

# Survey of knowledge of legal highs (novel psychoactive substances) amongst London pharmacists

**Key words:** legal high, novel psychoactive substance, pharmacist, questionnaire,

## **Abstract**

*Purpose:* To determine pharmacists' knowledge of legal highs (novel psychoactive substances; NPS).

*Approach:* A questionnaire was handed out at 2 London pharmacist continuing education events in mid-2014. These events update pharmacists about developments of interest/relevance to the profession and to improve their practice. A total of 54 forms were returned; a response rate of 26%.

*Findings:* Most pharmacists had poor knowledge of NPS and many considered that NPS were not important to their work, with few having had to advise customers in this area. Despite this, the majority thought that they had insufficient information about NPS. There was a negative correlation between the age of the pharmacist and knowledge of NPS.

*Research Limitations:* The sample is a self-selected one drawn from registered pharmacists working in community pharmacies in North West London, and thus does not include hospital pharmacies. Self-selection means that respondents may only reflect those who are interested in the NPS phenomenon and not the wider pharmacy community. The geographical area covered may not be representative of London as a whole, or indeed other parts of the UK or other EU countries.

*Practical and Social Implications:* It is clear that pharmacists do not know much about NPS but would like to know more. This information might improve their practice. Pharmacists, easier to see than general practitioners, could be a useful source of information for NPS misusers.

*Originality:* There have been no previous attempts to gauge the level of knowledge by pharmacists of legal highs/novel psychoactive substances in the UK or elsewhere to our knowledge.

## Introduction

Legal highs is the common term for a collection of drugs, many of which are new, or are older drugs, now misused<sup>[1, 2]</sup>. There is debate around nomenclature and definition<sup>[3]</sup>, but within Europe most researchers use the term novel psychoactive substance (NPS), using the definition of the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA)<sup>[4]</sup>. Over the last 5-10 years there has been a steady increase in the number of NPS<sup>[5]</sup> with approximately 100 new NPS found in 2013. There are also increasing numbers of deaths associated with legal high use<sup>[6]</sup>, **although in most cases the deceased are polydrug misusers and the drug(s) which caused death cannot be accurately determined.** Despite this, and the increased media attention, many healthcare professionals know little about NPS, and there are few studies describing their pharmacology or toxicity, mephedrone being a notable exception. With anticipated increases in NPS use and consequent public health issues, there is a need to educate healthcare professionals about NPS.

**In the UK, the Pharmacy profession is moving towards a more front-line position, where patients may come to see a pharmacist about a problem instead of visiting their general practitioner (GP). It is anticipated that this will increasingly become the case with a predicted reduction in UK GP services, and prescribing pharmacists becoming more common.** The role of the pharmacists in prescription drug misuse is acknowledged<sup>[7]</sup>. **Despite this, the Pharmacy curriculum, at least in the UK, does not typically place much emphasis on drug misuse and almost nothing is taught regarding NPS.** The UK General Pharmaceutical Council, in its 2011 'Future Pharmacists'<sup>[8]</sup> document briefly mentions drug misuse, but there is no mention of NPS. Thus, education on substance use and misuse targeting pharmacists and the pharmacy team is very limited. Two optional short courses 'Substance use and misuse' and 'Addiction, misuse and dependency' have been developed by the Centre for Pharmacy Postgraduate Education (CPPE) in order to prevent the misuse of over-the-counter (OTC), prescription medicines and traditional drugs of abuse such as cocaine and heroin. These courses aim to equip pharmacists to identify groups of patients who may misuse OTC or prescription medicines and learn about the pharmaceutical interventions that could be undertaken. These courses do not include information on NPS<sup>[9-10]</sup>.

**We can thus foresee a time in the near future where more and more pharmacists will be asked about NPS by their patients, with pharmacists not having appropriate knowledge to answer them.** This pilot study was designed to gauge UK pharmacists' knowledge of NPS with a view to designing appropriate educational resources for pharmacists and related healthcare professionals.

