control;

> "I think that legality allowed that change, you know so it may have gone a bit underground […] they've still managed to get hold of it but doing it different ways by the internet you know and it has sort of become a hidden version rather than on the street with the headshops and could go and access. Changed the accessibility of it. " (P11)

Despite the closure of headshops one participant acknowledged that some headshops still sell NPS;

> "Criminalise anything that you want to but it's not going to change anything. It's not as accessible, but the place they were selling it before, they are more select how they are doing it." (P10)

4.3.4 Media Influences

Most participants discussed how the media, including social media has influenced the perceptions of NPS use. The representation of 'spice' in the media was reported to affect the public perception of its use and increased the demand of services due to their concern. One participant, in discussions around the use in young people, said:

> "Often we'll have parents we are concerned that their kids maybe using synthetic cannabinoids and things like that but very very rarely backed up by any truth but because there's a lot of talk about it in the media" (P05)

Social media was also discussed as a contributory factor in the awareness of NPS. Participants discussed the use of videos of people under the influence of spice were posted on sites such as 'Facebook' and 'Spotted Grimsby'.

The terminology often used by the media to describe people who have taken 'spice' was frequently used by participants to describe the effects of NPS. In six out of ten interviews participants described people who had taken spice as zombies:

> "They are catatonic, they sort of like move, Zombie like." (P11)

4.4 Unpredictability of NPS

4.4.1 Unknown substances

All participants referred predominantly to the use of 'spice' in their client groups, citing it as being the most commonly used NPS. However, some participants expressed uncertainty around whether this was actually what the substance was or whether it was a generic name for all NPS types.

> "what you find is that whether they are taking the powders or the tablets, or whatever form it is coming in, they call it all spice now." (P09)

As well as the substances themselves being unknown, the strength of NPS was reported to vary with users not knowing how much they were taking. This was frequently discussed in the context of the closure of headshops, leading to NPS being sold by dealers.

> "[…] when it was being sold in the headshops, you knew people could go there and it was like, they'd buy it, It'd be roughly the same strength that they was getting each day, now you've got kids selling it, we've had kids thirteen fourteen and it's getting mixed with other stuff so the strength of it can be up and down they never know what they are getting. Whereas before they just used to go to the headshops, we didn't really have an issue with too many people selling. Now you see it all the time, from kids up to older people selling it." (P04)

Furthermore, since merging with the traditional substance market, traditional substances are reportedly being mixed with NPS to increase its strength. This is causing problems for people who are have chosen not to take NPS;

> "We're seeing people whose are buying crack cocaine, sprayed with the NPS to make the crack cocaine, cus its crap, they're spraying it with NPS to make it stronger which is causing effects, in with the heroin. It's not just people thinking *oh well I'm not going to smoke spice, I'm gunna stick to heroin or crack* but it's been sprayed with the spice, and they're not realising this" (P04)

4.4.2 Effects

Unpredictability and diversity of effects that are witnessed from users of NPS were discussed by many participants. Extreme examples of effects when someone has used NPS were frequently mentioned, for example it was reported that people had been hospitalised (MH and physical health), displayed erratic behaviours, or sedation effects.

> "some people present almost comatose, and calm and relaxed and not on the inside and some people will be in an absolute rage" (P09)

Additional to the immediate effects participants reported that they were concerned about the long-term effects of NPS which are relatively unknown.

> "I think that is the main worry that in the long term we don't know what it ['spice'] is essentially doing." (P01)

Some participants reported what they are starting to see some of what they perceive to be long term effects of NPS. Such as memory issues and disorientation. This was discussed particularly around methedrone users rather than 'spice' users.

> "there are a few people that are coming through that have been taking NPS, from when it first started as Mephedrone and when it was M-cat rather than spice. Erm who appear to have some memory deficits. Have some confusion, say that they struggle with daily living, sequencing, keeping up with things." (P09)

4.4.3 Testing for NPS

Participants frequently referred to the testing of NPS and how detectability is difficult due to the adaptability of the substances. Only the MH service reported that they drug test for some NPS substances. It was reported that no other service in the area test for NPS.

