**The current state of paediatric non medical prescribing**

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**Introduction**

Prescribing for children and young people highlights many complex issues which may not be relevant in other fields of non medical prescribing. Ongoing changes to legislation provide ongoing challenges, requiring paediatric non medical prescribers (NMPs) to be vigilant within their daily prescribing practice. This article aims to address pertinent challenges and barriers frequently seen in prescribing for children and young people, including not only organisational and human factors, but also legal issues, controversial prescribing, education, the impact of the recent Covid-19 pandemic, and also how that has influenced the rise in childhood obesity – which in itself is an important element to take into account.

**Challenges and barriers**

**Organisational factors**

Organisational factors have been identified as a barrier to optimum paediatric non medical prescribing (Noblet, Marriott et al. 2017). This can include time for continuous professional development (CPD) once qualified, or even obtaining the required hours during the NMP module. Finding a supportive Designated Prescribing Practitioner (DPP) is paramount, and although the DPP may be a senior member of the NMP’s team, there must be adequate time and effort for training and reflection which must be considered (Jarmain, Moreno-Chamorro et al. 2023). This can be at risk especially during the winter months, when ‘winter pressures’ have an impact on paediatric space and resources, which can include staffing (RCPCH 2019). Unscheduled care for children needs to be taken into consideration when planning specific supervision time. Having an awareness of course / module commitments and requirements – for both the student and the DPP – can support the student’s progress, and organisational planning needs to be carefully considered so as to not to hinder the student’s development (Graham-Clarke, Rushton et al. 2018).

**Human factors**

DPP supervision – during and post NMP training – can also be considered as a human factor;despite research showing that DPPs on the whole are enthusiastic regarding supervision (Jarmain, Moreno-Chamorro et al. 2023), anxieties regarding the DPP’s potential lack of knowledge regarding non medical prescribing may impact the relationship with the student, but the two way learning process could be seen as an advantage. This could be related to potential negative thoughts and perceptions regarding non medical prescribing as a whole from medical colleagues, regarding fear of loss of power or control (Noblet, Marriott et al. 2017). Regular continuous professional development (CPD) updates for all healthcare professionals can lessen these, re-iterating the essence of multi-disciplinary teamwork.

Other human factors to consider could be due to prescription errors. Most errors are fortunately intercepted before the actual drug administration (Conn, Fox et al. 2021), but the actual dosing error is the most common type of error, usually related to weight based calculations, which can be clearly more dangerous in neonates. Human factors have also been highlighted in paediatric intensive care units, where errors have been split into physical attributes (such as fatigue, distraction, and interruption during the prescribing process), and also psychological attributes, including aspects of inexperience or insufficient decision making (Sutherland, Ashcroft et al. 2019). Experience in working with children is also raised in a recent scoping review, where errors are made more often in the beginning of the academic year when new doctors join clinical teams (Conn, Kearney et al. 2019). Whilst this is not necessarily related to NMPs, new NMPs working with children and young people may also be at risk. Knowledge of the differences between children and adults is paramount (Houghton 2006), including aspects of growth, development, and pharmacokinetics. Specific drug calculations based on weight do need to be practiced regularly (Eggleton 2017), and it could be suggested that regular calculation updates for paediatric NMPs – and indeed medical prescribers – could be encouraged.

**Off label / licensed medications**

However, experience and knowledge of working with children and young people is not the only challenge: actual medications that are available to children need to be considered. Due to a lack of clinical trials and robust evidence (Robertson 2018), there are an increased number of unlicensed or off label medications available in paediatric practice. Off label medications are quite often seen in neonatal care: these are licenced medications, but are used for unauthorised indications, such as different age groups, dose, or administration routes (Davies 2023). Off label use in children can be up to 69% of all prescriptions in hospital and up to 100% in primary care (Schrier, Hadjipanayis et al. 2020). Unlicensed medications do not have a UK licence, or is made up as a special product because it is not readily available. Pharmaceutical companies now have to include studies in children for most new medicines development (RCPCH 2023), although currently, many medications remain unlicensed for children. Paediatric NMPs are legally permitted to prescribe both off label and unlicensed medications, as long as the prescribing is within their clinical competence, and follows appropriate safeguarding and consent measures (RPS 2021): they must also ensure that they are adhering to agreed local prescribing guidelines. Again, regular NMP updates could be beneficial in order to provide up to date, evidence based research.