## Methods

*Questionnaire.* The survey was based on an existing questionnaire used for a previous EU-funded project (RedNet; <http://www.rednetproject.eu>) and contained a brief definition of NPS and the categories used by the EMCDDA. The survey first asked for some demographic data (e.g. sex, age, years of pharmacy practise) then asked about knowledge of NPS. We then listed 38 relatively well known NPS and asked subjects if they had heard of them. Finally we asked about what type of information they would like about NPS and whether it was important to their pharmacy practice.

*Administration of questionnaire.* The questionnaire was distributed at 2 London North West Local Practice Forum continuing professional development events in mid-2014 (207 attendees). These events update pharmacists about developments of interest/relevance to the profession and to improve their practice. One of the authors (AG) spoke about our EU-funded EU-MADNESS project (<http://www.eumadness.eu>) and that one of its aims is to establish current levels of knowledge amongst healthcare professionals. The paper questionnaire was distributed to all attendees. A total of 54 forms was returned; a response rate of 26%. Usually, each attendee represents a different community pharmacy. Ethics approval was granted by the University of Hertfordshire Health & Human Sciences ECDA; protocol number aPHAEC1042(03).

*Statistics.* Data were collated and graphed using SigmaPlot. Spearman correlation analysis was performed on age of pharmacist versus number of NPS of which they were aware. Fig 2 was analysed by a Kruskal-Wallis 1-way ANOVA on ranks, multiple comparisons were made using Dunn's Method and the data plotted are the medians.

## Results

*Participants.* Of the 54 respondents there were 32 female (59%) and 22 male (41%). Most considered that they had 'poor' to 'basic' knowledge of NPS (40 pharmacists; 74%; Fig 1A) and most (29; 54%) did not provide advice or counselling to patients or customers on NPS, while only 8 (15%) said that they did provide counselling on NPS (Fig 1B).

*Knowledge of NPS.* Of 36 relatively common NPS we listed, 16 (30%) pharmacists were not aware that any were being misused, while 11 (20%) were only aware that 1 was being misused (Fig 1C). The most commonly recognised misused drugs were pregabalin (recognised by 32 pharmacists; 59%), mephedrone (17; 31%), benzydamine (13; 25%), tropicamide (9; 18%) and 'Spice' (9; 18%). There was a negative correlation between the age of the pharmacist and the number of NPS that they had heard of ( $p < 0.01$ , Pearson's correlation; Fig 1D).

*Relevance of NPS to Pharmacy and future learning needs.* Although 20 pharmacists (20; 37%) thought that knowledge of NPS had 'little' significance to their work (Fig 1E), the overwhelming majority (50; 93%) thought that they did not have enough information about NPS. Most got their information from the internet/web (21, 39%), followed by the media (15; 28%), seminars (12; 22%) and email (11; 20%; Fig 1F). The majority wanted to be updated about NPS (44; 81%) with only 8 (15%) stating that they did not want to be updated. Their preferred method for being updated was by email (38; 70%), followed by the Internet/Web (25; 46%) and online courses (19; 35%).

**When asked about the type of information that they wanted, to improve their knowledge of NPS, it was found that knowledge of NPS adverse events, clinical warnings and desired psychoactive effects were considered most significant, all 3 were rated higher compared to knowledge of chemical characterisation of NPS ( $H(12) = 24.04$ ,  $P < 0.05$ ; Fig 2).**

## Discussion

These pilot data suggest that although knowledge of NPS may not have been considered central to a pharmacist's job, with few pharmacists offering advice on NPS to customers or patients, there is an acknowledgement that information on this area is needed.