> "so when they came through our door we will drug test them. but the police don't drug test, when they turn up at hospital they don't drug test or paramedics don't carry drug tests, so they present as mentally unwell." (P08)

The substance misuse service reported;

> "We don't test for NPS because of the nature of the chemical is so greatly changeable that we would never be on board." (P11)

Drug testing appeared to be a key concern for the MH service, however they are aware that if a client has taken an NPS it may not be detectable on drug tests. Further suggesting that although the number of NPS users appears to have reduced in recent months this could be due to the evolved substances which are no longer detectable by drug screens.

> "I'm not sure, I'm sayings dipped, people testing negative now, however, our drug screens are not as sophisticated. They were, put together, I think we've had them for two years this particular brand, so obviously the changing types in NPS, and chemical compositions, we are not picking them up. There are a few now (P09)

Due to this unpredictability of detection some participants cited it being a particular motivating factor for people who are being regularly tested for substance use such as those on a probation order or in treatment for other substances.

4.5 Services & Treatment pathways

4.5.1 Knowledge and Understanding of NPS

All participants were asked about their understanding of NPS. All had at least a basic understanding and could articulate what NPS was. Some had a better understanding than others, which was reflected in their service/role. For instance, the MH service and those working in homelessness appeared to have a better understanding than the police. Participant's knowledge sources varied which included, specific training on NPS, general substance misuse training, email updates and on the job experience.

> "I have had some formal training, from *drugstrain* I think is the training organisation, who came in and did erm basically a day's training on NPS, and how they are changing the legal aspects and addiction around them. Other than that a lot of the training I have had is on the job experience." (P09)

There was discussion of the topic being wide-ranging incorporating many different substances replicating traditional substance and a variety of effects which had implications on management of NPS. This sometimes was a reason why they are do not feel up to date with information.

> "so NPS very very broad erm, term relating to lots of different classes of drugs […] I feel that it is very ill defined and unclear term." (P06)

Participants discussed providing support for other aspects of their lives and offering low level harm-reduction advice, however, they reported a lack of specific NPS related advice to provide to users which is a source of frustration for services.

> "Basic harm reduction, but nothing else that there is that you can do with them, it's hard" (P04)

4.5.2 Perceptions of available treatment

Participants expressed a sense of uncertainty about what support is available to people who take NPS. Most participants referred people who take NPS to the SMS, however, many were unsure what the offer was from the service. Often reporting that there were limited options for support.

> "I am sure they [drug and alcohol service] have a specific advice service for NPS, I just know there is no long term service there for it." (P09)

This uncertainty was related to the perception that the SMS was based around traditional substance use (heroin and cocaine) rather than NPS. Participants frequently commented that there is no substitute for NPS, unlike other substances and that the service focus on psychosocial interventions.

> "You can't have a detox can you. And when people go to the Addaction, like with heroin they get their Subbutex, and you get you antibuse with your alcohol. They can't give you anything for this. It is just working with you about the psychological dependence and getting you to reduce" (P08)

Furthermore, participants cited that this as a reason why users will often not engage with treatment for their use of NPS because of this lack of substitution. Therefore, users of NPS do not think that SMS will provide them with the support that they want/need.

> "spice very much we centre it around […] communities that are not fully engaged in treatment, not engaged in treatment with us at all." (P11)

> "therefore people who are suffering with these sort of things who are addicted are like [deep voice] *"I'm not going there what's the point!"* It's like it's not dealt with very well not, you know, not managed very well. (P08)

A contributory factor to this perception was that the SMS had recently (April 2018) been re-commissioned to a new provider resulting in some changes to the service, such as no longer having a drop-in clinic which provided advice to people using substances, because of this the interviewee from the SMS stated:

> "this service wouldn't match, I don't think it would match, entirely [with a NPS habit]" (P11)

Several participants felt that there was need for a specialised service to help deal with the issue of NPS use. However, one participant disagreed that this would be a valuable source saying;

> "I mean here if we were talking about highly specialised service, it probably wouldn't get used, so it would be a waste of resource." (P06)

4.5.3 Mental Health and NPS use

Many service providers discussed the increase in MH problems as a result of taking NPS.

> "Mental health issues […] they've gone through the roof with it" (P03)

Participants reported that many users of NPS experience paranoia, depression, anxiety and drug induced psychosis. During discussions that arose with some service providers about whether MH issues were induced or exacerbated by NPS, participants were unsure, often reporting that the circumstances that users are in often leads to MH problems regardless of whether they use drugs, but it is exacerbating symptoms that may not have occurred previously.

