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A Prescribing Implementation Framework (PIF) for non-medical prescribing: A review of systematic reviews

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Abstract

Background

Non-medical prescribing is increasingly used to support workforce shortages that challenge global access to healthcare. Limited theoretical guidance exists on how to successfully undertake its implementation. This systematic review of reviews was used to i) identify determinants to implementation of non-medical prescribing and ii) develop a framework of factors that influence successful non-medical prescribing implementation

Methods: Inclusion criteria were reviews reporting barriers and facilitators to non-medical prescribing. Six electronic databases were searched January 2010- May 2024 with results recorded using Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). Informed by principles of meta

ethnography, data from included reviews were extracted and synthesised following a structured approach. Themes were mapped to four stages of implementation: preparation; training; transition and sustainment. Consideration was given as to whether they operated at the micro, meso or macro level. An overarching determinant for each theme was identified and used to populate the '**Prescribing Implementation Framework**'.

Results: Nineteen reviews fulfilled the inclusion criteria, 7 focussed on independent prescribing and 12 independent and or supplementary prescribing reporting that non-medical prescribing is largely acceptable to both service users and healthcare professionals. The Prescribing Implementation Framework comprises 13 determinants of effective implementation, 7 of which are located in the preparation phase. Thirty six out of 72 identified macro, meso or micro level factors were in the preparation phase, 11 training, 15 transition and 11 sustainment.

Conclusion

There is pressing need to advance understanding of non-medical prescribing implementation by developing theoretically informed guidance to support the planning, execution and sustainability of its implementation globally. Our resultant multi-professional, systems-wide conceptual **Prescribing Implementation Framework** (PIF) emphasises the dynamic nature of determinants, change over time, and importance of interdependence. The newly develop PIF can help guide organisations with preliminary capacity/needs assessment, identify potential 'pinch points' and assist in formative evaluations of non-medical prescribing processes and outcomes to help enhance implementation in this area.

PROSPERO registration number: CRD42024593690

Key words

Non-medical prescribing, Prescribing Implementation Framework, healthcare services research, healthcare implementation, healthcare policy, healthcare workforce

Background

Severe workforce shortages, population growth and ageing are challenging global access to healthcare and ability to deliver the 4.5 trillion doses of medicines required by the world population each year¹⁻³. A worldwide deficit of 18 million health workers and inadequacies with traditional doctor/physician-led care systems mean new approaches are imperative to ensure service sustainability and ensure patient access to prescription medicines⁴, including the nearly 2 billion people globally who have no access to medicines⁵. Extending prescribing rights to health professionals who are not medical doctors, e.g. nurses, midwives, pharmacists, therapeutic radiographers, paramedics, podiatrists, physiotherapists, dietitians, and optometrists, commonly known as non-medical prescribing (NMP), is one such strategy⁶⁻¹⁰.

Eligibility for NMP training and the level of autonomy and scope of prescribing practice is dictated by country specific legislation¹¹⁻¹³, resulting in diverse models^{14, 15}, subject to further variation at state/provincial level in some countries i.e. Canada, United States (US), and Australia¹⁶⁻¹⁸. Three main forms of NMP are broadly discernible (Table 1): independent, supplementary/dependent and collaborative prescribing¹⁹. Affording the highest level of autonomy, independent prescribing allows practitioners to make prescribing decisions without medical input. In contrast, supplementary/dependent prescribing requires initial diagnosis by a doctor and an agreed patient-centred clinical management plan detailing medicines that can be prescribed^{14, 17, 20}, and collaborative prescribing, a protocolised model of NMP, requires initial and on-going physician diagnostic and treatment management decisional input^{19, 21}.

In Canada, Australia, New Zealand, Ireland, Sweden, Spain and the Netherlands NMP is exclusive to the nursing and/or pharmacy professions^{13, 14, 16, 22-24}. However, in the United Kingdom (UK), where legislation is most extensive, nurses, midwives, pharmacists, optometrists, physiotherapists, podiatrists, therapeutic and diagnostic radiographers, dietitians and paramedics all have the right to prescribe medicines using independent and/or supplementary forms²⁵⁻²⁷. While the size of the global NMP population is unclear, recent data suggests that the contribution of NMPs to overall demand for prescribed medicines in different countries is rising^{12, 28-30}, with an increasing number of countries including those of low-resource (e.g., Iran, Jordan, Iraq, Vietnam), in the early consultative stages of implementation^{12, 20, 23, 31-40}. Suggesting the UK is the forerunner in NMP development⁴¹, currently more than 120,000, approximately 10% of the eligible workforce hold NMP qualification⁴². NMPs work across a range of care sectors and clinical specialties including primary, community and secondary care, mental health as well as in private practice⁴³⁻⁴⁷.

NMP is safe, clinically appropriate^{41, 48, 49}, produces equivalent or more favourable clinical outcomes when compared to physician prescribing⁵⁰, promotes the development of new service pathways and is highly acceptable to stakeholders and service users^{51, 52}. It may also have an important role in helping to address global health inequalities by streamlining medicines in underserved and rural populations as well as optimising workforce skills for universal health care coverage^{1, 53-57}. It is important however, that as a complex innovation requiring political, legislative, organisational and provider level change, NMP is implemented successfully and sustainably⁵⁸⁻⁶². Implementation can be defined as the process of putting to use or integrating an innovation within a setting⁶³, and is regarded as a series of stages/phases along a continuum^{63, 64}, in which formal and informal processes actively support the innovation and its practice change⁶⁵. Although in practice rarely linear, the continuum is conceptualised to include pre-implementation (exploration, adoption, preparation) implementation and sustainment phases⁶⁶⁻⁶⁸.

Successful implementation requires understanding of how organizations and systems adopt, spread, implement and sustain innovations over time^{69, 70}. To date however, NMP research has conceptualised and evaluated implementation based upon whether it is achieving policy objectives for enhancing patient/service medicines access. Proxy measures have predominantly included clinical and/or service outcomes such as prescribing (in)activity, practitioner skills/activities, economic savings, adoption rates and service developments^{43, 45, 46, 50, 71-74}. With the field of implementation at a limited level of advancement in NMP, there is no agreed minimum dataset of NMP outcomes by which to either conceptualise or measure successful implementation. Accordingly, literature has focused heavily on contextual determinants and omitting any theoretical underpinning has not advanced understanding of how to develop strategies to mitigate against barriers nor ensure integrated sustainable NMP⁷⁵. Additionally, adopting generic underpinning determinant theory e.g. Consolidated Framework for Implementation Research' (CFIR), and 'Theoretical Domains Framework' (TDF)⁷⁶⁻⁷⁹ may prevent empirical capture of the full complexity of NMP implementation. There is pressing need to advance understanding of implementation within NMP by developing theoretically informed guidance to support the planning, execution and sustainability of NMP implementation globally.

A systematic review of reviews, or 'meta review', was selected as an appropriate method to comprehensively consolidate and extend the scope of extant knowledge on NMP implementation⁸⁰. The method comprised of a) identifying and synthesising contextual determinants that influence organisational ability to implement NMP and b) mapping these determinants to develop a new framework for NMP implementation for healthcare professionals, managers and policy makers.

Aim: was to identify determinants to implementation of NMP in order to develop a framework of factors that influence successful NMP implementation, the Prescribing Implementation Framework (PIF).

Objectives

1. To review international literature on barriers and facilitators to NMP implementation
2. To identify determinants of successful implementation
3. Develop the Prescribing Implementation Framework (PIF)

Methods

A review of systematic reviews was conducted on the topic of barriers and facilitators to non-medical prescribing, registered with PROSPERO (no. CRD42024593690) following Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (additional file 1)^{81 82} and reporting (Supplemental file 1).

Definition of terms

1. *Barriers:* any type of obstacle (material or immaterial) which can impede the adoption, implementation and/or sustainability of non-medical prescribing^{83, 84}
2. *Facilitators:* any type of element (material or immaterial) which can enhance implementation or help overcome barriers to adoption, implementation and/or sustainability of non-medical prescribing^{83, 84}

Methods for conducting an overview of reviews, as stated in the Cochrane handbook⁸⁵, were not fully appropriate to this review as they are designed to summarise current evidence relating to intervention studies. As barriers and facilitators are primarily derived from a combination of qualitative, mixed methods or survey research, the review process drew upon principles of reporting and synthesis practices applied in barriers and facilitators reviews⁸⁶, and thematic synthesis⁸⁷, while following a structured approach as outlined by Joanna Briggs Institute (JBI) for conducting a systematic review of systematic reviews^{88, 89}.

This blended approach, using a systematic search strategy followed by methods of qualitative synthesis (see Lau et al 2016 for an example of a similar approach)⁹⁰ enabled findings from a number of reviews to be brought together to form a single comprehensive overview which then informed the development of the **Prescribing Implementation Framework (PIF)**.

Search strategy

A comprehensive search of MEDLINE, CINAHL, EMBASE, Cochrane Database of Systematic Reviews, ProQuest and British Nursing Index databases, supplemented with handsearching of relevant citations

was conducted to identify systematic reviews from any country, published in English language between January 2010-May2024.

Systematic Reviews of any methodological design were eligible for inclusion if they met criteria shown in Table 2 and included data on barriers and facilitators to the adoption or use of prescribing by nurses, midwives, pharmacists or the allied health professions. Search strings (additional file 1) included keywords to cover forms of prescribing (such as non-medical prescribe*), a range of professions (such as: nurs*, pharmacist*) plus a range of review methods (e.g., meta-synthesis, meta-analysis), with use of wild cards and Boolean (AND/OR) terms⁹¹. Retrieved citations were downloaded to EndNote V.X9 software and duplicates removed.

Study selection, screening, and eligibility

The total number of papers identified was 4,091, using MEDLINE (n = 1,066), CINAHL (n = 622), EMBASE (n = 1,265), British Nursing Index (n = 639), Nursing & Allied Health (n = 481), Cochrane (n=12) and citation searching (n=6). Two reviewers independently assessed titles and abstracts for eligibility in relation to the inclusion criteria shown in Table 2. After duplicate removal (n = 1,104), and exclusion of articles by title (n = 2,784) and abstract (n = 137), 66 full text articles were reviewed independently by the full author team for relevance. A further 46 were excluded for reasons shown in PRISMA Figure 1, leaving 19 full text articles eligible for inclusion. All reviewers confirmed the eligibility of the identified reviews. Disagreements were resolved by reviewing and discussing the full text within the author team.

Data extraction

Data extraction was conducted by four team members using a bespoke data extraction form to capture details about aims, study design, number of papers included, time frame, and participant characteristics (i.e., NMP profession)⁹². Data was also captured which would inform the review questions, this included information on model of prescribing used (independent and/or supplementary), care setting, and barriers and facilitators to NMP implementation (see Table 3). Given the lack of agreed definition of success, a pragmatic approach to evidence of effectiveness was taken based on authors own evaluation and reporting of barriers and facilitators with review articles. Data was also extracted on publication dates of research article, and dates of data collection included in the systematic reviews in order to develop understanding of the context and development of NMP.

Data quality

A validated quality assessment tool (A MeaSurement Tool to Assess systematic reviews, AMSTAR) was used to assess quality of the included reviews⁹³. The AMSTAR comprises of 11 elements, covering aspects such as a 'piori' research design, data extraction and assessment of scientific quality of the included

studies. Each element is rated on a scale of 0 – no evidence, to 1 – evidence provided, with clear reasons for each score⁹⁴. Each of the reviews were independently appraised by two members of author team; any disagreement in the scores was resolved through discussion (see additional file 2).