**Legal considerations**

As well as considering the prescribing of off label / unlicensed medications, other legal issues may provide a challenge for paediatric NMPs. Aspects of consent to treatment, or consenting to the prescribing process as a whole (ie, history taking and physical examination) need to be considered, particularly if the child is under the age of 16. The NMP must judge whether their patient has the capacity to be able to consent: in younger children, it is obvious that parents / caregivers who have parental responsibility consent for their child (Griffith 2015). However, even here, the changing demographic of the family also needs to be explored, including considering step-parents, parents of the same sex, carers, or parents with acquired parental responsibility. Conversely, older children – although still under 16 – may be able to consent if they are deemed ‘Gillick competent’ (Cornock 2018), where they have been judged to be emotionally mature and capable, thus enabling that their consent is legally valid. Paediatric NMPs must ensure that they are up to date with their local consent policies, relevant to their own particular area of practice.

The prescribing of controlled drugs must also be carefully considered. Whilst medical-use controlled drugs (eg morphine) can legally be prescribed if it is within the scope of competence, there has been recent focus on the prescribing of medical cannabis for childhood intractable epilepsy (Ben-Zeev 2020), such as Dravet syndrome or Lennox Gaustat syndrome . Since 1971, both recreational and medical cannabis was made illegal in the UK, under the Misuse of Drugs Act (HMSO 1971), so research had declined (Zafar, Schlag et al. 2021). However, this law changed in the UK as recently as 2018, but parents of children with such epilepsy syndromes have been struggling to obtain prescriptions (RCPCH 2020), as the specific formulations are not freely available on the NHS (GOSH 2020), although there is one that is licensed. As always, paediatric NMPs clearly need to act in their patient’s best interests and scope of practice, and NMPs working within this specialist field need to closely follow legal updates and licensing issues.

Other avenues of potentially controversial prescribing clearly need to be discussed within the paediatric NMP’s multi-disciplinary teams, and it would be inadvisable for the paediatric NMP to prescribe wholly autonomously in such situations. This could be relevant in children and young people identifying as transgender, requiring gonadotrophin releasing hormone (GnRH) analogue therapy for pubertal suppression (Carmichael, Butler et al. 2020): this practice has been heavily criticised recently, although recent data has shown that the prescribing of GnRH analogue therapy was not associated with an increase in the prescribing of cross sex hormones (Nos, Klein et al. 2022). The prescribing of GnRH analogues is, however, frequently prescribed for children with central precocious puberty (Eugster 2019). Paediatric NMPs working within transgender care, and even in the field of paediatric endocrinology, again must work closely within their multi-disciplinary team.

**Scope of practice**

It is clear that any NMP must prescribe within their scope of practice. Regular audit of prescribing practice can provide insight into the appropriateness of prescribing practice (McHugh, Hughes et al. 2020), as well as also providing encouragement to maintain accuracy of prescriptions. An emphasis on CPD is also necessary: local NMP forums, or study days run by Trusts or universities can prove to be invaluable to share knowledge, skills and experiences, between the novice and more proficient NMP, as well as undertaking clinical supervision (Tatterton 2017). Nevertheless, local policy must always be explored, especially if the NMP changes jobs. This can be especially pertinent if linked to off licence medication use, as there can be the potential for multiple, inconsistent resources: for example, different neonatal units are known to have different prescribing manuals (Conn, Kearney et al. 2019).

**Prescribing confidence**

Acting within one’s scope of practice, and support with clinical supervision, alongside regular CPD will increase the NMP’s confidence in prescribing. This does increase with practice (Scrafton, McKinnon et al. 2012), but at times, lack of confidence has been cited as a barrier: the scope of practice amongst children and young people can be diverse, depending on age and morbidity (Tatterton 2017), so it is clear that in order to reduce potential anxieties, NMPs must keep up to date with advances in drug development and licencing aspects (Weglicki, Reynolds et al. 2015).