> "usually it will present like psychosis, or people believing that they are somebody else, that they sometimes that have special powers, usually that, if they're already in a low mood, what you will find is that they will become quite increasingly paranoid, think someone's after them think that it is a conspiracy, and they will act violently out of what appears to be fear." (P09)

Several participants identified issues with the MH service not engaging with those who use NPS, making it difficult for people to access the support they need.

> "Mental health services aren't there. You go to mental health in this area and all we seem to get told is that it's drug induced. You go in when they're not taking the drugs and its "oh it's the lasting effects of the drugs it's not mental health, it's because of the drug use from the past" it's not really helping people, mental health has caused loads of problems." (P04)

However, this was disputed by the MH service who reported finding it difficult to manage clients who are presenting due to the effects of NPS because they cannot assess their MH whilst they are under the influence. MH service providers reported that they are experiencing high numbers or clients being referred to them from the police and hospital, because they are presenting as mentally unwell.

> "So basically they present as psychotic and they get brought to us. And that has no end to impact on our service." (P08)

If clients are displaying extreme MH symptoms they are often sent out of area, as the service does not have the resource for them in NEL. If they are presenting with less extreme symptoms, the service refers users to the SMS as they are unable to treat them whilst under the influence of substances, which often was perceived to causes frustration with clients, who want support.

There was uncertainty around whether the MH service was an appropriate service for people who are using NPS, expressing that the service would not be not able to deal with the high volume if they did support people who were using substances.

> "I suppose at the end of the day, in one way it doesn't matter because they are presenting who they are and that is their needs, whether the drugs created that problem. But if we did that we wouldn't be able to cope as a service." (P08)

Several participants raised the issue of dual diagnosis service, reporting that it had stopped two years ago due to lack of funding. It was believed that his would help to overcome these barriers and be able to support MH and substance misuse issues concurrently. Providers reported that dual diagnosis had helped to improve the links between the MH service and the SMS service and these had been lost as a result of the dual diagnosis service stopping as well as the change of service provider.

4.5.4 Service Demand

Several participants reported that there was lack of resources due to the high demand across a range of services, these included, MH, police, ambulance service and A&E. Although representatives from ambulance or A&E services were not interviewed for this study several participants acknowledged that they had limited resources and users sometimes did not want their help.

> "We've seen them getting violent with the ambulance crew stuff like this. I mean when the ambulance crew try to bring them round or put the monitors on them they become violent towards the ambulance crew. It becomes a waste of services." (P04)

The police reflected on how this also caused consequences for their service.

> "So we have to attend welfare checks, call an ambulance we can be there sometimes three four hours with somebody and we will wait for ambulances, sometimes for three four hours." (P05)

Due to the awareness of stretched resources several participants reported that they have first aid knowledge and training on NPS so often do not call for an ambulance in the first instance unless they believe it to be serious.

5 Quantitative Findings

Between 10th and 28th September 2018, questionnaire data was collected from 24 participants who were service users from three services in NEL. Due to the small response, data will not be presented by service. However, it should be noted that a large proportion of respondents in contact with the homeless shelter completed the survey. Due to some respondents skipping questions the number of responses for each question is reported.

5.1 Descriptive statistics

Participants ages ranged between 22 and 55 years, with a mean age of 37 years old (SD= 9.5; Table 3). There were a greater number of males to females; 75% and 25% respectively. Half of male respondents were aged between 30 and 39 years.

Table 3 Respondents age and gender

	Female		Male		Total	
Years	**Count**	**Percentage**	**Count**	**Percentage**	**Count**	**Percentage**
20-29	2	33%	3	17%	5	20.8%
30-39	1	17%	9	50%	10	41.7%
40-49	3	50%	4	22%	7	29.2%
50-59	0	0%	2	11%	2	8.3%

N=24

Most respondents reported not having stable accommodation (81.8%). Nearly two thirds of respondents (65.2%) to the employment question reported that they were unemployed (Table 4). Of the respondents that reported other (8.7%) one reported they were a rough sleeper and another reported that they were long term sick.

Table 4 Respondents employment status

Employment status	**Count**	**Percentage**
Full-time employment	1	4.3%
Retired	1	4.3%
Unemployed	15	65.2%
Disabled	3	13.0%
Voluntary work	1	4.3%
Other	2	8.7%

N=23

5.2 Use of NPS

Seventy-nine percent (n=19) of participants reported that they had previously taken NPS. Of those who reported taking NPS, 73.7% were male and 26.3% were female.