The approach to synthesis outlined by Thomas and Harden⁸⁷ draws upon principles of meta ethnography in that it follows an iterative and interpretative process to develop analytic themes. Phase one of the analysis followed the three-step process developed by Thomas and Harden⁸⁷ for undertaking a synthesis of qualitative findings. The results sections of the included reviews (including any direct quotations) were subject to line-by-line coding using Nvivo 11 (step 1), from which descriptive themes of barriers and facilitators were identified (step 2). These were further synthesised into analytic themes (step 3) (such as role clarity and leadership) whose presence or absence can act as barriers or facilitators to implementation of NMP.

Here our methods depart from Thomas and Harden as a second phase of interpretative analysis was undertaken: broadly informed by the Diffusion of Innovations theory⁹⁵ and CIFR^{78, 79}, which provided theoretical anchors for identifying contextual factors likely to influence implementation themes were mapped against four key stages of implementation of non-medical prescribing: I) *preparation*; II) *training*; III) *transition* and IV) *sustainment and development*⁹⁶ (see table 4). Themes were non-weighted and positioned at the stage where, based on author team extensive research experience in this area, it was felt they had most prominence and influence. Consideration was also given as to whether the barriers and facilitators operated at the micro (individual), meso (organisational or macro (national) level^{97, 98}. Each member of the team was allocated a single stage of implementation to analyse before meeting to discuss findings and amend the overall analysis.

The final phase in the synthesis was based on Thomas and Harden's development of implications for practice from the analytical themes. For each theme, an overarching determinant was identified that encapsulated the necessary components for successful implementation of non-medical prescribing. Analysis was accomplished through team discussion and reflection upon the stage and level (meso, macro, micro) at which the barriers would best be resolved. The agreed determinants were used to populate the different stages into the **Prescribing Implementation Framework**. Determinants are defined as factors that influence implementation and may function either as barriers, which impede implementation or facilitators, which enable or promote implementation⁹⁹.

Results

Characteristics of included reviews

All 19 reviews reported aspects of barriers and facilitators of non-medical prescribing, with this being the primary research aim for four studies^{96, 100-102}. Independent prescribing was the focus of seven reviews^{96, 100-105}, with 12 exploring independent and/or supplementary prescribing. Six reviews focussed on primary care, four primary and secondary care, one each secondary, and tertiary care and primary secondary and community: the rest included studies from non-specified care settings (n=5) or any healthcare setting (n=2). Please see Table 3.

Twelve reviews (63%) were undertaken in the UK, 4 (21%) Australia, and one each in Brazil, Sweden and the US (15%). Of the 297 original articles, 79 were included in more than one review: 47 were referenced in two reviews, 14 in three reviews, 8 in four reviews, two in five reviews, three in six reviews and two in seven reviews. The number of original studies included in reviews ranged from 3-65. Ten (53%) reviews^{96, 100-102, 106-111} reported details on primary study participants including prescribers (nurses, pharmacists, midwives, physiotherapists, and non-specified healthcare professionals), non-prescribers (nurses, pharmacists, pharmacist students, trainee nurse independent prescribers, physiotherapists, midwives, dietitian), doctors, NMP leads, higher education institute (HEI) course leads, managers/ senior leaders, key informants, administrative staff, care home workers, patients, carers (see additional file 3). Of the 43,514 participants described in reviews reporting data from primary studies, 5,708 were reported in more than one review, resulting in a total sample size of 37,806 (see additional file 4).

Included reviews were published between 2016 and 2024. An analysis of the date range of included studies revealed a total of 297 original articles published from 1988-2023, with over half (n=198, 66.7%) published pre-2014. Period of data collection was missing from 85 (28.6%) original studies. Ten reviews were international, with primary studies mainly undertaken in developed countries including the UK (n=10), US (n=7), Australia (n=6), Canada (n=5), Ireland & New Zealand (n=3 each), Nigeria & Sweden (n=2 each) and Botswana, Finland, Netherlands, India, Spain, Zimbabwe, and South Africa (n=1 each). Seven focused on the UK^{96, 100, 103, 105, 106, 112, 113}, the US (n=1)¹⁰⁷ or Australia (n=1)¹¹⁴. Three reviews included only qualitative papers, 6 included quantitative, qualitative and mixed methods studies, 6 both quantitative and qualitative, two qualitative and mixed methods, with one qualitative review including discussion papers.

Methodological quality of included reviews

The level of methodological quality, assessed using eight components of AMSTAR⁹³ varied across reviews (range= 1-6), with eight reviews scoring > 50% (additional file 2). Eleven reviews (58%) reported the use of a statement that the theory review methods were established prior to the conduct of the review, and the process for duplicate study selection and data extraction. A comprehensive literature search was

performed in 17 (89%) reviews. An overview of included and excluded studies was adequately reported in all reviews (n=19, 100%), with 15 (79%) providing details of the study characteristics. Thirteen (68%) reviews critically appraised the scientific quality of included studies, with the scientific quality of studies being appropriately used in four (21%) of reviews. All reviews were included in the synthesis regardless of the outcomes of the individual quality assessments. This was done with in line with contemporary thinking which advises applying scores to domains and calculating total quality scores should not be used, as not all domains of quality are equal; scores therefore are not useful, may give a false sense of precision and hence not methodologically defensible ¹¹⁵.

Thematic synthesis findings

NMP is largely acceptable to both service users and healthcare professionals ^{96, 100-102, 106-108, 110-112}.

There is ongoing consensus regarding barriers and facilitators to implementation which have been mapped across four phases: i) preparation, ii) training; iii) transition and iii) sustainment. Although the barriers and facilitators were found to be interlinked and could arise in more than one phase, to avoid duplication and support interpretation these were mapped to reflect the highest level of alignment (Table 4).

Theme i) Preparation

International/national level influences

With international variation in legislative frameworks and regulatory body approval, inconsistent funding associated with changes in government was reported to affect availability of national level funding to support NMP training ^{102, 116}. Lack of costs considerations (e.g., insurance reimbursements), regional/state variation in subsidised formularies ^{101, 107, 114} and lack of secured funding was felt to limit the potential that NMP had to support equity in healthcare access ^{101, 107, 114, 117}, optimising the workforce ^{96, 109, 110, 116} and or creating the supportive climate that underpins successful implementation ^{109, 110}.

Leadership and management

Strong pro-NMP leadership facilitated the development of NMP within an organisation ^{102, 118}. A lack of strategic vision for NMP ^{96, 102, 112, 116, 117} hampered innovative NMP-led service development and resulted in a lack of organisational preparation ^{96, 101, 110, 117}. Support from doctors and multi-disciplinary teams (MDTs) was crucial to facilitating NMP uptake from pre-training through to implementation in practice ^{96, 101, 106-111, 113, 114, 117, 118}. Formal support mechanisms, including supervision and feedback on NMP practice, were viewed as helpful ^{104, 106}. NMP uptake was regularly reported to be hampered by a lack of management and multi-disciplinary team support ^{96, 101, 103, 106-108, 110, 116-118}, regular clinical supervision ^{101,}

¹⁰⁶, and or mentoring ^{101, 108, 110, 114}. It was important therefore that stakeholders had positive attitudes towards NMP and recognised the benefits associated with the prescribing role ^{96, 101, 102, 106-109, 116, 117}.

NMP leads in the UK were reported to have an influential role in supporting organisations and individuals to overcome barriers in implementation ^{102, 116}. Despite this, concerns were reported regarding the restrictive nature of the legislative frameworks i.e., supplementary prescribing, and formulary limitations. For example, NHS trusts, who had their own drug formularies, continued to impose additional constraints on medicines that could be prescribed ^{100, 102, 112, 118}. These formularies required updating and regular review to ensure they were fit for purpose for NMP use ^{102, 106}. Some trusts required individual prescribers to have a personal formulary, i.e., an agreed list of medicines that they could prescribe^{96, 100, 118}. While it was recognised that this could be useful in defining scope of practice, it could act as a barrier if too restrictive and time consuming to adapt when NMPs want to expand their prescribing remit ¹⁰².

Organisational readiness

Organisations who had established appropriate governance and infrastructure i.e., local NMP policies and approved protocols were well placed to support timely implementation of the NMP role ^{96, 100, 102, 104, 106, 112, 113, 116, 118}. Implementation challenges occurred when governance arrangements were lacking, underdeveloped or overly restrictive ^{96, 100, 102, 105, 111, 114, 116, 118} including poor communication network/access to medical support in community pharmacy^{100, 103, 109} and a lack of support for monitoring and clinical audit ^{96, 102, 116}. Additional difficulties were experienced when there was a lack of clarity over liability and insurance cover ^{101, 102, 107, 111, 114}, and restrictive local formularies that were used as a cost saving measure ^{96, 100, 108, 114}.

Role clarity

A lack of clarity and ambiguity about the prescribing role, particularly regarding professional and legal boundaries ^{96, 100-102, 105, 106, 116-118}, resulted in a lack of recognition and understanding about potential NMP benefits ^{96, 109, 117, 118}. Role dissonance manifesting as a lack of acceptance, opposition, resistance, and professional rivalry from doctors^{96, 100-102, 104-111, 113, 116, 118}, and pharmacists ¹¹⁰ was prevalent.

A pre-emptive approach where new NMP roles and scope of practice were discussed and clarified with key stakeholders (e.g. General Practitioners (GPs), clinicians, nurses, patients) in advance was reported to be key to overcoming challenges ^{96, 106, 116, 118}. Similarly, demonstration of benefits and need for NMP, along with doctors' involvement in NMP training facilitated clinician and manager support leading to increased acceptance of the prescribing role^{96, 102, 106, 109, 116}.

Practitioner readiness

Practitioner readiness for the prescribing role was affected by pre-registration education^{96, 100, 103, 104, 108}, practice experience^{96, 106, 109} and completion of specialist training^{96, 103, 105, 106, 109, 116} prior to undertaking NMP training. This “degree of readiness” affected people’s ability to deal with the challenges associated with NMP, confidence to deal with complex cases^{96, 100, 103, 104, 108, 118} and ultimately the scope with which the role was implemented in practice.

A proactive approach, by individuals and organisations alike, helped ensure an agreed scope of practice with key stakeholders (e.g., GPs, clinicians, nurses, patients) prior to course commencement^{96, 101, 106, 118}. Identification of appropriate candidates^{96, 100, 103}, who were aware of course commitments^{96, 100, 117} and had established a case of clinical need^{96, 102} prior to commencing NMP training was key to ensuring success.

Individuals’ ability to optimise their state of prescribing “readiness” was impacted when they experienced shortfalls in funding to support pre-training e.g. pharmacology and numeracy^{96, 102, 103, 111, 112, 118} and a lack of backfill while undertaking pre-course requisites^{96, 100, 102, 109, 116}. Similar negative effects were reported when practitioners were unable to access regular clinical supervision^{96, 110} and or mentor support¹⁰⁶.

Motivation

Motivation to undertake NMP training was largely driven by individual drive and enthusiasm^{109, 110} associated with a desire for increased autonomy^{96, 100, 102, 105, 118} and improved care quality^{107, 116} and job satisfaction^{96, 100, 102, 105-110, 116, 118} related to the prescribing role. Improving pharmacological knowledge was reported to expand practitioners’ level of clinical competence^{103, 118}.