**Education**

Resources for paediatric NMPs need to be clear: whilst an interprofessional approach to medication prescribing and education is seen as the way forward (Stewart, Purdy et al. 2010), taught education course for paediatric healthcare professionals are limited, until a recent paediatric specific NMP module had been designed (Khan 2019). This is in contrast to views from 2007, which argued that only generic programmes should continue, and that there were no requirements for paediatric specific programmes (Bewley 2007). There are now higher levels of clinical practice amongst advanced nurse practitioners (ANPs) and advanced clinical practitioners (ACPs) (Woodman and Spencer 2023), and clearly the way forward is for more paediatric specific education (HEE 2017, RCPCH 2023).

**Covid-19 pandemic**

The Covid-19 pandemic interrupted paediatric NMP provision at London South Bank University (LSBU). This interruption, however, re-aligned the focus of education, with academics having to rapidly adjust curricula to not only reflect pandemic response practices, but also how to ensure safe learning experiences for the NMP student (Leaver, Stanley et al. 2022), many of whom were working in high risk clinical areas themselves. The impact of Covid-19 is having a lasting effect on lesson design, with learning outcomes being re-designed, forms of academic assessment being re-evaluated, and the inclusion of social media tools and advanced technological systems being incorporated within teaching (Lockee 2021).

Online learning and teaching does have it’s benefits, but also comes with challenges: feelings of isolation, lack of support and poor motivation have all been reported (Cao, Fang et al. 2020), although some students do prefer online teaching as it first in when working shifts, or around home commitments (Haslam 2021). For both the paediatric specific and generic NMP cohorts, LSBU provides a hybrid approach, offering both face to face and online teaching, and care is taken to engage the student with quizzes and more active participation, whilst appreciating that both on-site and remote teaching will be experienced differently (Raes 2021). More support is offered to the student, with both regular group and one-to-one tutorials. The ‘pandemic experience’ of isolation has reinforced the need for student support (Valiga 2021), and this remains ongoing.

**Childhood obesity**

Whilst obesity prevalence in Year 6 children in the UK (ages 10 / 11 years) decreased from 23.4% to 22.7% in 2022/2023 from 2021/2022 (NHS 2023) is encouraging, obesity levels are still not ideal. The impact of a national lockdown during the Covid-19 pandemic, with limits on leaving the house and playground closures, also led to a more sedentary lifestyle for children. Many short and long term health consequences can result from childhood obesity, such as endocrine conditions (type 2 diabetes, polycystic ovarian syndrome), respiratory conditions (obstructive sleep apnoea), coronary artery disease, and even some cancers (Jebeile, Kelly et al. 2022). However, medicines management in childhood obesity needs close consideration, even with or without the possible co-morbidities, which are commonly seen in newly commissioned ‘CEW’ clinics (Complications from Excess Weight) (Mears, Leadbetter et al. 2022).

Drug dosing in children with obesity provides prescribers with uncertainties, with a tendency to adapt the medication dose to the child’s actual weight, or possibly consider the ideal weight. However, aspects to consider are complex, and should include calculations of body surface area, the individual’s metabolic capacity, and drug characteristics, such as lipophilicity and hydrophilicity, which are important pharmacokinetic components (Gaeta, Conti et al. 2022).

As pharmacokinetics can be altered in obesity, particularly in distribution and clearance, paediatric NMPs should be vigilant on these aspects, and it is clear that further studies need to be undertaken to inform correct prescribing guidance. Antibiotic prescribing, for example, is common practice in children, and reviews highlight that obese children need to be included in clinical trials (Sampson, Cohen-Wolkowiez et al. 2013). Paracetamol is also commonly prescribed, particularly for children undergoing surgery, and accurate dosing is paramount in order to avoid hepatotoxicity (Minshull 2019), and clinical areas need to implement specific dosing guidelines to ensure safety, such as also recording the child’s height, to ascertain if weight centiles correspond with height centiles (Minshull 2019). It is therefore clear that the inclusion of a focus on prescribing for obese children needs to be incorporated into NMP educational programmes, and through CPD via regular clinical updates.