The last time respondents used NPS varied, with 28% reporting using NPS in the past 24 hours and 28% reporting use over a year ago (Table 5). Of those who reported using NPS in the past 24 hours 60% (n=3) reported that they used NPS every day. Furthermore, 60% (n=3) of those who reported using NPS in the past 24 hours were aged between 30 and 39 years of age.

Table 5 Last time respondents used NPS

	Count	Percentage
Past 24 hours	5	28%
Past week	3	17%
Past Month	2	11%
Past year	3	17%
Over a year ago	5	28%

N=18

Nearly half (44.4%) reported using NPS at least weekly, with 22.2% reporting using NPS everyday (Table 6). Those reporting NPS use every day were aged between 20 and 49 years and were a mix of both males and females. A third (33.3%) of respondents reported that they hardly ever used NPS.

Table 6 Frequency of NPS use

	Count	Percentage
Every day	4	22.2%
Multiple times a week	4	22.2%
Weekends Only	1	5.6%
Hardly ever	6	33.3%
Only once	3	16.7%

N=18

The substance reported as being most used in the last year was synthetic cannabinoids (66.7%; Table 7). The overall most used substance was reported as synthetic cannabinoids (83.3%, n=5). This question yielded a low response rate. This could have been for several reasons including confusion over the question, not wishing to disclose substances used or substances unknown to participants.

Table 7 NPS used in past year and month

	Year		Month	
	Count	**Percentage***	**Count**	**Percentage***
Synthetic Cannabinoid	6	66.7%	2	40.0%
Stimulant NPS	2	22.2%	2	40.0%
Hallucinogen NPS	0	0.0%	0	0.0%
Depressant NPS	2	22.2%	1	20.0%
Other	2	22.2%	1	20.0%
Total responders	9	-	5	-

*Percent exceeds 100% as participants were able to answer with more than one response.

Over half (55.6%) of respondents reported that they solely used NPS. Of those who reported that they had used other substances when taking NPS (44.4%, n=8), heroin and Cocaine/crack cocaine were reported as the most used substances with NPS (see Table 8).

Table 8 Poly-substance use

	Count	Percentage*
NPS Only	10	55.6%
With alcohol	1	12.5%
With cannabis	2	25.0%
With heroin	6	75.0%
With cocaine/crack	6	75.0%
With ketamine	0	0.00%
With prescription drugs	1	12.5%
With other	1	12.5%

N=18

Table 9 shows where participants reported acquiring their NPS from. Nearly half of respondents (47.4%) reported acquiring their NPS from a dealer. A high proportion of respondents (42.1%) did not wish to disclose where they acquired NPS from.

Table 9 Acquisition of NPS

	Count	Percentage*
Friend	3	15.8%
Shop	0	0.0%
Dealer	9	47.4%
Online	0	0.0%
Family member	1	5.3%
Stranger	1	5.3%
Do not want to disclose	8	42.1%
Other	2	10.5%

N=19

Table 10 shows where respondents reported taking NPS. Most people reported taking NPS on the streets (72.2%). Of those who took NPS on the streets, most reported synthetic cannabinoid as their most used substance (83.3%, n=5) and over half reported acquiring their NPS from a dealer (61.5%, n=8).

Table 10 Where NPS is used

	Count	Percentage*
At Home	7	38.9%
At friend's house	7	38.9%
Streets	13	72.2%
Clubbing	2	11.1%
Pub	1	5.6%
Other	1	5.6%

N=18

The most reported reason for first using NPS was because it was cheap (44.4%), followed by being given by a friend (27.8%; Table 11). The 'other' response was due to being 'on the streets'. Of those who reported using synthetic cannabinoids in the past year 100% (n=6) reported that this was because it was cheap and 33.3% reported they wanted to try it.