There was however a lack of willingness by some to accept and undertake the additional training and support required prior to undertaking NMP which later hampered success. The time and cost related to completing pre-course requisites^{96, 102}, combined with a lack of funding available for training^{96, 100, 102} acted as a deterrent for some. Concerns were also raised about the added responsibility that came with prescribing^{96, 103, 105, 107, 110, 116, 117} together with a lack of financial remuneration^{96, 101, 102, 104, 107, 108, 116-118}.

ii) Training

NMP education and role preparation

NMP education was recognised to legitimise current practice¹⁰⁹, and support learning in practice^{101, 103, 106, 118}. In the UK, the prescribing programme was reported to be challenging in terms of time and course commitments^{96, 100, 110, 116}. Feedback on course content highlighted concerns related to its generic nature^{96, 102, 103, 106, 110, 116, 118} and variation in content¹⁰⁶. It was largely considered that the pharmacology content did not adequately compensate for the lack of grounding in pharmacology and bioscience at

undergraduate level, particularly for nurses and physiotherapists^{96, 102, 103, 111, 112, 118}. Other concerns related to level of physical assessment and diagnostic skills training^{96, 103, 106, 107, 109, 110, 112, 116} and numeracy currency¹⁰³.

Learning was facilitated through interprofessional opportunities and networking that arose from the multi-professional adopted by university course providers^{96, 102}. Taught aspects of the course benefited from adopting a multidimensional approach¹⁰³: pedagogical methods, such as podcasts and virtual patients for example, facilitated history taking and developed diagnostic skills with further opportunities to consolidate learning afforded through the period of supervised practice¹⁰³.

Support and supervision during training

Ongoing concerns were raised regarding the challenges associated with identifying an appropriate person to act as a designated medical prescriber (DMP), which either delayed or prevented candidates from undertaking the training^{96, 102, 103}. Once on the course, peer and professional support were reported to be often lacking^{96, 100, 116}; with DMP supervision reported to be patchy and sometimes poor quality^{96, 111}.

iii) Transition

Delays to prescribing initiation

Delays in prescribing initiation were known to occur, particularly when it was the first NMP in the trust and the necessary infrastructure was not in place^{96, 101, 102, 108, 114}. NMP could only be implemented once Trust policy and ratification of NMP, for each profession, was in place^{96, 100, 118}. Implementation was streamlined by having an agreed scope of prescribing with the local Drugs and Therapeutic committee in advance^{96, 100-102, 105, 114, 117}. Delays occurred when arrangements regarding accessing a prescribing budget^{102, 117, 118}; prescription pads^{102, 110, 118} and or medical records^{100, 102, 104, 107, 109-113, 117}; were not in place. Practicalities, such as space and time to engage in prescribing also needed to be considered but were often overlooked^{102, 107-110, 117, 118}.

The experience of prescribing was key for developing expertise, competence, and capability^{96, 103, 113, 118}; NMPs who experienced a delay in putting their skills into practice and starting to prescribe resulted in a loss of confidence^{96, 100, 101, 103-105, 111-113}. Newly qualified NMPs reported being fearful of making mistakes^{96, 101, 103, 104, 110-112, 118}. The anxiety associated with making mistakes was linked with increased accountability^{96, 103, 105, 108, 116-118}, fear of liability^{96, 102, 109, 111}, and litigation, particularly with respect to the perceived lack of legal protection practitioners had when working as an NMP^{96, 102, 104, 112}.

Multi-disciplinary support

Transitioning to the prescribing role was commonly reported as a time of vulnerability when newly qualified NMPs needed to build confidence in prescribing^{96, 103, 104, 108, 110-113, 118}. At this time, continuing

support and supervision from MDTs, management, and peers, appeared to be crucial^{96, 100-103, 105, 108, 110, 113, 114, 116}, however this was sometimes lacking leading to feelings of isolation^{102, 103, 110}.

Newly qualified NMPs reported challenges establishing boundaries and expectations with colleagues and patients as to what they could prescribe^{96, 104, 112, 113}. This was further exacerbated by the high workload NMPs often had, which in turn was viewed as a risk factor when making difficult prescribing decisions^{100, 110, 118}. Having adequate consultation times supported the decision-making process^{96, 104, 105, 107, 108, 117}. However, this was often not possible due to time pressures experienced in busy clinics^{103, 113, 118}.

A team approach to prescribing with support and encouragement from management, MDT, and doctors built NMPs confidence^{96, 100-103, 107, 108, 110, 116, 117} and helped them to resist pressure from patients to prescribe^{104, 112, 113}. Peer support post-training^{96, 102-105, 108, 113}, including a buddy system and regular multidisciplinary continued professional development (CPD), was also found to have a positive impact on maintaining evidence-based practice¹⁰².

iv) Sustainment

Impact on healthcare

NMP helps address issues with workforce planning and helps cater for contingency and succession planning in health services^{100-102, 107, 117}. When this was inadequate however, sustainability and funding associated with prescribing roles were affected¹⁰¹. There was recognition that NMP has improved access to healthcare^{96, 100, 102, 105, 106, 108-111, 114, 116-118} with many reported benefits including improved quality of care^{100, 102, 105-111, 116-118}. Knowledge gained in the NMP course was also reported to be beneficial to wider practice^{96, 100}.

There were however issues with developing and maximising NMP roles. While NMPs who completed specialist training were found to prescribe more items, from a wider range of medications¹⁰³, expansion of prescribing into new areas of practice was restricted by limitations placed on personal formularies and scope of practice by organisations^{96, 102}, and hampered by lack of established processes, audit, to gather evidence on the cost effectiveness of NMP¹⁰².

Access to CPD

A lack of access to ongoing continuing professional development (CPD) to update and extend prescribing knowledge and remit was considered a barrier in the development and sustainability of NMP^{96, 100, 103, 105, 112, 118}. This included the ability to keep up to date with evidence-based practice, including pharmacology, as well as regular updates on prescribing policy¹⁰³. CPD that was offered to NMPs often

lacked structure, with some NMPs not being able to access formal CPD and others turning to colleagues and peers for support ^{96, 103, 108, 112}.

The Prescribing Implementation Framework

The Prescribing Implementation Framework (PIF) is made up of 13 determinants of effective implementation located within four phases: preparation, training, transition and sustainment (see table 4 & figure 2). The majority (7) of the determinants are located in the preparation phase as this is the phase during which most determinants (such as governance and organisational infrastructure) are best initiated. Of the 72 identified macro (n=17), meso (39) or micro (n=16) level factors that affect success/ impediment of NMP implementation 36 were found to occur in the preparation phase, 11 training, 15 transition and 10 sustainment (see table 4).

Discussion

This review of reviews is the first of its kind to map key barriers and facilitators that influence NMP during the four stages of implementation: 1) preparation, 2) training, 3) transition and 4) sustainment. NMP is an important international strategy for maximising workforce skills and streamlining medicines ^{12, 119, 120}. Despite numerous recommendations of the need to optimise its implementation since inception over three decades ago, this review has demonstrated that barriers have persisted over time, arising as issues for each new profession and country that embark on the prescribing journey. Facilitators for implementation such as leadership and organisational governance also remain consistent.

Using rigorous methodology, the resultant **Prescribing Implementation Framework (PIF)** represents an overarching conceptual framework that clarifies key phases for NMP implementation. Within each phase, we propose core themes along with constituent barriers and facilitators that need to be considered and reflected upon for effective implementation ^{121, 122}. Our identified 13 determinants of success reflect what 'good', 'desirable' or 'optimal' NMP implementation looks like. Derived from systematic reviews of UK and international primary studies, including a diverse range of relevant stakeholders, the framework is multi-disciplinary and multi-professional, thereby accessible and meaningful to countries who may wish to conduct or enhance NMP implementation¹²¹.

The **PIF** reiterates the importance of the '**preparation**' stage where; in keeping with former implementation endeavours introducing new roles, the bulk of determinants are required to be in place ¹²³⁻¹²⁶. Predominantly operating at the meso (organisational) level these include prerequisites for training, organisational governance procedures and infrastructure to support NMP. Although NMP does feature in countries without supporting legislation ^{12, 119, 120}, the '**preparation**' stage novelly highlights the

importance of political appetite for implementing underpinning international/national level policies. For example, formal legislative and regulatory frameworks to generate both the climate for NMP implementation and its subsequent scope ^{127, 128}. An aspect consistently reported as important across all stages is the leadership required to promote NMP, iron out misunderstandings and foster understanding and development of NMP roles within clinical teams.

Key aspects during **‘training’** included NMP education and role preparation that aligns to service/population needs along with robust support and supervision. During the **‘transition’** period to becoming an experienced prescriber, on-going access to support and a functional infrastructure to enable prescribing were key. Notable for its relative paucity of determinants addressing the national, regional or local longevity of NMP, the **PIF** highlights **‘sustainment’** as a gap in the evidence for NMP implementation. While adequate workforce planning and funding to sustain a pipeline of NMPs, along with evidence of NMP benefits and access to ongoing training/support were critical for promoting expansion and long-term development, our synthesis establishes a need to better define, clarify and understand what constitutes sustainability in NMP ¹²⁹.

Contemporary guidance such as the Nuffield Trust 2026 report¹³⁰ and the ICN Guidelines on Prescriptive Authority for Nurses 2021 report¹¹⁹ primarily address strategic-level implementation (policy, governance, education, regulation and workforce development), rather than providing an operational framework that is applicable to the implementation process in practice. In this systematic review of reviews, we have demonstrated the challenges associated with NMP implementation and its complexity both within and across professional groups and diverse care settings.

While generic determinant frameworks, such as the Consolidated Framework for Implementation Research (CFIR) and the Theoretical Domains Framework (TDF) ⁷⁶⁻⁷⁹, have standardised the conceptualisation and reporting of factors influencing implementation, their deductive application may overlook determinants specific to NMP. These frameworks were not developed to explain NMP implementation across diverse professions, healthcare systems and international contexts, and therefore an inductive review of reported barriers and facilitators was undertaken to develop an empirically informed, prescribing-specific implementation framework. This addresses the need for empirically informed guidance to support the planning, implementation and sustainability of NMP globally. In contrast to other frameworks informed by pre-existing theory such as the ‘Consolidated CFIR, and TDF’ ⁷⁶⁻⁷⁹, our conceptual PIF has however been developed using data collected from primary studies, and is stage based. Despite a differing methodological approach, our overarching themes align with several integral CFIR constructs. For example, *‘international/national level influences’* such as *‘variation in state and/or*

territory legislation for NMP align with the *'Policies and Laws'* CFIR construct, while *'Impact on Healthcare'* reflecting acceptability to service users and HCPs, mirror the CFIR constructs *'Innovation Deliverers'* and *'Innovation Recipients'*. However, the PIF has captured elements of implementation that are central to NMP, and which a more general framework may fail to sufficiently specify. For example, in the core theme *'NMP education and role preparation'*, determinants such as access to funding, skill pre-requisites, mentoring and supervisory requirements move beyond a strictly innovation focus, reflecting the organizational and system processes that are critical to support the training and preparation of practitioners for NMP¹³¹.

Importantly while it is recognised that barriers and facilitators are dynamic, likely to change over time, and are interdependent^{86, 122, 132, 133}, little consideration is given to this within the included reviews. Rather, as reported by Greenhalgh et al¹³⁴, factors are presented as discrete and static influences. In synthesising the **PIF** we have mapped determinants to the four stages of NMP implementation⁹⁶ based on their prominence and influence. Recognising that they are not static, nor exclusive to one particular stage, our series of **PIF** cog images represent the dynamic nature of the determinants to successful implementation. For example, a *'lack of strong NMP leadership within organisations including senior management support'* whilst highly influential to the *'preparation stage'* could also affect the subsequent stages of *'training'*, *'transition'* and *'sustainment'* (please see Figure 3, 1-4).