**Best practice insights**

Clearly, the focus should be on the education of future paediatric NMPs, and regular CPD for qualified paediatric NMPs. New standards for prescribing programmes have been put forward (NMC 2023), following the NMP student’s journey, including:

* Selection, admission and progression
* Curriculum
* Practice learning
* Supervision and assessment, and
* Qualification to be awarded (NMC 2023).

The paediatric specific NMP module at LSBU has developed a specific curriculum (Khan 2019), including a focus on neonates, legal aspects of prescribing for children and young people, principles of paediatric pharmacokinetics and pharmacodynamics, as well as child and adolescent mental health. Content provides the required balance between theory and practice, using the required range of learning and teaching strategies (NMC 2023), which have certainly progressed and developed since the Covid-19 pandemic. These still do involve lectures, but online resources and quizzes are encouraged, as well as flipped classroom techniques and blended learning (Omer, Veysey et al. 2022). Relationships are also formed and attended to between the academics and the DPPs, to ensure optimum student support, and to offer further guidance in practice if needed (Jarmain, Moreno-Chamorro et al. 2023).

Individual Trusts have their own policies and guidelines for NMPs, and some Trusts have implemented preceptorship programmes for new NMPs (Allen and Rayment 2022). This can involve further support to enable more confidence in the new NMP, a barrier which has already been discussed. NMP leads in clinical practice could potentially work with prescribing academics at local universities in order to work together in providing more confident and competent prescribing practitioners.

Interprofessional continuing education has been identified as a vital component of health care quality and safety (Regnier, Chappell et al. 2019), and the advent of a multi-professional framework for advanced clinical practice (HEE 2017) is ensuring that the core skills and capabilities of advanced clinical practitioners are enhancing the care for the ever changing needs of the population. NMP modules are also ensconced within ACP Master’s programmes, and whilst many universities in the UK offer child specific programmes, the NMP component is largely generic, which prompts the need for a change in the curriculum provided. Nevertheless, working and being educated alongside a variety of practitioners provides the NMP practitioner further opportunities of working with new colleagues, and promoting new ways of thinking (Henderson 2021). Collaborative working is highlighted in NMP education (Graham-Clarke, Rushton et al. 2022), although implementing a paediatric specific module has been shown to be popular and successful.

**Conclusion**

The way forward in evaluating paediatric NMPs need to be audited and supported through clinical preceptorship programmes, regular clinical updates, clinical supervision, active involvement in local NMP / drugs and therapeutics committees, and continuous professional development. Any barriers and challenges need to be identified early, including not only organisational and human factors, but also challenges related to the specific child or young person. Paediatric prescribing is challenging, and some aspects have been considered here which are not relevant to generic prescribers, which need to be considered closely in order to provide safe and efficient prescribing practice.

**References**

Allen, S. and S. Rayment (2022). "How preceptorships can benefit nurse prescribers." Cancer Nursing Practice **21**(5): 12 - 13.

Ben-Zeev, B. (2020). "Medical Cannabis for Intractable Epilepsy in Childhood: A Review." Rambam Maimonides Med J **11**(1).

Bewley, T. (2007). "Preparation for non medical prescribing: a review." Paediatric Nursing **19**(5): 23 - 26.

Cao, W., Z. Fang, G. Hou, M. Han, X. Xu, J. Dong and J. Zheng (2020). "The psychological impact of the COVID-19 epidemic on college students in China." Psychiatry Res **287**: 112934.

Carmichael, P., G. Butler, U. Masic, T. J. Cole, B. L. De Stavola, S. Davidson, E. M. Skageberg, S. Khadr and R. Viner (2020). "Short-term outcomes of pubertal suppression in a selected cohort of 12 to 15 year old young people with persistent gender dysphoria in the UK."