Table 11 Reasons for first taking NPS

	Count	Percentage*
It was cheap	8	44.4%
Thought it was legal	1	5.6%
Under the influence of other drugs	1	5.6%
Wanted to try it	4	22.2%
Thought it was something else	2	11.1%
Friend gave it to me	5	27.8%
Dealer offered it	3	16.7%
It was easy to get	4	22.2%
Took it in prison	1	5.6%
Mental health reasons	4	22.2%
Physical health reasons	1	5.6%
Other	1	5.6%

N=18

As a result of taking NPS a large proportion of respondents reported they felt anxious, paranoid or confused (60%), collapsed (53.3%) or experienced night terrors/sleeping issues (40%). Of those who reported difficulty stopping NPS, 50% were by participants reporting use of synthetic cannabinoids.

Of those reporting taking synthetic cannabinoids in the past year 80% (n=4) reported they had felt anxious, paranoid or confused, 60% (n=3) had collapsed and 60% had sleeping issues as a result of taking NPS. The other category comments included participants 'slept', 'felt relaxed' and 'weight lifted' as a result of taking NPS.

Table 12 Reported effects from NPS

	Count	Percentage*
Felt anxious, paranoid or confused	9	60.0%
Felt physically ill	3	20.0%
Collapsed	8	53.3%
Had unpredictable behaviour/became violent	5	33.3%
Been unable to stop taking NPS	4	26.7%
Had night terrors/sleeping issues	6	40.0%
Other (please tell us)	2	13.3%

N=15

Most respondents reported being in contact with Addaction (85%) or their GP (65%) for their NPS use (Table 13). Furthermore, 4 respondents (20%) reported that they had been in contact with the MH service, and 3 (30%) reported that they would contact them for support with their NPS use.

Table 13 Services respondents have had contact with or would contact for support

	Had contact with		Would Contact	
	Count	**Percentage***	**Count**	**Percentage***
Addaction NEL (SMS)	17	85.0%	8	80.0%
GP	13	65.0%	4	40.0%
A&E	3	15.0%	2	20.0%
Navigo (MH service)	4	20.0%	3	30.0%
Search online	0	0.0%	1	10.0%
I don't know where to go for help/ I have not been in contact with any services	0	0.0%	0	0.0%
Other service (please tell us)	2	10.0%	1	10.0%
Total respondents (n)	20	-	10	-

The themes to participants' responses to further comments varied covering several different issues;

"When you're in a mess it becomes a kind of comfort to you at the time"

"It is dangerous and I believe more people will die in future"

"Should be legal"

"Navigo blame me for mental health, not understand why I take it"

6 Discussion

The aim of this study was to develop the understanding of NPS use in NEL and identify challenges health and welfare services are experiencing. This section will discuss the findings from the service user surveys and service provider interviews in the context of existing literature. Strengths and limitations of the research will be presented as well as implications for policy and practice and future research recommendations. Key findings will be presented for three main areas; 1) NPS use; 2) unpredictability of NPS; and 3) awareness of support and treatment pathways.

6.1 NPS use

Most service providers perceived the use of NPS amongst their client group was high. In line with previous research, service providers reported that users of NPS were typically homeless, offenders and/or traditional substance users (HMIP, 2017; Pirona et al., 2017; PHE, 2017; Ralphs & Gray, 2017). Furthermore, most service users responding to the survey did not having stable accommodation, with many reporting using NPS on the streets. It should be noted that a majority of respondents to the survey were in contact with a homeless charity; this may have increased the proportion of this population of users. Nevertheless, the use of NPS was identified as a significant problem amongst these subpopulations.

Supporting Blackman and Bradley's (2017) findings, service providers acknowledged that the demographic of NPS users had changed, from young people, to vulnerable populations of all ages. This was also reflected in family services reporting low numbers of clients using NPS. This correlates with the portrayal of NPS in the media (Alexandrescu, 2018). Furthermore, it was reported in the interviews that there was a change in the type of substance used, from mephedrone to now being predominantly 'spice', which has also previously been found (Webb et al., 2018). Although, NDTMS reported the number of mephedrone users accessing SMS in NEL had increased (NELC, 2017).

Through interviews with NPS users and service providers, Ralphs and Gray (2017) identified a shift from heroin to 'spice' use in homeless populations. Although this was reported by some service providers, others did not believe this to be true, reporting that heroin and cocaine users are often discouraged from using 'spice' due to its adverse effects. This dichotomy was also evidenced in the survey with just over half reporting solely using NPS, and of those reporting using other substances 75% reported taking heroin and/or cocaine/crack. NEL has a high number of opiate users, which is reflected here (NELC, 2017).