As a result of this review, we have highlighted an apparent lack of appreciation of the contextual nuances associated with implementing a practice change such as NMP. This lack of implementation focus could go some way to explain the dearth of theoretical underpinning in the included reviews, with only four having primary focus on determinants. Applying a conceptual framework, such as the novel **PIF**, would help improve knowledge and awareness of the important key contextual elements and inform future research and implementation in this area. We anticipate with real world application the **PIF** should help guide organisations with preliminary capacity/needs assessment. In addition to aiding situational analysis in identifying potential 'pinch points' for implementation where barriers may arise and assist in formative evaluations of NMP processes and outcomes. It may also have utility in supporting the measurement of organisational maturity for implementation^{135 136 137}. Given that over 50% of constituent factors occurred at the meso (organisational) level, this is important.

Strengths and limitations

To the best of our knowledge, this is the first systematic review of reviews to develop a multi-professional, systems-wide conceptual framework for NMP implementation. Adopting a global perspective, it is not restricted to type of prescribing model, profession, country, care setting, study design or data type. We

acknowledge the criticism that aggregative approaches to barrier/facilitator synthesis may be considered reductionist⁸⁶ and the associated difficulties of establishing causation and relative strength of determinants in implementation^{86,122}. However, we made no attempt to ‘weight’ barriers and facilitators nor develop explicit causal mechanisms of how and why implementation might fail or succeed. Rather, aligning with Breslin et al’s¹³⁸ ‘miner’ metaphor for theorising from literature reviews, we attempted to thematically synthesise the research to propose new conceptualizations and an accessible framework for those planning implementation¹³⁸. We acknowledge limitations of the dataset, PIF is based on the current international evidence base which is weighted towards research from developed countries and also lacks focus or details related to health equity in the available data or implementation. A large number of primary studies published pre-2014, which precedes legislative changes to expand NMP in countries such as the UK. Repeated use of original studies, with 27% featured in one or more review, may unduly exaggerate findings from these studies. Our synthesis was based on review author interpretations of primary articles, and we did not revisit primary studies for additional details or information. Additionally, we may not have captured all relevant literature.

Conclusion

There is pressing need to advance understanding of NMP implementation by developing theoretically informed guidance to support the planning, execution and sustainability of its implementation globally. Adopting a multi-level approach to synthesising barriers and facilitators from 19 systematic reviews, we identified barriers and facilitators to NMP implementation. This resulted in the development of a multi-professional, systems-wide conceptual framework which emphasised the dynamic nature of determinants, change over time, and importance of interdependence. The evidence based conceptual **PIF** can help guide organisations with preliminary capacity/needs assessment, identify potential ‘pinch points’ and assist in formative evaluations of NMP processes and outcomes to help enhance implementation in this area. This is important given the ongoing challenges in ensuring medicines access and in delivering the 4.5 trillion doses of medicines required by the world population each year.

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Table 1. International models of non-medical prescribing

Model of NMP	Definition
Independent prescribing	Prescribing by an appropriate practitioner responsible and accountable for the assessment of patients with undiagnosed or diagnosed conditions and for decisions about the clinical management required, including prescribing ¹³⁴ .
Supplementary/dependent prescribing	A voluntary partnership between an independent prescriber (a doctor or dentist), a supplementary prescriber and a patient to implement an agreed patient-specific Clinical Management Plan that stipulates specific medicines that can be prescribed. Supplementary prescriber is responsible for managing the patient's health needs as well as prescribing the associated medication(s) ²⁵ .
Collaborative prescribing	A practice agreement negotiated between an independent prescriber (a doctor or dentist) and designated health care professional (collaborative prescriber) or group practice that outlines delegation and receiving authority of prescribed medicines. The independent prescriber is responsible for initial diagnosis and treatment decisions, and the collaborative prescriber selects, initiates, monitors, modifies and continues or discontinues medication(s) according to a protocol ²¹ .

Table 2: Inclusion and exclusion criteria barriers and facilitators non-medical prescribing review of systematic reviews

Inclusion Criteria	Exclusion Criteria
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► Systematic reviews (with meta-analyses or meta-synthesis, including traditional, mixed method, realist and qualitative review methods)	► Literature and scoping reviews without documented transparent and replicable process, abstracts, conference reports
► Qualitative, quantitative, and mixed methods systematic reviews	► Primary research
► Reviews addressing Non-Medical Prescribing (NMP) (this includes Independent Prescribing, supplementary and/or collaborative models of prescribing by legislated non-doctor health care professionals)	
► Reviews addressing NMP in primary/ community/secondary/mixed primary and secondary care	
► Reviews presenting empirical evidence of barriers and/or facilitators to NMP implementation	
► Reviews published in English	► Reviews published in non-English language

Table 3: Characteristics of included reviews

<i>First author, year, review type</i>	<i>Aims/objectives</i>	<i>Primary studies dates of data collection Model of prescribing (IP/SP) Participants Care setting Location of included studies</i>	<i>Number and type of included studies Details of amount and type of data collected in primary studies Description of study screening and abstraction process Description of study selection and flow diagram</i>
Abuzour et al. (2018) ¹⁰³ Systematic review	To explore whether McLellan et al.'s (2012) theory of expertise development model - true competence in prescribing demands expertise, regardless of the simplicity of the task at hand is applicable to iNMP and to assess the factors underpinning expertise development reported in the literature.	- 2005 to 2015 - IP - Nurses & pharmacists - Primary, secondary, & tertiary care - United Kingdom	- 34 (qualitative, mixed method, quantitative (surveys)) - No - Yes - Yes (flow diagram)

Chater et al. (2020) ¹⁰⁴ Systematic review	To identify what evidence exists regarding the influences of NMPs antimicrobial prescribing behaviour and analyse the operationalisation of the identified drivers of behaviour using the Theoretical Domains Framework (TDF).	- 2009 to 2017 - IP - Nurses, pharmacists, physiotherapists - Any healthcare context - United Kingdom, USA,	- 8 (qualitative, quantitative experiment, analysis of data mixed methods.) -Yes - Yes - Yes (flow diagram)
Cleary et al (2017) ¹⁰⁶ Systematic review	To identify and summarize qualitative research that focussed on mental health nurse prescribing, synthesize findings, and outline key themes discerned.	- 2002 to 2007 - IP & SP - Nurses, - Not specified - United Kingdom	- 12 (qualitative) - Yes - Yes - Yes (flow diagram)
Djebib. (2018) ¹¹² Systematic review	To discover and understand the factors that influence prescribing decisions made by NMP nurses in primary care.	- 2005 to 2009 - IP & SP - Nurses - Primary care - United Kingdom	- 10 (qualitative & mixed methods) -No - Yes - Yes
Eckhaus et al. (2021). ¹⁰⁷ Systematic review	To understand pharmacist and patient perspectives on pharmacist-prescribed contraception in the United States.	- 2003 to 2017 - Collaborative (SP) - Pharmacists, - Unspecified - USA	- 15 (quantitative & qualitative) -Yes - Yes - Yes (flow diagram)
Edwards et al. (2022) ⁹⁶ Systematic review	To identify barriers and facilitators that influence implementation of IP in UK primary care.	- 2005 to 2019 - IP -Nurses, pharmacists, physiotherapists, - Primary care - United Kingdom	- 23 (qualitative & mixed methods) -Yes -Yes - Yes (flow diagram)
Fox et al. (2022) ¹¹⁶ Integrative review	To explore evidence available relevant to implementation of all levels of nurse prescribing & provide practical recommendations for evidence-informed Implementation & sustainability of nurse prescribing under a supervision model.	- 2004 to 2018 - IP & SP - Nurses, midwives, pharmacists - Unspecified - Australia, Ireland, New Zealand, Spain United Kingdom	- 39 (quantitative, qualitative methods) -No - Yes - Yes (flow diagram)
Graham-Clarke E. 2018 ¹⁰⁰ Systematic review	To evaluate the use of, as well as facilitators, and barriers of independent non-medical prescribing in primary and secondary care in the UK.	- 2006 to 2011 - IP Nurses, - Primary & secondary care - United Kingdom	- 42 (qualitative, quantitative (surveys) mixed methods) -Yes - Yes - Yes (flow diagram)
Hammarberg et al. (2024) ¹⁰⁸ Systematic review	To shed light on the district nurses' experience of drug prescribing in primary care.	- 2007 to 2019 - IP & SP - District Nurses - Primary care - New Zealand, Sweden, United Kingdom	- 9 (qualitative) -Yes - No - Yes - Yes (flow diagram)

Hull et al. (2024) ¹¹⁴ Scoping review.	To search for published information on the prescribing of scheduled medications by Endorsed midwives in Australia, report on the literature, synthesise the findings, and discuss the results.	- 2014 to 2019 - Endorsed midwife prescribing (IP) - Midwives - Any context - Australia	- 7 (quantitative, review & papers) -No -Yes - Yes (flow diagram)
Jebara et al. (2018) ¹⁰⁹ Systematic review	To: (1) critically appraise, synthesize and present the available evidence on the views and experiences of stakeholders on pharmacist prescribing and (2) present the perceived facilitators and barriers for its global implementation.	- 1990 to 2015 - IP & SP - Pharmacists - Primary care, community, & secondary care - Australia, Canada, India, Ireland, Nigeria, United Kingdom, USA	- 65 (qualitative, quantitative (surveys), & mixed methods) -Yes -Yes -Yes (flow diagram)
McIntosh et al. (2016) ¹¹³ Systematic review	To critically appraise, synthesize and present evidence on the influences on prescribing decision-making among supplementary and independent NMPs in the United Kingdom.	- 2005 to 2010 - IP & SP - Nurses, pharmacists, physiotherapists - Primary care - United Kingdom	- 3 (qualitative) -No - Yes - Yes (flow diagram)
Medway et al. (2020) ¹⁰¹ Literature review	To identify barriers and enablers for midwives to use the Nursing and Midwifery Board of Australia's (NMBA) endorsement for scheduled medicines	- 1998 to 2014 - IP - Midwives, Unspecified context - Australia, Finland, New Zealand, The Netherlands, United Kingdom	- 26 (qualitative, mixed methods, quantitative (surveys, descriptive analysis of data) -Yes - Yes - Yes (flow diagram)
Mills et al. (2021) ¹¹⁰ Systematic review	To explore the views, opinions, and attitudes of pharmacists and graduates towards non-medical prescribing.	- 2004 to 2011 - IP & SP - Pharmacists - Primary & community care - Australia, Canada, United Kingdom	- 14 (qualitative, quantitative (surveys) & mixed methods) -Yes -Yes - Yes (flow diagram)
Noblet et al. 2017 ¹⁰² Systematic review	To explore the factors that affect the implementation or utilisation of independent non-medical prescribing (iNMP)?	- 2001 to 2011 - IP - Nurses, pharmacists, allied professions, optometrist - Primary, secondary, & specialist care - Canada, United Kingdom, USA	- 43 (qualitative & quantitative (surveys)) -Yes -Yes -Yes (flow diagram)