Conn, R., A. Fox, A. Carrington, T. Dornan and M. Lloyd (2021). "Prescribing errors in children - why they happen and how to prevent them " The Pharmaceutical Journal: 1 - 24.

Conn, R. L., O. Kearney, M. P. Tully, M. D. Shields and T. Dornan (2019). "What causes prescribing errors in children? Scoping review." BMJ Open **9**(8).

Cornock, M. (2018). "Victoria Gillick, consent and the rights of the child." Nursing Children and Young Peopla **30**(4): 18.

Davies, K. (2023). "B - BNFc (A - Z of Prescribing Practice)." Journal of Prescribing Practice **5**(10): 418 - 419.

Eggleton, A. (2017). "Safe prescribing for children." Nurse Prescribing **15**(1): 13 - 15.

Eugster, E. A. (2019). "Treatment of Central Precocious Puberty." J Endocr Soc **3**(5): 965-972.

Gaeta, F., V. Conti, A. Pepe, P. Vajro, A. Filippelli and C. Mandato (2022). "Drug dosing in children with obesity: a narrative updated review." Ital J Pediatr **48**(1): 168.

GOSH (2020). The use of cannabis-based medicinal products to treat epilepsy, Great Ormond Street Hospital for Children.

Graham-Clarke, E., A. Rushton and J. Marriott (2022). "Exploring the barriers and facilitators to non-medical prescribing experienced by pharmacists and physiotherapists, using focus groups." BMC Health Serv Res **22**(1): 223.

Graham-Clarke, E., A. Rushton, T. Noblet and J. Marriott (2018). "Facilitators and barriers to non-medical prescribing - A systematic review and thematic synthesis." PLoS One **13**(4): e0196471.

Griffith, R. (2015). "Consent: the scope of parental responsibility." British Journal of Cardiac Nursing **10**(9): 460 - 461.

Haslam, M. B. (2021). "What might COVID-19 have taught us about the delivery of Nurse Education, in a post-COVID-19 world?" Nurse Educ Today **97**: 104707.

HEE (2017). Multi-professional framework for advanced clinical practice in England, NHS**:** 1 - 23.

Henderson, C. (2021). "Advanced practice education and development." Practice Nursing **32**(11): 443 - 448.

HMSO (1971). Misuse of Drugs Act.

Houghton, J. (2006). "Understanding the biological differences between adults and children." Nurse Prescribing **4**(2): 54 - 59.

Jarmain, S., D. Moreno-Chamorro and C. Piggin (2023). "The role of the designated prescribing supervisor: an evaluation." Journal of Prescribing Practice **5**(2): 68 - 76.

Jebeile, H., A. S. Kelly, G. O'Malley and L. A. Baur (2022). "Obesity in children and adolescents: epidemiology, causes, assessment, and management." Lancet Diabetes Endocrinol **10**(5): 351-365.

Khan, F. (2019). Developing a pharmacology module for the paediatric non medical prescribing course.

Leaver, C. A., J. M. Stanley and T. Goodwin Veenema (2022). "Impact of the COVID-19 Pandemic on the Future of Nursing Education." Acad Med **97**(3S): S82-S89.

Lockee, B. B. (2021). "Online education in the post-COVID era." Nature Electronics **4**(1): 5-6.

McHugh, A., M. Hughes, A. Higgins, T. Buckley, A. Cashin, M. Casey and D. Rohde (2020). "Non medical prescribers: prescribing within practice." Journal of Prescribing Practice **2**(2): 68 - 77.

Mears, R., S. Leadbetter, T. Candler, H. Sutton, D. Sharp and J. P. H. Shield (2022). "Cross-sectional survey of child weight management service provision by acute NHS trusts across England in 2020/2021." BMJ Open **12**(11): e061971.

Minshull, K. (2019). "Overcoming the challenges of prescribing paracetamol in the overweight paediatric population." Journal of Prescribing Practice **1**(1): 38 - 42.

NHS (2023). National Child Measurement Programme, England, 2022\_23 School Year, NHS.

NMC (2023). Standards for education and training, Part 3: Standards for Prescribing Programmes. London, Nursing Midwifery Council.