Similar to existing evidence on motivations for NPS use, service providers reported that problematic NPS use was associated with deprivation and social inequality (Addison et al; 2017; Potter &

Chatwin, 2018). Service providers and users of NPS reported that the cheapness of NPS was a reason for its use; concurring with findings reported by Addison et al., (2018) and Sutherland et al., (2017). Service providers believed people used NPS to self-medicate and as a mechanism for coping with the realities of poverty, homelessness and previous traumas, supporting previous studies (Gittins et al., 3018; User Voice, 2016; NHS Tayside, 2014, Ralphs & Gray, 2017). One NPS user reported that NPS was a 'comfort' to them. These results further support Addison et al., (2017) findings that NPS use is a "solution" not a "symptom" to users' chaotic lifestyles.

6.2 Unpredictability of NPS

Service providers viewed NPS as unpredictable due to many unknowns about the substances thus, difficult for users and professionals to manage. Service providers were unsure what substances clients were taking, although they reported it to be 'spice', they acknowledged that this was a generic name and could encompass a variety of substances. Most users of NPS on the survey also reported using 'spice', however only half of participants responded to the question. An explanation for this could be that users did not know what substance they were taking supporting Gittens et al., (2018) findings from interviews with SMS clients who were taking NPS. Users of NPS reported acquiring their NPS from a dealer. Service providers expressed concerned that since NPS use has merged with the traditional illicit drug market, the quality of NPS is more unpredictable and also reported to have been mixed with traditional substances to make them stronger (Abdulrahim & Bowden-Jones, 2015). Gittins et al., (2018) found that strength of NPS was perceived by users of NPS to be both positive and negative, echoing some service provider responses suggesting that the strength of NPS was a motivating factor for use, as a smaller dose can produce greater effects (Abdulrahim & Bowden-Jones, 2015). A third of NPS users in the survey reported having unpredictable behaviour as a consequence of taking NPS. This has implications for services who report that the varying effects of NPS are difficult to manage (Campbell O'Neil, & Higgins, 2017). No service providers reported using RIDR to report NPS encountered and their associated harms, which could be useful for professionals to obtain information on new substances (PHE, 2017).

The difficulty of testing for NPS in clients was acknowledged by some service providers, particularly the MH service who reported using drug tests to detect some NPS. However, MH services were the only service that reported testing for NPS. Gittins et al., (2017) acknowledge that although expensive, SMS should consider using NPS-specific tests arguing that if used appropriately, they can be a useful tool, particularly when substitute prescribing. However, this could drive the increase in number of NPS substances as was seen prior to the 2016 PSA, which could further increase their unpredictability and management (EMCDDA, 2018).

6.3 Services and treatment pathways

As found in previous studies, service providers believed there to was a lack of guidance on the correct advice and signposting to provide to clients who use NPS (Addison et al., 2017; Campbell, O'Neil, & Higgins, 2017; HMIP, 2017; Pirona et al., 2017; Ralphs, Gray & Norton, 2017; Simonato et al., 2013). Service providers had knowledge of NPS, however there was a consensus that more training would be beneficial because of the rapidly changing landscape of the substances. The rough sleeping strategy 2018 has acknowledged this and has committed to providing frontline staff working in homelessness adequate training to support NPS users (Ministry of Housing, 2018).

Although service providers reported that referring clients using NPS to Addaction (SMS), there was uncertainty around what Addaction's offer was for NPS users. The representative from Addaction reported low numbers of clients in treatment which is reflected in NDTMS and previous literature (Gittins, 2018; PHE, 2018). Addaction provides psychosocial support and motivational approaches to support those using NPS, which is recommended in the guidance for management of NPS use (Abdulrahim & Bowden-Jones, 2015). However, service providers perceived that Addaction would not be appealing to NPS users. It was believed that NPS use was not managed very well, thus deterred users from attending, along with the knowledge that there is no substitute medication for NPS (Ralphs & Gray; 2017). Another barrier for engagement with the SMS, identified by service providers was that they are for opiate users, which Blackman and Bradley (2017) also identified. Conversely, a high proportion of respondents on the user survey reported that they had been in contact with Addaction although the numbers were smaller for those stating they would contact Addaction for support specifically for NPS. Thus, potentially indicating that service provider's perceptions of engagement issues may reflect an accurate picture. However, Gittins et al., (2017) found that those in treatment for other substances often conceal their use of NPS, therefore it is not recorded. Thus, SMS should be aware and enquire about use of NPS, particularly when prescribing opiate substitutes.