Nuttall (2018) ¹¹⁸ Systematic review	To develop an understanding of the existing theoretical perspectives around nurse prescribing and to identify any gaps in knowledge which would support further research into the lived experience of the nurse prescriber in the primary care setting.	- 2001 to 2011 - IP & SP - Nurses - Primary care - Australia, Botswana, Canada, Ireland, New Zealand, Sweden, United Kingdom, USA, Zimbabwe	-37 (qualitative & mixed methods) -No - Yes - Yes (flow diagram)
Ramos et al. (2022). ¹¹⁷ Literature review	Explore the perception, experience, and reception of pharmacist prescribing practices by any group of the interested parties.	-2006 to 2017 - IP & SP -Pharmacists -Unspecified non-hospital settings -Canada, United Kingdom, USA	- 17 (qualitative, quantitative) - No - Yes - Yes (flow diagram)
Stenner et al. (2018) ¹¹¹ Systematic review	To systematically review physiotherapy and podiatrist prescribing and medicines management activity, including evidence of impact on patient care, levels of knowledge and attitudes towards extended medicine's role.	- 1997 to 2012 - IP & SP -Physiotherapists & podiatrists - Primary & secondary care - Australia, New Zealand, Nigeria, South Africa, United Kingdom, USA	- 21 (qualitative & quantitative) (surveys, RCTS, cohort studies) -Yes - Yes - Yes (flow diagram)
Thampi & Mathew (2022) ¹⁰⁵ Systematic review	To analyse factors and challenges influencing prescribing for non-medical prescribers in primary and urgent treatment centre facilities.	- 2009 to 2018 - IP - Nurses, pharmacists, Physiotherapists, Primary care, minor illness, urgent care - United Kingdom	- 10 (qualitative, quantitative technique, surveys) - No - No - Yes (flow diagram)

Abbreviations: IP: independent prescribing; SP: supplementary prescribing; iNMP: independent non-medical prescribing

Table 4: Key themes associated with the success or impediment of NMP implementation

	Themes	Barrier	Facilitator	Sources	Level			Determinants of success
					Macro	Meso	Micro	
International/national level influences	Absence of political leadership and cost considerations (e.g., insurance reimbursements/payment schedules) and positive promotion of NMP as a professional development, rather than as a cost saving	Political drive for NMP, funding, education and nationally agreed prescribing competencies informed by collaborative approach	96, 100-102, 107, 114, 116, 117	√				Sustainability, equity, affordability of funding, NMP training across all professional groups

	Variations in state/territory legislation and facility-based policies governing prescribing limiting equitable public health service access i.e. remote and rural locations		101, 107, 108, 114, 116, 117	√			Generic legislative prescribing across professional groups
	Legislative model of prescribing (i.e. dependent forms)		109, 116, 117	√			
	National NMP restrictions and formulary limitations making scope of what NMPs can prescribe too restrictive	National agreement on scope of formulary	100-102, 107, 108, 112, 114, 116, 118	√			
		Development of NMP lead roles to promote NMP development	102, 116	√			
	Lack of access to course funding	Access to course funding	96, 109, 110, 114, 116		√		
Leadership and Management	Lack of strategic vision results in lack of organisational preparation and practitioner readiness to undertake prescribing role	A strong pro-NMP leadership within organisations, including senior management support	96, 100-102, 106, 110, 112, 116-118		√		Leadership strategy workforce
		Implementation of NMP is facilitated by a collaborative/inclusive approach to organisational development. Including involvement of service users	96, 102, 116		√		
	Lack of management and multi-disciplinary team support and positive culture for NMP	Multi-disciplinary team and doctors understand, support, and appreciate NMP	96, 100-103, 106-111, 113, 114, 116-118		√		
		Cover during training absence	102		√		
Organisational readiness	A lack of local legislation, policies and reimbursement of start-up costs to support NMP	Clear local NMP policies, guidelines, and protocols in place	96, 100-102, 104, 106, 107, 111-114, 116-118		√		Establish and/or have appropriate governance infrastructure in place
	Poor communication networks/access to medical support in community pharmacy		96, 100, 103, 109		√		
	Lack of clarity over liability and insurance cover		101, 102, 107, 111		√		
	Local formulary can be restrictive when used as a cost saving measure	Regular review and updates of policies and formularies	96, 100, 102, 106, 108, 114		√		

		Lack of support for monitoring and clinical audit	Formal support mechanisms, including (clinical) supervision in place	96, 100, 102, 104-106, 118		√		
		Lack of appropriate consultation facilities (e.g., physical space, equipment, sundries)		96, 102, 107-110, 117, 118		√		
Role clarity	A lack of clarity regarding professional and legal boundaries of NMP	Proactive approach within Trusts where new NMP role and scope of practice is discussed and clarified with key stakeholders (e.g., GPs, clinicians, nurses, patients)	96, 100, 101, 105, 106, 109, 116-118		√			Business with clear defined prescription and remuneration
	Perceived lack of need for NMP	Demonstration of benefits and need for NMP facilitates support from clinicians and managers to include NMP	96, 102, 110, 117		√			
	Role dissonance, misunderstanding or resistance from doctors, colleagues or service users	Acceptance and positive attitudes towards NMP.	96, 100-111, 113, 116-118		√			
	Lack of recognition of the professional NMP role and its potential, e.g., what pharmacists can do	Doctor involvement in NMP training helps understand NMP	96, 100, 101, 109, 118		√			
Practitioner readiness	Pre- reg education and preparation affect challenges associated with NMP and confidence to deal with complex cases		96, 100, 103, 104, 108	√				Knowledge acquisition pre-course requisites
	Transient work force can affect access to training and education pre-NMP	Education and training in specialist area of practice prior to NMP	103, 104, 106, 109		√			
	Lack of perceived clinical need	Identifying an area of clinical need	96, 102				√	
	Inadequate pre-training knowledge of pharmacology and numeracy		96, 102, 103, 105, 111, 112, 116, 118	√				
	A lack of access to funding for training and backfill for completing pre-course requisites	Experience in area of practice is essential	96, 100-102, 106, 109, 116		√			
	Lack of awareness of authorisation/regulatory requirements	Awareness of course commitments	96, 100, 117				√	
	A lack of pre course clinical assessment skills for pharmacists		103, 107-110, 117	√				

		Lack of agreement for regular (clinical) supervision or mentoring support		96, 106, 110		√		
			Appropriate selection of candidates	96, 100, 103			√	
			Helps with professional development and increases clinical competence	96, 100, 102, 103, 107, 108, 118			√	
			Proactive approach to ensuring an agreed scope of practice with key stakeholders (e.g., GPs, clinicians, nurses, patients)	96, 101, 106, 118			√	
Motivation		Lack of willingness to accept training and support required prior to undertaking NMP	Pre-existing nurse and pharmacist communication & specialist skills	96, 102, 104, 109, 117			√	
		Lack of financial remuneration	Individual drive and enthusiasm	96, 100, 102, 106-110, 114, 116-118			√	
		Lack of incentives	Professional job satisfaction, increased job security, increased business revenue	96, 100, 102, 105-110, 112, 116, 118			√	
		Concerns re additional responsibility and liability.	An increased sense of professional autonomy and identity	96, 100, 102, 103, 105, 107, 108, 110, 111, 116-118			√	
		Time and cost of completing course prerequisites		96, 102			√	
NMP education and role preparation		Concern re adequacy of generic NMP training	NMP education supports learning in practice	96, 101-103, 106, 110, 116-118	√			
		Lack of specialist knowledge affects confidence and decision-making including pharmacology	Multi-faceted mixed methods approach to teaching students how to prescribe	102-104, 110-112, 116, 118		√		
		Concerns re adequacy of pharmacological knowledge	Improved pharmacological knowledge	96, 102, 103, 111, 112, 116, 118	√			
		Lack of current numerical proficiency	Consolidation of learning in practice through period of supervised practice	103		√		
		Inadequate physical assessment and diagnostic skills		96, 103, 106, 107, 109, 110, 112, 116	√			
			NMP legitimises current practice	109			√	

Managing expectations

NMP education aligned with multi-professional learning

			Interprofessional learning opportunities during NMP course	96, 102		√		
		Difficulty finding DMPs and/or mentors		96, 102, 103		√		
		Lack of quality supervision during training		96, 111, 116		√		
		Time and course commitments make completing NMP training challenging		96, 100, 110, 116		√		
		Lack of peer and professional support during training		96, 100, 116	√			
Delays to prescribing initiation		Administrative processes: e.g., initial registration/endorsement and organisational approvals		96, 101, 102, 108, 114, 117		√		
		Diminution of confidence post-qualification with delayed administrative processes		96, 100, 101, 103-105, 111-114, 117, 118			√	
		A lack of an agreed scope of practice	Having an agreed scope of prescribing practice with local Drugs and Therapeutic committee	96, 100-102, 105, 114, 117		√		
		Anxiety associated with increased accountability, risk of error & professional consequences		96, 102-105, 108-112, 116-118			√	
		Lack of pre-agreed prescribing budget		102, 117, 118		√		
		Lack of access to prescription pads/electronic prescribing		100, 102, 110, 118		√		
		Lack of medical record access		100, 102, 104, 107, 109-111, 117		√		
		Lack of managerial/MDT support	Managerial/medic/ multi-disciplinary team support and supervision	96, 100-103, 105, 108, 113, 114, 116		√		
		Lack of access to clinical supervision	Prescribing opportunity	96, 102, 103, 105, 108, 113, 116-118		√		
		Lack of peer support	Peer support	96, 101-105, 108, 113, 114		√		
		Time pressures / workload constraints	Adequate consultation time	96, 100, 102-105, 107-110, 114, 116-118		√		
		Role isolation		96, 105, 110, 117		√		
Multi-disciplinary support		Managing patient demand for medicines		104, 112, 113		√		
Impact on healthcare			Improved access to healthcare	96, 100, 102, 105-111, 114, 116-118		√		

Access to support and supervision

Enact NMP logistical strategy

Access to support

Demonstrate benefits

	Lack of service user acceptability	High level of acceptability to service users and healthcare professionals	96, 100-102, 106-112		✓		service efficiency
		Better quality of care	96, 100, 102, 105, 106, 108-111, 116, 118		✓		
		NMP addresses issues with workforce planning supporting staff recruitment & helps cater for contingency and succession planning in health services.	100-102, 107, 117	✓			
	Inadequate workforce planning		101	✓			
	A lack of adequate funding to support sustainability of prescribing roles		101	✓			
		NMPs who had completed specialist training prescribed more items from a wider range of medications	103			✓	
	Organisation restrictions on personal formulary/ scope of practice prevents expansion of prescribing into new areas of practice	Knowledge from NMP course beneficial to enhancing prescribing scope of practice	96, 100, 102			✓	
Access to CPD	A lack of organisational provision to support CPD	Access to CPD includes updates on prescribing policy (for pharmacists)	96, 100, 102, 103, 105, 112, 118		✓		Availability and appropriateness
	A lack of adequate tailored, and up-to-date knowledge not met		96, 103, 108, 112, 118			✓	