Of the 36 relatively common NPS listed in the survey, pregabalin was the most well-known misused drug. This is unsurprising as it is prescribed for neuropathic pain, anxiety and epilepsy, is misused<sup>[11]</sup> and is increasingly associated with drug-related deaths<sup>[6]</sup>. Of the other well-recognised NPS, benzydamine is found in oral rinses for sore throats and tropicamide is used to dilate the pupil in diagnostic eye test; both these drugs are misused<sup>[12, 13]</sup>. Thus the number of genuinely 'novel' psychoactive substance known by pharmacists is small, with the stimulant mephedrone and the synthetic cannabinoid 'Spice' drugs the best known. This confirms that pharmacists in London have a poor knowledge of NPS.

The re-emergence and abuse of older clinically used/tested drugs is not a new phenomenon, but appears to be gathering pace. There are increasing numbers of old disused clinical drugs being rebranded by Internet opportunists as legal highs. For example, desoxypipradrol, tested for narcolepsy many decades ago, resurfaced in 2009 as 'Ivory Wave' and was associated with a number of drug related deaths<sup>[14]</sup>. In addition, alpha-methyltryptamine (AMT), once used as an antidepressant, is also now misused<sup>[15]</sup> and associated with drug-related deaths<sup>[6]</sup>. **It should be noted that in most cases the exact cause of death is not known because multiple drugs, including alcohol and nicotine, are typically taken by drug misusers. The multiple online user forums are full of user reports specifying which drug combinations have been taken to obtain the psychological changes sought, and also drug(s) taken to ease the comedown, facilitate sleep or reduce withdrawal effects.**

**In the UK, pharmacists are leading health care professionals in the different health care settings. In primary care, it was reported that more than 1.4 million people visit 11,500 community pharmacies on the high streets every day in England. This makes pharmacists**

very well suited to reach out to customers or patients who may have or may be developing substance misuse<sup>[16]</sup>. Pharmacists are equipped with the knowledge and skills to promote education, detection, prevention and treatment of drug misuse<sup>[17]</sup>. In 2010, pharmacists were formally notified of the health harms related to a new 'legal high' called 'Ivory Wave'. With the limited knowledge provided then, pharmacists were able to raise awareness and educate customers on the potential toxicities that may result from the intake of this substance<sup>[18]</sup>.

Within their profession, pharmacists are involved in the provision of opiate substitute therapy and in the prescribing of controlled drugs for the treatment of many conditions including addiction<sup>[19]</sup>. In 2012, amendments to the UK Misuse of Drugs regulations (2001) were introduced and involved lifting restrictions and allowing independent pharmacist prescribers to prescribe any controlled drugs (Schedules 2-5) including diamorphine, dipipanone and cocaine for relieving pain but not for the treatment of addiction<sup>[20]</sup>. In secondary care, substance abuse is sometimes associated with psychiatric patients. Mental health pharmacists are commonly part of the multi-disciplinary team and are well equipped to provide pharmacological advice and to carry out pharmaceutical interventions in cases related to drug misuse<sup>[21, 22]</sup>. Assessment of complications/ toxicities related to substance misuse is often mutually assessed by the diagnosing doctors and pharmacists on psychiatric inpatient wards<sup>[21]</sup>. Available hospital guidelines commonly involve generic pharmaceutical interventions for the misuse of traditional stimulants, benzodiazepines, amphetamine and opiates in a manner, where 'one size fits all'<sup>[21]</sup>.

In line with the UK national policy priorities in 2014, the care quality commission (CQC), the independent regulator of health and social care in England, has initiated pilot inspections of substance misuse services, which include services provided by pharmacists in inpatient units<sup>[22]</sup>. The substance misuse services currently provided do not include NPS related services.