Gittins et al., (2017) acknowledged that management of NPS users is complex, and relies upon good partnership between services who have a range of different competencies. However, a significant finding reported by service providers was that there were gaps between services such as substance misuse, MH and emergency services, with a perceived increase in demand due to NPS use. The police reported that they often spend a considerable amount of time and resource supporting people in the community who have had adverse reactions to NPS, often waiting for an ambulance to provide appropriate care. Increased call outs to deal with adverse NPS reactions are also impacting on an already stretched ambulance service and contributing to significant resource pressures.

However, this study and previous research suggests users of NPS often decline to attend A&E when an ambulance is called (Fitzpatrick et al., 2017). Patients experiencing NPS induced MH symptoms, are more likely to present at ED and/or have police involvement prior to admission to a MH hospital (PHE, 2017; Shafi et al., 2017). In this study the MH services acknowledged this, reporting a high number of NPS users being brought to them by the police and other emergency services, often with drug-induced psychosis. However, MH services reported that the management of patients under the influence of substances is difficult. Therefore, unless symptoms are severe requiring an inpatient service, patients are referred to Addaction to support them with their NPS use, before they will provide the MH support some of these clients reported to require. However, as discussed NPS users do not appear to want to engage with Addaction. It was reported by other service providers and Ralphs and Gray (2017), that it was difficult to get MH services to engage with NPS users. Corroborating these results, one service user reported that 'Navigo blamed them for their mental health problems and did not understand why they used spice'. Furthermore, 60% of NPS users in this study reported experiencing psychological symptoms from using NPS such as anxiety and paranoia. Service providers suggested that communication issues between services was sometimes resulting in people not receiving the necessary support. Thus, improved communication and clearer treatment pathways for people presenting with NPS induced MH issues would be advantageous.

6.4 Strengths and Limitations

This study was a unique exploration of the use of NPS in NEL providing insightful information on their use and the implications for health and welfare services. The study provides an initial exploration of some of the issues of NPS use, from both a service provider and a service user perspective.

Although a broad range of different support services were represented there was unequal representation and this may not illustrate the whole picture of NPS use in NEL. Specifically, , probation, GPs, sexual health services, A&E and ambulance service were missing from this research. Information from these services may have added valuable insights that were not discussed by organisations interviewed. However, it was not feasible, in the timeframe of this project, to obtain the required approvals to conduct research with these services. Ideally these services would have been included. Furthermore, selection biased may have occurred, if participants have strong views on NPS or had experience with clients who have used NPS they may have been more inclined to take part.

The sample size of the user survey was smaller than planned and ideally would have been larger. Some services were unable to take part due to ethics approvals not being possible for the time

frame of this project. A larger sample size, from a broader range of services may have provided a more accurate representation of NPS use. The smaller than planned sample size for this cohort of people may also have been influenced by the level of literacy skills. There was a low response rate on some questions in the survey. Participants may not have had the necessary literacy skills. Ideally, an option for a scribe may have been useful. In particular, the question on which substance they used may have needed a higher level of literacy to understand. Conducting a pilot study may have highlighted these issues potentially gaining a better response rate. Furthermore, although the researcher briefed organisations distributing the survey thoroughly, the researcher had no control over the recruitment of participants.

Service providers suggested that the use of NPS has declined in young people, however, the survey was aimed at adults (18+) who were in contact with specific services, therefore cannot provide insight into the pattern of younger users of NPS.

6.5 Implications for Policy and Practice

This study has identified significant challenges that are facing users of NPS and health and welfare services in NEL. Recommendations Include:

- Provide frontline professionals with guidance on how to support people who use NPS
- Encourage the reporting of NPS and associated harms to RIDR (PHE, 2017)
- Increase awareness for both professional and public of support/treatment for NPS use
- Improve integration between MH service and SMS
- Develop referral pathway for NPS users to clearly set out roles and responsibilities from services

6.6 Further research

To develop a more comprehensive understanding of NPS use in NEL, further research with NHS services such as ambulance service, A&E and GPs, sexual health and probation services should be conducted. Both this study and previous literature suggests the use of NPS is problematic for these services too. Furthermore, the perspectives of people who use NPS, particularly synthetic cannabinoids, should be explored further, through qualitative research which may be a more accessible format for those with literacy challenges. This would help to further develop the understanding of NPS use enabling exploration of key issues such as reasons for use and support that would be beneficial.