Figure 1: PRISMA flowchart

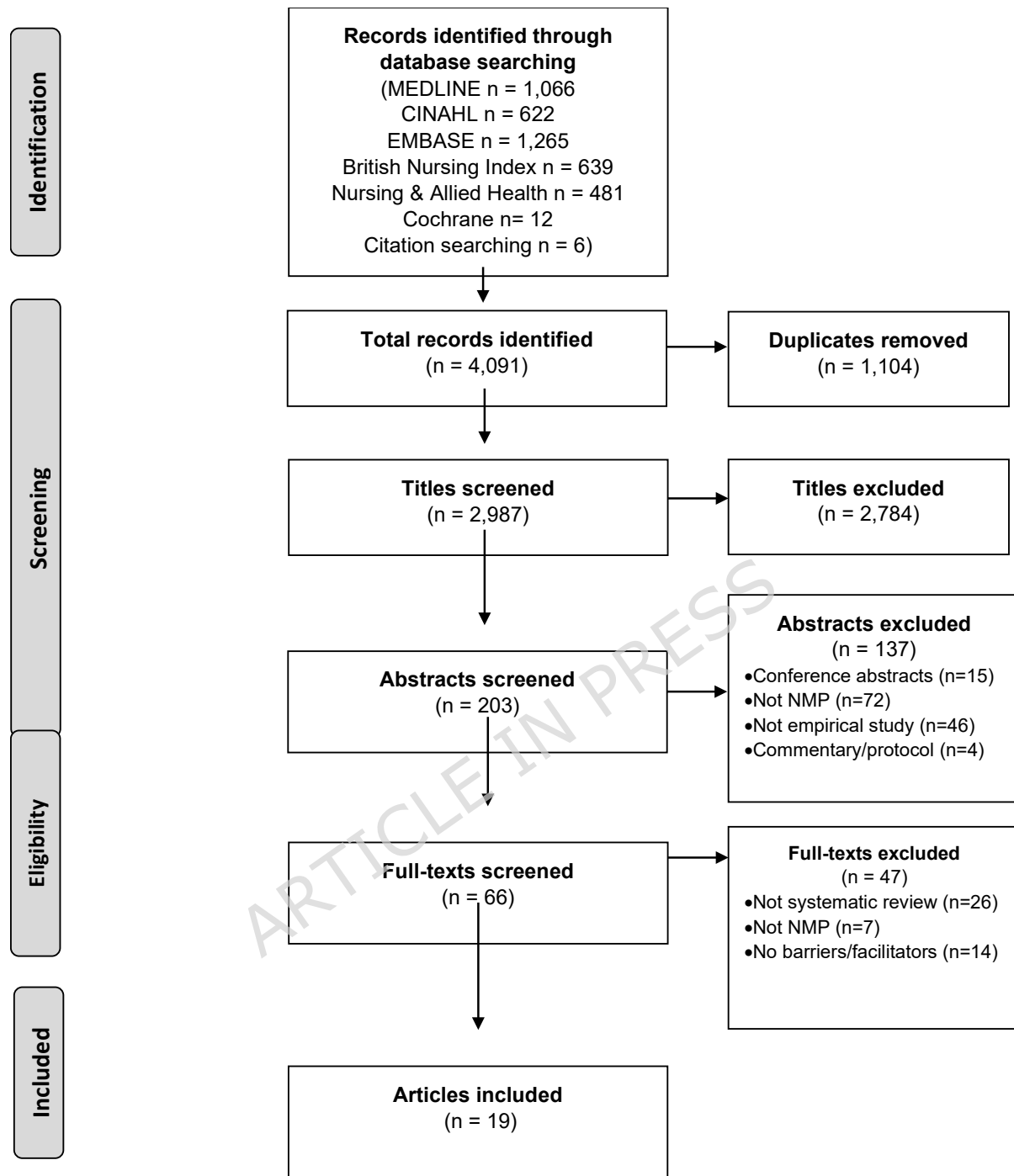
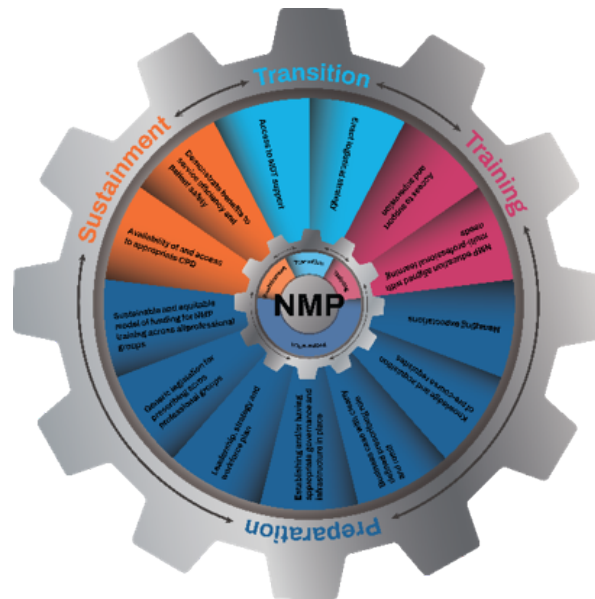


Figure 2 Prescribing Implementation Framework



Prescribing stage and determinants

Preparation

1. Sustainable and equitable model of funding for NMP training across all professional groups
2. Generic legislation for prescribing across professional groups
3. Leadership, strategy and workforce plan
4. Establishing and/or having appropriate governance and infrastructure in place
5. Business case with clearly defined prescribing role and remit
6. Knowledge and acquisition of pre-course requisites
7. Managing expectations

Training

1. NMP education aligned with multi-professional learning needs
2. Access to support and supervision

Transition

1. Enact logistical strategy
2. Access to MDT support

Sustainment

1. Demonstrate benefits to service efficiency and patient safety
2. Availability of and access to appropriate CPD

Figure 3 Images representing dynamic nature of the Prescribing Implementation Framework

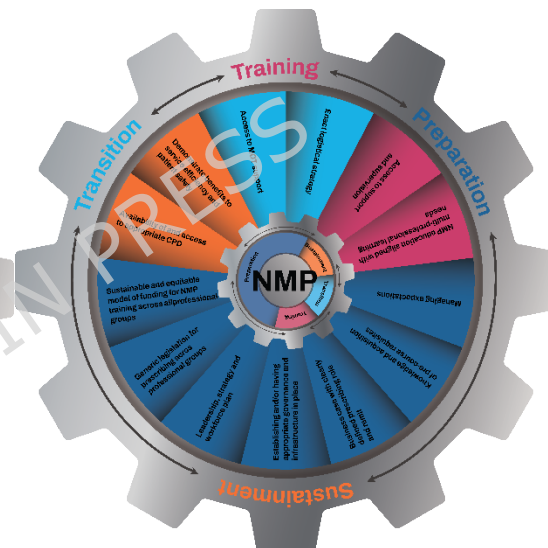
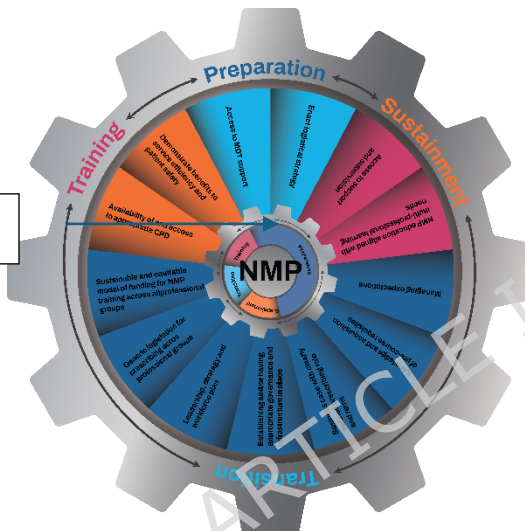
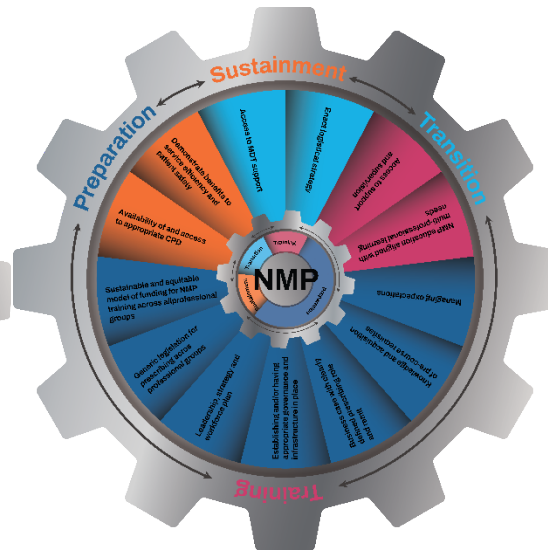
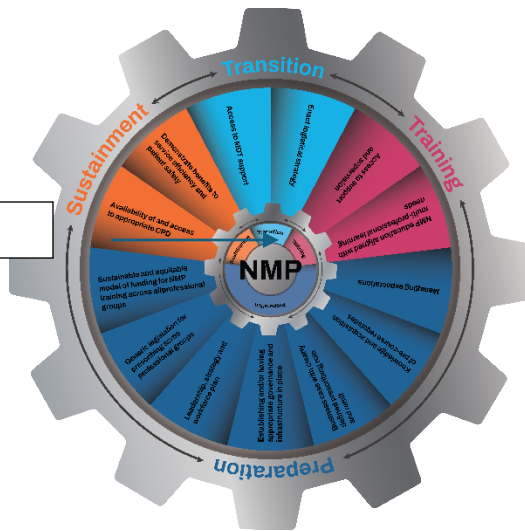


Figure 1: PRISMA flowchart

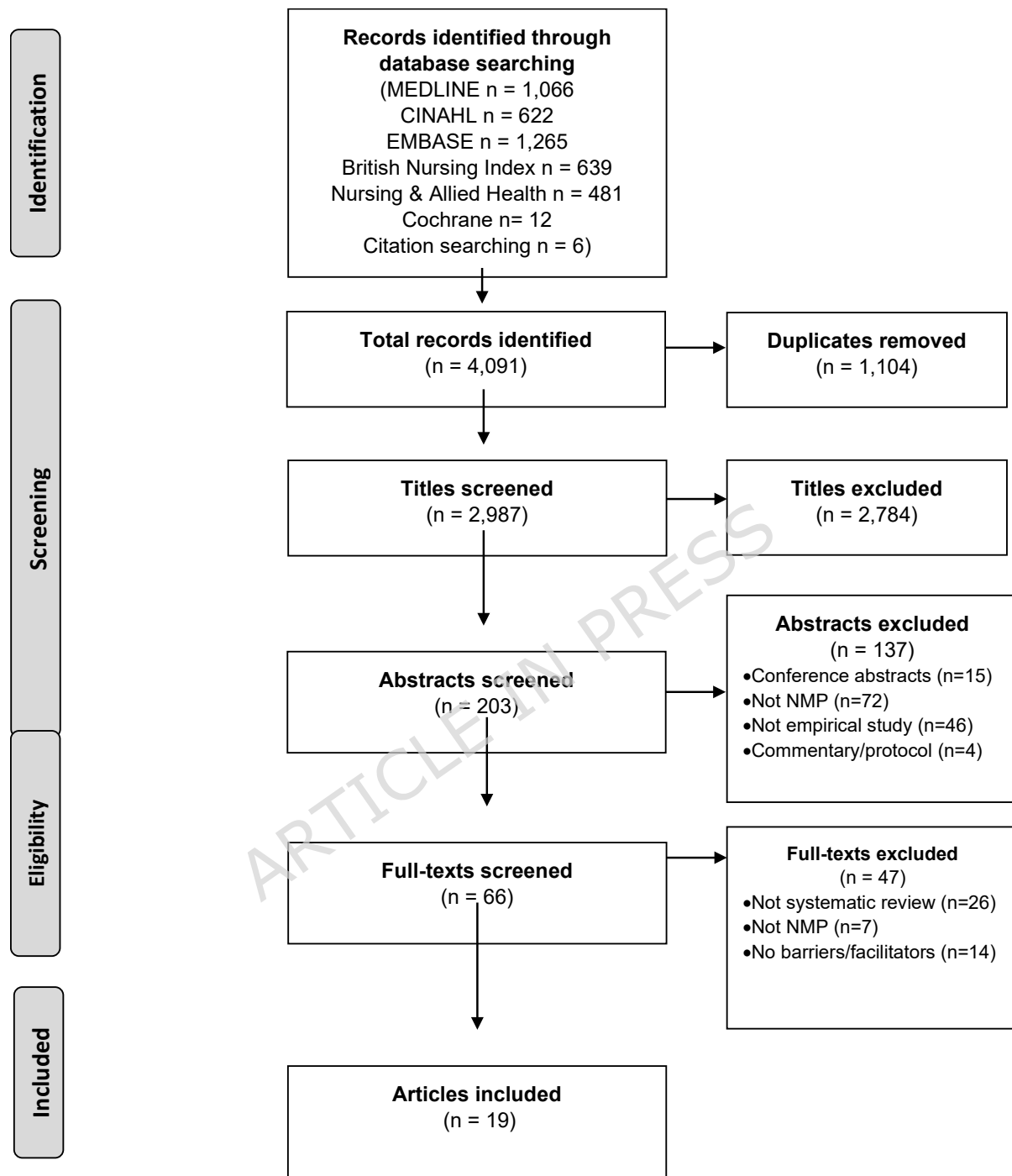
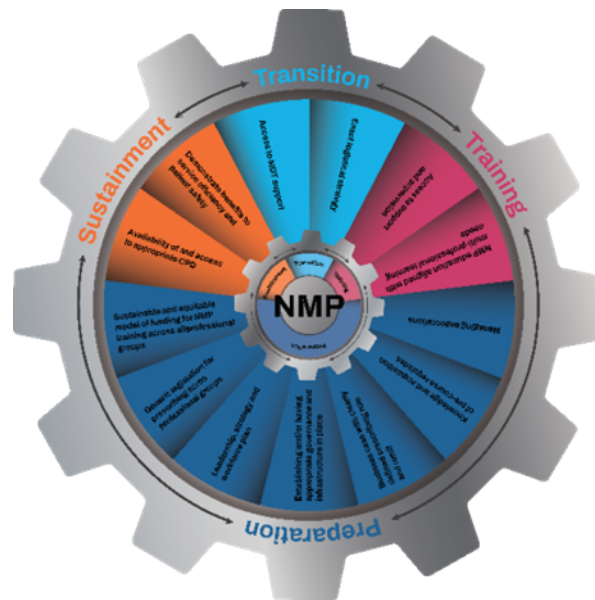