**Our data suggest that UK pharmacists will need further education on NPS either within the undergraduate curriculum or as part of their continuing professional development (CPD). We are currently funded by the EU MADNESS project, part of which is to create new learning resources for healthcare professionals. Our current studies include a survey of European Medical and Pharmacy schools, to determine what is being taught about NPS across Europe. We are also surveying undergraduate students in the UK to determine what they know about NPS and particularly if they believe them to be safe. Finally we have a larger UK-wide survey underway determining pharmacists' knowledge of NPS. These data, taken with the current study will inform us of what type of information is needed to educate learners and teachers about NPS. To this end we will create specific PowerPoint slides and fact sheets on NPS specifically for pharmacists, as well as other healthcare professional.**

This study has some limitations. The sample is a self-selected one drawn from registered pharmacists working in community pharmacies in North West London, and thus does not include hospital pharmacies. Self-selection means that respondents may only reflect those who are interested in the NPS phenomenon and not the wider pharmacy community. The geographical area covered may not be representative of London as a whole, or indeed other parts of the UK or other EU countries. Despite this, it is clear that London pharmacists do not know much about NPS but would like to know more.

## **Conclusions**

**In conclusion, pharmacy education involving knowledge on NPS health harms, potential pharmaceutical interventions and referral pathways is lacking. Education related to NPS would enable pharmacists to contribute in recognising the local needs and in promoting prevention and education, which in turn would reduce the negative social impact of NPS misuse, unnecessary hospital admissions and avoidable fatalities.** Pharmacists need further information on NPS, not only those prescription drugs which are now being misused but especially the new 'designer' NPS. In particular, pharmacists requested information related to the pharmacology and toxicity of NPS.



## **Declarations**

## **Acknowledgements**

We would like to thank Stefania Chiappini for her kind assistance in translating the original survey instrument. Thanks are also due to the LNWLPF committee steering group for facilitating access to the events, and pharmacists attending the events.

## **Conflicts of interest**

AG is a member of the LNWLPF committee steering group. FS is a member of the UK Advisory Council on the Misuse of Drugs (ACMD). FS and JC are members of the ACMD's Novel Psychoactive Substances Working Group.

## **Funding**

The European Commission-funded EU-MADNESS project (2014–2016; contract no: JUST2013/DPIP/AG/4823) resources were used to assist with the preparation of this research document.

## **Authors' contributions**

AG collected the data, JC, FS and AG constructed the questionnaire, CD analysed the data and wrote the manuscript with help from AG. All authors were involved in editing manuscript drafts and approved the final version.

## References

1. Schifano F (2015) Novel Psychoactive substances (NPS): clinical and pharmacological issues. *Drugs and Alcohol Today* 15 (1) 21-27.
2. Papaseit E, Farre M, Schifano F, Torrens M (2014) Emerging drugs in Europe. *Curr. Opin. Psychiatry* 27 (4) 243-50.
3. King LA, Nutt DJ. Deaths from “legal highs”: a problem of definitions. *The Lancet* 2014; 383: 952.
4. EMCDDA. (2011). Responding to new psychoactive substances. Drugs in focus No 22. December. Lisbon: European Monitoring Centre for Drugs & Drug Addiction. Available at: <http://www.emcdda.europa.eu/publications/drugs-in-focus/responding-to-new-psychoactive-substances>
5. Deluca P, Davey Z, Corazza O, Di Furia, Farre M, Flesland LH, Mannonen M, Majava A, Peltoniemi T, Pasinetti M, Pezzolesi C, Scherbaum N, Siemann H, Skutle A, Torrens M, van der Kreeft P, Iversen E, Schifano F. Identifying emerging trends in recreational drug use; outcomes from the Psychonaut Web Mapping Project. *Prog Neuro-Psychopharmacol & Biol Psychiatry* 2012; 39: 221-226
6. Corkery J, Claridge H, Loi B, Goodair C, Schifano F. Drug-related deaths in the UK: Annual Report 2013. International Centre for Drug Policy, St George's University of London. Available at: [http://www.sgul.ac.uk/research/projects/icdp/our-work-programmes/pdfs/drd\\_ar\\_2013.pdf](http://www.sgul.ac.uk/research/projects/icdp/our-work-programmes/pdfs/drd_ar_2013.pdf)
7. Hale KM, Murawski MM, Huerta J. Pharmacist roles in combating prescription drug abuse. *J Am Pharm Assoc* 2009; 49: 589-92.