There is still a lack of clarity about the true extent of the situation. Other areas of further research which should be explored to help improve this could include:

- Obtaining secondary data from services on NPS such as police seizures of NPS, ambulance calls for NPS and MH service
- More comprehensive review of NPS users' needs

6.7 Conclusion

NPS is a diverse and complex topic. This study has enhanced the knowledge of the use of NPS and their implications for services in NEL. The study's findings were largely similar to that in the existing literature, suggesting that use of NPS in NEL reflects what is occurring elsewhere, confirming that since the 2016 Psychoactive Substances Act, problematic NPS use amongst those in the most vulnerable communities in NEL has increased although there is some debate as to whether NPS is being used by opiate users. Professionals engaged with vulnerable groups require more training in order to feel more confident in providing support to users of NPS, which has been highlighted as a key priority in the 2018 rough sleeping strategy (Ministry of Housing, 2018). Furthermore, the development of a treatment pathway for those who are presenting mentally unwell across services would be advantageous to those supporting people using NPS. This would help to ensure roles and responsibilities are highlighted and that users get the appropriate support. As already indicated, further research is needed to explore the use of NPS further, and understand what the true extent of NPS use is in NEL. This study has gone someway to explore the issues surrounding NPS use in NEL as well as contributing to existing literature.

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8 Appendices

Appendix 1 Table of NPS Categories (Adapted from Abdulrahim & Bowden-Jones, 2015; Tracy, Wood & Baumeister, 2017)

NPS Category		Other names	Similar traditional Substance	Administered	Effects	
					Desired	Adverse
Synthetic Cannabinoids/ Synthetic Cannabinoid Receptor Agonists (SCRAs)		Spice, Black Mamba, Annihilation, Clockwork Orange, Pandora's Box	Marijuana, Cannabis	Typically smoked (herbs sprayed with substance) Or liquid, inhaled in e-cigarettes/vaporisers etc.	euphoria, relaxation, disinhibition, energised and altered consciousness	Convulsions, cardiovascular problems, acute kidney injury, hyperglycaemia, vomiting, temporary loss of vision and speech, reduced consciousness, anxiety, aggression, bizarre behaviour, amnesia, panic attacks, hallucinations, paranoia, delusions, psychosis, cognitive impairment, catatonic states, persistent vomiting, withdrawal symptoms on reduction or cessation of use.
Stimulant NPS/ synthetic cathinones		Mephedrone, M-Cat, Meow, Meow, Benzo Fury, BZP	MDMA, cocaine, amphetamine	powders or pills	Euphoria, energised, empathetic	Hyperthermia, hyponatraemia, tachycardia, hypertension, serotonin syndrome, collapse, convulsions, hallucinations, headache, sweating, kidney injury
Depressant NPS	Sedative	Diclazopam, Flubromazepam, Etizolam	tranquilisers or anti- anxiety drugs,	Smoked, pills, injected or nasal inhalation	relaxed, sleepy or euphoric	Reduce breathing and heart rate. Can lead to loss of consciousness, and even a coma or death.
	opioids	Novel fentanyls, MT-45, carfentanil,	Similar to traditional opiods		Euphoria, relaxation and sedation	Hypothermia, reduced breathing and heart rate, subsequently may lead to respiratory arrest and death.

Hallucinogen NPS	Dissociative	Methoxamine (“mexxy”),	ketamine	Swallowed, inhaled or injected	Euphoric “dissociated” state, with a perception of an absence of time, weightlessness, and disconnection from the physical body.	Aggression, psychosis, cardiovascular problems, kidney injury, respiratory failure
	Psychedelic	N-BOME, Bromo-Dragonfly	LSD or magic mushrooms		Alterations to perception, quasi-mystical experiences	Mood alteration
Nitrous Oxide		Laughing gas		Inhaled through balloons from high pressure canisters	Euphoria, relaxation and laughter	Dizziness, coordination and judgement. Large doses can cause low blood pressure, fainting and death by hypoxia (oxygen deficiency).