Figure 2 Prescribing Implementation Framework**Prescribing stage and determinants****Preparation**

1. Sustainable and equitable model of funding for NMP training across all professional groups
2. Generic legislation for prescribing across professional groups
3. Leadership, strategy and workforce plan
4. Establishing and/or having appropriate governance and infrastructure in place
5. Business case with clearly defined prescribing role and remit
6. Knowledge and acquisition of pre-course requisites
7. Managing expectations

Training

1. NMP education aligned with multi-professional learning needs
2. Access to support and supervision

Transition

1. Enact logistical strategy
2. Access to MDT support

Sustainability

1. Demonstrate benefits to service efficiency and patient safety
2. Availability of and access to appropriate CPD

Figure 3 Images representing dynamic nature of the Prescribing Implementation Framework

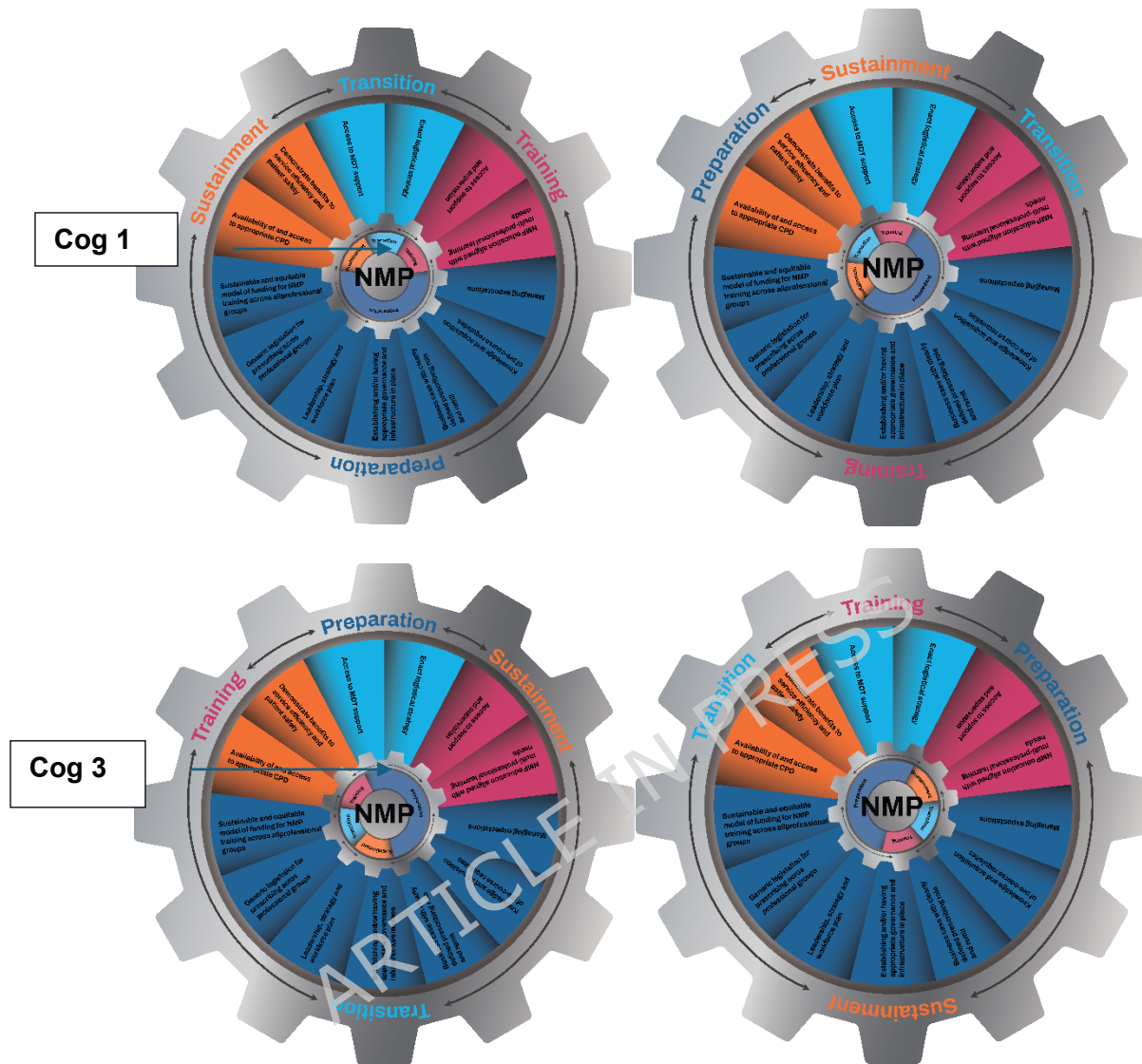


Table 1. International models of non-medical prescribing

Model of NMP	Definition
Independent prescribing	Prescribing by an appropriate practitioner responsible and accountable for the assessment of patients with undiagnosed or diagnosed conditions and for decisions about the clinical management required, including prescribing ¹³⁴ .
Supplementary/dependent prescribing	A voluntary partnership between an independent prescriber (a doctor or dentist), a supplementary prescriber and a patient to implement an agreed patient-specific Clinical Management Plan that stipulates specific medicines that can be prescribed. Supplementary prescriber is responsible for managing the patient's health needs as well as prescribing the associated medication(s) ²⁵ .
Collaborative prescribing	A practice agreement negotiated between an independent prescriber (a doctor or dentist) and designated health care professional (collaborative prescriber) or group practice that outlines delegation and receiving authority of prescribed medicines. The independent prescriber is responsible for initial diagnosis and treatment decisions, and the collaborative prescriber selects, initiates, monitors, modifies and continues or discontinues medication(s) according to a protocol ²¹ .

Table 2: Inclusion and exclusion criteria barriers and facilitators non-medical prescribing review of systematic reviews

Inclusion Criteria	Exclusion Criteria
► Systematic reviews (with meta-analyses or meta-synthesis, including traditional, mixed method, realist and qualitative review methods)	► Literature and scoping reviews without documented transparent and replicable process, abstracts, conference reports
► Qualitative, quantitative, and mixed methods systematic reviews	► Primary research
► Reviews addressing Non-Medical Prescribing (NMP) (this includes Independent Prescribing, supplementary and/or collaborative models of prescribing by legislated non-doctor health care professionals)	
► Reviews addressing NMP in primary/ community/secondary/mixed primary and secondary care	
► Reviews presenting empirical evidence of barriers and/or facilitators to NMP implementation	
► Reviews published in English	► Reviews published in non-English language

Table 3: Characteristics of included reviews

<i>First author, year, review type</i>	<i>Aims/objectives</i>	<i>Primary studies dates of data collection Model of prescribing (IP/SP) Participants Care setting Location of included studies</i>	<i>Number and type of included studies Details of amount and type of data collected in primary studies Description of study screening and abstraction process Description of study selection and diagram</i>
Abuzour et al. (2018) ⁹⁹ Systematic review	To explore whether McLellan et al.'s (2012) theory of expertise development model - true competence in prescribing demands expertise, regardless of the simplicity of the task at hand is applicable to iNMP and to assess the factors underpinning expertise development reported in the literature.	- 2005 to 2015 - IP - Nurses & pharmacists - Primary, secondary, & tertiary care - United Kingdom	- 34 (qualitative, mixed methods, quantitative (surveys)) - No - Yes - Yes (flow diagram)
Chater et al. (2020) ¹⁰⁰ Systematic review	To identify what evidence exists regarding the influences of NMPs antimicrobial prescribing behaviour and analyse the operationalisation of the identified drivers of behaviour using the Theoretical Domains Framework (TDF).	- 2009 to 2017 - IP - Nurses, pharmacists, physiotherapists - Any healthcare context - United Kingdom, USA,	- 8 (qualitative, quantitative, experiment, analysis of data, mixed methods.) -Yes - Yes - Yes (flow diagram)
Cleary et al (2017) ¹⁰² Systematic review	To identify and summarize qualitative research that focussed on mental health nurse prescribing, synthesize findings, and outline key themes discerned.	- 2002 to 2007 - IP & SP - Nurses, - Not specified - United Kingdom	- 12 (qualitative) - Yes - Yes - Yes (flow diagram)
Djerrbib. (2018) ¹⁰⁸ Systematic review	To discover and understand the factors that influence prescribing decisions made by NMP nurses in primary care.	- 2005 to 2009 - IP & SP - Nurses - Primary care - United Kingdom	- 10 (qualitative & mixed methods) -No - Yes - Yes
Eckhaus et al. (2021). ¹⁰³ Systematic review	To understand pharmacist and patient perspectives on pharmacist-prescribed contraception in the United States.	- 2003 to 2017 - Collaborative (SP) - Pharmacists, - Unspecified - USA	- 15 (quantitative & qualitative) -Yes - Yes - Yes (flow diagram)