8. Future Pharmacists, Standards for the initial training of pharmacists. General Pharmaceutical Council (2011). Accessed on 20/04/2015 from [http://www.pharmacyregulation.org/sites/default/files/GPhC\\_Future\\_Pharmacists.pdf](http://www.pharmacyregulation.org/sites/default/files/GPhC_Future_Pharmacists.pdf)
9. Wragg, K. Substance use and misuse. 2010. The Centre for Pharmacy Postgraduate Education (CPPE), University of Manchester: HMSO. Accessed on 20/04/2015 from [https://www.cppe.ac.uk/learningdocuments/pdfs/substanceuse\\_ol.pdf](https://www.cppe.ac.uk/learningdocuments/pdfs/substanceuse_ol.pdf)
10. Wragg, K. Addiction, misuse and dependency: a focus on over-the counter and prescribed medicines. 2013. The Centre for Pharmacy Postgraduate Education (CPPE), University of Manchester: HMSO. Accessed on 20/04/2015 from <https://www.cppe.ac.uk/programmes/l/addict-e-01>
11. Schifano F. Misuse and abuse of pregabalin and gabapentin: cause for concern? *CNS Drugs* 2014; 28: 491-496.
12. Anand JS, Gleboacka ML, Korolkiewicz RP. Recreational abuse with benzydamine hydrochloride (tantum rosa). *Clin Toxicol*: 2007; 45: 198-199.
13. Bersani FS, Corazza O, Simonato P, Mylokosta A, Levari E, Lovaste R, Schifano F. Drops of madness? Recreational misuse of tropicamide collyrium; early warning alerts from Russia and Italy. *Gen Hosp Psychiatry* 2013; 35: 571-573.
14. Corkery JM, Elliot S, Schifano F, Corazzo O, Ghodse AH. 2-DPMP (desoxypipradrol, 2-benzhydrylpiperidine, 2-phenylmethylpiperidine) and D2PM (diphenyl-2-pyrrolidin-2-yl-methanol, diphenylprolinol): A preliminary review. *Prog Neuropsychopharmacol Biol Psychiatry*. 2012; 39: 253-258.
15. Hill SL, Thomas SH. Clinical toxicology of newer recreational drugs. *Clin Toxicol* 2011; 49: 705-719.

16. Patient Voice. 2014. Prevention not cure: health on the high street key to NHS survival according to new report. Accessed on 20/04/2015 from <http://www.pharmacyvoice.com/press/prevention-not-cure-health-on-the-high-street-key-to-nhs-survival-according>

17. The American Society of Health-System Pharmacists (ASHP) Council on Pharmacy Practice. 2013. ASHP Statement on the Pharmacist's Role in Substance Abuse Prevention, Education, and Assistance. Medication Therapy and Patient Care: Specific Practice Areas—Statements. American Society of Health-System Pharmacists, Inc. Accessed on 20/04/2015 from <http://www.ashp.org/DocLibrary/BestPractices/SpecificStSubstance.aspx>