Noblet, T., J. Marriott, E. Graham-Clarke and A. Rushton (2017). "Barriers to and facilitators of independent non-medical prescribing in clinical practice: a mixed-methods systematic review." J Physiother **63**(4): 221-234.

Nos, A. L., D. A. Klein, T. A. Adirim, N. A. Schvey, E. Hisle-Gorman, A. Susi and C. M. Roberts (2022). "Association of Gonadotropin-Releasing Hormone Analogue Use With Subsequent Use of Gender-Affirming Hormones Among Transgender Adolescents." JAMA Netw Open **5**(11): e2239758.

Omer, U., M. Veysey, P. Crampton and G. Finn (2022). "Educating non-medical prescribers in the UK - perspectives of programme leads." Journal of Prescribing Practice **4**(6): 256 - 264.

Raes, A. (2021). "Exploring Student and Teacher Experiences in Hybrid Learning Environments: Does Presence Matter?" Postdigital Science and Education **4**(1): 138-159.

RCPCH (2019). Winter pressures in children’s emergency care settings - position statement, RCPCH.

RCPCH (2020). Medical cannabis for children and young people - briefing, RCPCH.

RCPCH (2023). Advanced Practitioner (AP) paediatric curricular framework - in development, RCPCH.

RCPCH (2023). The use of unlicensed medicines or licensed medicines for unlicensed applications in paediatric practice. NPPG.

Regnier, K., K. Chappell and D. V. Travlos (2019). "The role and rise of interprofessional continuing education." Journal of Medical Regulation **105**(3): 6 - 13.

Robertson, D. (2018). "Prescribing for Children." Nurse Prescribing **16**(7): 341 - 344.

RPS (2021). A competency framework for all prescribers. London, Royal Pharmaceutical Society.

Sampson, M., M. Cohen-Wolkowiez, D. Benjamin, Jr., E. Capparelli and K. Watt (2013). "Pharmacokinetics of Antimicrobials in Obese Children." GaBI J **2**(2): 76-81.

Schrier, L., A. Hadjipanayis, T. Stiris, R. I. Ross-Russell, A. Valiulis, M. A. Turner, W. Zhao, P. De Cock, S. N. de Wildt, K. Allegaert and J. van den Anker (2020). "Off-label use of medicines in neonates, infants, children, and adolescents: a joint policy statement by the European Academy of Paediatrics and the European society for Developmental Perinatal and Pediatric Pharmacology." Eur J Pediatr **179**(5): 839-847.

Scrafton, J., J. McKinnon and R. Kane (2012). "Exploring nurses' experiences of prescribing in secondary care: informing future education and practice." J Clin Nurs **21**(13-14): 2044-2053.

Stewart, M., J. Purdy, N. Kennedy and A. Burns (2010). "An interprofessional approach to improving paediatric medication safety." BMC Medical Education **10**(19): 1 - 7.

Sutherland, A., D. M. Ashcroft and D. L. Phipps (2019). "Exploring the human factors of prescribing errors in paediatric intensive care units." Arch Dis Child **104**(6): 588-595.

Tatterton, M. J. (2017). "Independent non-medical prescribing in children’s hospices in the UK: a practice snapshot." International Journal of Palliative Nursing **23**(8): 386 - 392.

Valiga, T. M. (2021). "Postpandemic Nursing Education: Moving Forward With New Ideas." J Nurs Educ **60**(12): 680-685.

Weglicki, R. S., J. Reynolds and P. H. Rivers (2015). "Continuing professional development needs of nursing and allied health professionals with responsibility for prescribing." Nurse Educ Today **35**(1): 227-231.

Woodman, H. and S. Spencer (2023). "Advanced clinical practice in paediatric haematology and oncology: developing a capability document." Nurs Child Young People **35**(1): 27-33.

Zafar, R., A. Schlag, L. Phillips and D. J. Nutt (2021). "Medical cannabis for severe treatment resistant epilepsy in children: a case-series of 10 patients." BMJ Paediatrics Open **5**(1).