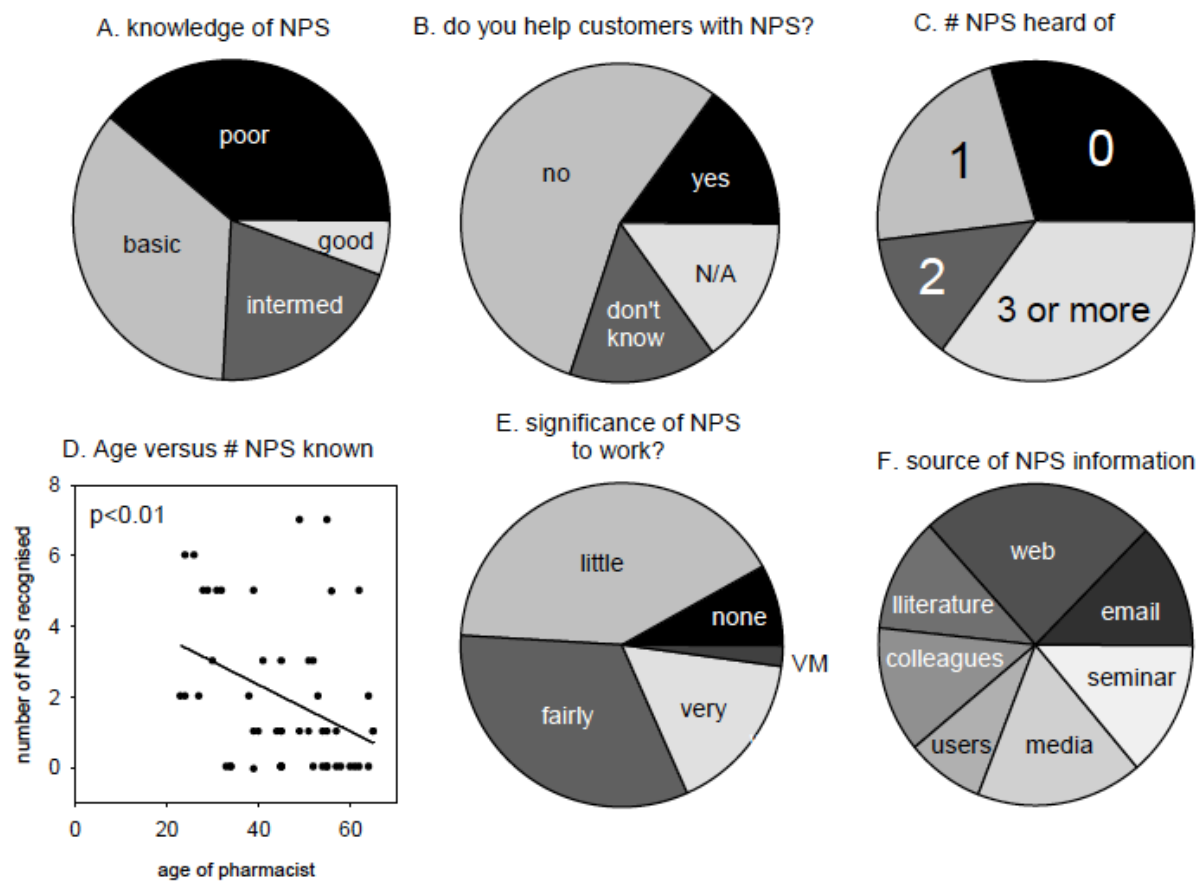
18. The Pharmaceutical Journal, online | URI: 11021656

19. Soubry, A. & Browne, J. (2013). Drug misuse and dependency. Department of Health, Home Office, part of National Health Service and Public health. Accessed on 20/04/2015 from <https://www.gov.uk/government/policies/reducing-drugs-misuse-and-dependence>

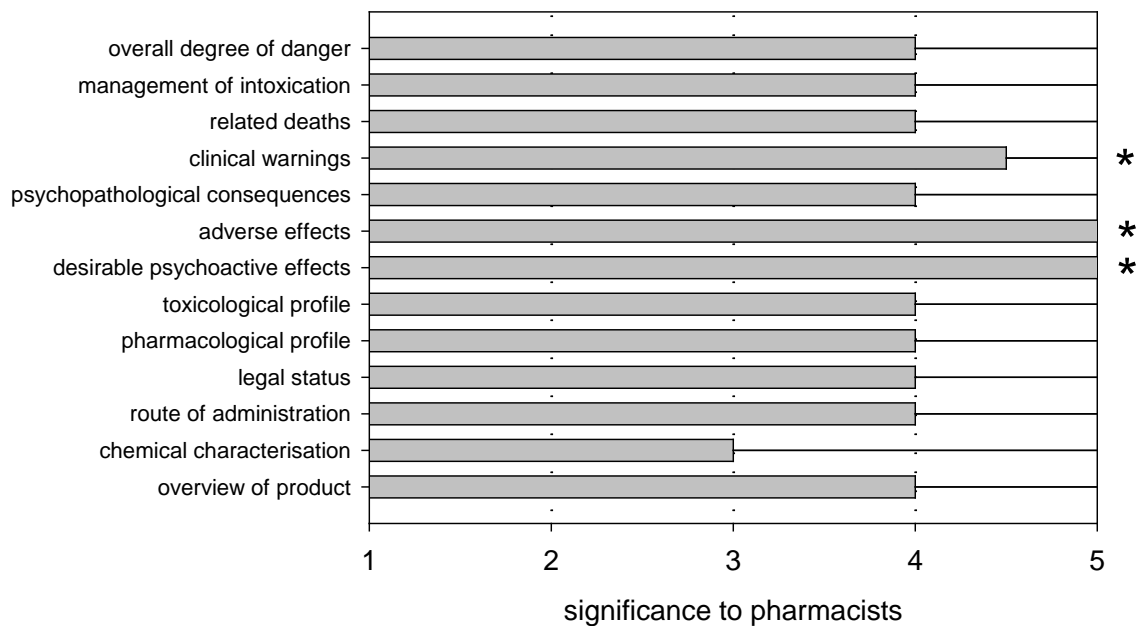
20. Department of Health. (2012). Nurse and pharmacist independent prescribing changes announced. Accessed on 20/04/2015 from <https://www.gov.uk/government/news/nurse-and-pharmacist-independent-prescribing-changes-announced>

21. Consultant nurse and Chief pharmacist. (2014). Policy for the management of service users with a dual diagnosis of mental health problems and substance misuse on psychiatric inpatient wards including destruction of substances. Manchester Mental Health and Social Care Services. Manchester City Council. Accessed on 20/04/2015 from <http://www.mhsc.nhs.uk/media/54352/substance%20misuse%20policy.pdf>

22. Richards, M. A fresh start for the regulation and inspection of substance misuse. 2014. Care Quality Commission (CQC). Report number CQC-260-300-092014. UK: CQC. Accessed on 21/04/2015 from [http://www.cqc.org.uk/sites/default/files/20140919\\_cqc\\_a\\_fresh\\_start\\_substance\\_misuse\\_final\\_low\\_res.pdf](http://www.cqc.org.uk/sites/default/files/20140919_cqc_a_fresh_start_substance_misuse_final_low_res.pdf)



**Figure 1. Results from a survey of London pharmacists on legal highs/NPS.** A. most pharmacists considered that they had only a 'poor' or 'basic' knowledge of NPS. B. Most pharmacists did not help customers or patients with advice on NPS. C. Many pharmacists (28/54; 52%) were not aware that any, or only 1, of the 36 relatively common NPS listed in the survey, were being misused. 19/54 (35%) pharmacists were aware that 3 or more of the NPS listed were being misused. D. There was a negative correlation between the age of the pharmacist and the number of NPS that they were aware of. E. Many pharmacists thought that knowledge of NPS had little significance to their work (20/54; 37%) but nearly as many thought that it was 'fairly' significant (16/54; 30%). F. Most pharmacists got their information on NPS from the Internet/Web. N/A = no answer (1B); VM = very much (1E).



**Figure 2. Significance of different aspects of NPS to pharmacists.** We asked pharmacists to rate the importance of NPS-related information to improving their knowledge of NPS. The different types of information were rated from 1 (not significant) to 5 (very significant). The graph shows that pharmacists thought that adverse events, clinical warning signs and the desirable psychoactive effects were most relevant, with chemical characterisation considered relatively less significant. Values are medians. \*P < 0.05 versus chemical characterisation.