Edwards et al. (2022) ⁹³ Systematic review	To identify barriers and facilitators that influence implementation of IP in UK primary care.	- 2005 to 2019 - IP - Nurses, pharmacists, physiotherapists, - Primary care - United Kingdom	- 23 (qualitative & mixed methods) - Yes - Yes - Yes (flow diagram)
Fox et al. (2022) ¹¹² Integrative review	To explore evidence available relevant to implementation of all levels of nurse prescribing & provide practical recommendations for evidence-informed Implementation & sustainability of nurse prescribing under a supervision model.	- 2004 to 2018 - IP & SP - Nurses, midwives, pharmacists - Unspecified - Australia, Ireland, New Zealand, Spain United Kingdom	- 39 (quantitative, qualitative methods) - No - Yes - Yes (flow diagram)
Graham-Clarke E. 2018 ⁹⁶ Systematic review	To evaluate the use of, as well as facilitators, and barriers of independent non-medical prescribing in primary and secondary care in the UK.	- 2006 to 2011 - IP Nurses, - Primary & secondary care - United Kingdom	- 42 (qualitative, quantitative (surveys) mixed methods) - Yes - Yes - Yes (flow diagram)
Hammarberg et al. (2024) ¹⁰⁴ Systematic review	To shed light on the district nurses' experience of drug prescribing in primary care.	- 2007 to 2019 - IP & SP - District Nurses - Primary care - New Zealand, Sweden, United Kingdom	- 9 (qualitative) - Yes - No - Yes - Yes (flow diagram)
Hull et al. (2024) ¹¹⁰ Scoping review.	To search for published information on the prescribing of scheduled medications by Endorsed midwives in Australia, report on the literature, synthesise the findings, and discuss the results.	- 2014 to 2019 - Endorsed midwife prescribing (IP) - Midwives - Any context - Australia	- 7 (quantitative, review & papers) - No - Yes - Yes (flow diagram)
Jebara et al. (2018) ¹⁰⁵ Systematic review	To: (1) critically appraise, synthesize and present the available evidence on the views and experiences of stakeholders on pharmacist prescribing and (2) present the perceived facilitators and barriers for its global implementation.	- 1990 to 2015 - IP & SP - Pharmacists - Primary care, community, & secondary care - Australia, Canada, India, Ireland, Nigeria, United Kingdom, USA	- 65 (qualitative, quantitative (surveys), & mixed methods) - Yes - Yes - Yes (flow diagram)
McIntosh et al. (2016) ¹⁰⁹	To critically appraise, synthesize and present evidence on the influences on prescribing	- 2005 to 2010 - IP & SP - Nurses, pharmacists,	- 3 (qualitative)

Systematic review	decision-making among supplementary and independent NMPs in the United Kingdom.	physiotherapists - Primary care - United Kingdom	-No - Yes - Yes (flow diagram)
Medway et al. (2020) ⁹⁷ Literature review	To identify barriers and enablers for midwives to use the Nursing and Midwifery Board of Australia's (NMBA) endorsement for scheduled medicines	- 1998 to 2014 - IP - Midwives, Unspecified context - Australia, Finland, New Zealand, The Netherlands, United Kingdom	- 26 (qualitative, mixed methods, quantitative (surveys, descriptive analysis of data) -Yes - Yes - Yes (flow diagram)
Mills et al. (2021) ¹⁰⁶ Systematic review	To explore the views, opinions, and attitudes of pharmacists and graduates towards non-medical prescribing.	- 2004 to 2011 - IP & SP - Pharmacists - Primary & community care - Australia, Canada, United Kingdom	- 14 (qualitative, quantitative (surveys) & mixed methods) -Yes -Yes - Yes (flow diagram)
Noblet et al. 2017 ⁹⁸ Systematic review	To explore the factors that affect the implementation or utilisation of independent non-medical prescribing (INMP)?	- 2001 to 2011 - IP - Nurses, pharmacists, allied professions, optometrist - Primary, secondary, & specialist care - Canada, United Kingdom, USA	- 43 (qualitative & quantitative (surveys)) -Yes -Yes -Yes (flow diagram)
Nuttall (2018) ¹¹⁴ Systematic review	To develop an understanding of the existing theoretical perspectives around nurse prescribing and to identify any gaps in knowledge which would support further research into the lived experience of the nurse prescriber in the primary care setting.	- 2001 to 2011 - IP & SP - Nurses - Primary care - Australia, Botswana, Canada, Ireland, New Zealand, Sweden, United Kingdom, USA, Zimbabwe	-37 (qualitative & mixed methods) -No - Yes - Yes (flow diagram)
Ramos et al. (2022). ¹¹³ Literature review	Explore the perception, experience, and reception of pharmacist prescribing practices by any group of the interested parties.	-2006 to 2017 - IP & SP -Pharmacists -Unspecified non-hospital settings -Canada, United Kingdom, USA	- 17 (qualitative, quantitative) - No - Yes - Yes (flow diagram)

Stenner et al. (2018) ¹⁰⁷ Systematic review	To systematically review physiotherapy and podiatrist prescribing and medicines management activity, including evidence of impact on patient care, levels of knowledge and attitudes towards extended medicine's role.	- 1997 to 2012 - IP & SP -Physiotherapists & podiatrists - Primary & secondary care - Australia, New Zealand, Nigeria, South Africa, United Kingdom, USA	- 21 (qualitative & quantitative (surveys, RCTS, cohort studies)) -Yes - Yes - Yes (flow diagram)
Thampi & Mathew (2022) ¹⁰¹ Systematic review	To analyse factors and challenges influencing prescribing for non-medical prescribers in primary and urgent treatment centre facilities.	- 2009 to 2018 - IP - Nurses, pharmacists, Physiotherapists, Primary care, minor illness, urgent care - United Kingdom	- 10 (qualitative, quantitative technique, surveys)) - No - No - Yes (flow diagram)

Abbreviations: IP: independent prescribing; SP: supplementary prescribing; iNMP: independent non-medical prescribing

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Table 4: Key themes associated with the success or impediment of NMP implementation

	Themes	Barrier	Facilitator	Sources	Level			Determinants of success
					Macro	Meso	Micro	
	International/national level influences	Absence of political leadership and cost considerations (e.g., insurance reimbursements/payment schedules) and positive promotion of NMP as a professional development, rather than as a cost saving	Political drive for NMP, funding, education and nationally agreed prescribing competencies informed by collaborative approach	93, 96-98, 103, 110, 112, 113	√			Sustainable equitable of funding NMP tra across all professio groups
		Variations in state/territory legislation and facility-based policies governing prescribing limiting equitable public health service access i.e. remote and rural locations		97, 103, 104, 110, 112, 113	√			
		Legislative model of prescribing (i.e. dependent forms)		105, 112, 113	√			
		National NMP restrictions and formulary limitations making scope of what NMPs can prescribe too restrictive	National agreement on scope of formulary	96-98, 103, 104, 108, 110, 112, 114	√			
			Development of NMP lead roles to promote NMP development	98, 112	√			
		Lack of access to course funding	Access to course funding	93, 105, 106, 110, 112		√		
	Leadership and Management	Lack of strategic vision results in lack of organisational preparation and practitioner readiness to undertake prescribing role	A strong pro-NMP leadership within organisations, including senior management support	93, 96-98, 102, 106, 108, 112-114		√		Leadership strategy workfor
			Implementation of NMP is facilitated by a collaborative/inclusive approach to organisational development. Including involvement of service users	93, 98, 112		√		
		Lack of management and multi-disciplinary team support and positive culture for NMP	Multi-disciplinary team and doctors understand, support, and appreciate NMP	93, 96-99, 102-107, 109, 110, 112-114		√		
			Cover during training absence	98		√		

Organisational readiness	A lack of local legislation, policies and reimbursement of start-up costs to support NMP	Clear local NMP policies, guidelines, and protocols in place	93, 96-98, 100, 102, 103, 107-110, 112-114		√		Establish and/or h appropriate governance infrastru place
	Poor communication networks/access to medical support in community pharmacy		93, 96, 99, 105		√		
	Lack of clarity over liability and insurance cover		97, 98, 103, 107		√		
	Local formulary can be restrictive when used as a cost saving measure	Regular review and updates of policies and formularies	93, 96, 98, 102, 104, 110		√		
	Lack of support for monitoring and clinical audit	Formal support mechanisms, including (clinical) supervision in place	93, 96, 98, 100-102, 114		√		
	Lack of appropriate consultation facilities (e.g., physical space, equipment, sundries)		93, 98, 103-106, 113, 114		√		
Role clarity	A lack of clarity regarding professional and legal boundaries of NMP	Proactive approach within Trusts where new NMP role and scope of practice is discussed and clarified with key stakeholders (e.g., GPs, clinicians, nurses, patients)	93, 96, 97, 101, 102, 105, 112-114		√		Business with clea defined prescrib and rem
	Perceived lack of need for NMP	Demonstration of benefits and need for NMP facilitates support from clinicians and managers to include NMP	93, 98, 106, 113		√		
	Role dissonance, misunderstanding or resistance from doctors, colleagues or service users	Acceptance and positive attitudes towards NMP.	93, 96-107, 109, 112-114		√		
	Lack of recognition of the professional NMP role and its potential, e.g., what pharmacists can do	Doctor involvement in NMP training helps understand NMP	93, 96, 97, 105, 114		√		
Practitioner readiness	Pre- reg education and preparation affect challenges associated with NMP and confidence to deal with complex cases		93, 96, 99, 100, 104	√			Knowled acquisiti
	Transient work force can affect access to training and education pre-NMP	Education and training in specialist area of practice prior to NMP	99, 100, 102, 105		√		
	Lack of perceived clinical need	Identifying an area of clinical need	93, 98			√	

		Inadequate pre-training knowledge of pharmacology and numeracy		93, 98, 99, 101, 107, 108, 112, 114	√			pre-course requisites
		A lack of access to funding for training and backfill for completing pre-course requisites	Experience in area of practice is essential	93, 96-98, 102, 105, 112		√		
		Lack of awareness of authorisation/regulatory requirements	Awareness of course commitments	93, 96, 113			√	
		A lack of pre course clinical assessment skills for pharmacists		99, 103-106, 113	√			
		Lack of agreement for regular (clinical) supervision or mentoring support		93, 102, 106		√		
			Appropriate selection of candidates	93, 96, 99			√	
			Helps with professional development and increases clinical competence	93, 96, 98, 99, 103, 104, 114			√	
			Proactive approach to ensuring an agreed scope of practice with key stakeholders (e.g., GPs, clinicians, nurses, patients)	93, 97, 102, 114			√	
	Motivation	Lack of willingness to accept training and support required prior to undertaking NMP	Pre-existing nurse and pharmacist communication & specialist skills	93, 98, 100, 105, 113			√	Managing expectations
		Lack of financial remuneration	Individual drive and enthusiasm	93, 96, 98, 102-106, 110, 112-114			√	
		Lack of incentives	Professional job satisfaction, increased job security, increased business revenue	93, 96, 98, 101-106, 108, 112, 114			√	
		Concerns re additional responsibility and liability.	An increased sense of professional autonomy and identity	93, 96, 98, 99, 101, 103, 104, 106, 107, 112-114			√	
		Time and cost of completing course prerequisites		93, 98			√	
NMP education and role preparation		Concern re adequacy of generic NMP training	NMP education supports learning in practice	93, 97-99, 102, 106, 112-114	√			NMP education aligned with multi-professional learning

	Lack of specialist knowledge affects confidence and decision-making including pharmacology	Multi-faceted mixed methods approach to teaching students how to prescribe	98-100, 106-108, 112, 114		√		
	Concerns re adequacy of pharmacological knowledge	Improved pharmacological knowledge	93, 98, 99, 107, 108, 112, 114	√			
	Lack of current numerical proficiency	Consolidation of learning in practice through period of supervised practice	99		√		
	Inadequate physical assessment and diagnostic skills		93, 99, 102, 103, 105, 106, 108, 112	√			
		NMP legitimises current practice	105			√	
		Interprofessional learning opportunities during NMP course	93, 98		√		
	Difficulty finding DMPs and/or mentors		93, 98, 99		√		Access to support supervision
	Lack of quality supervision during training		93, 107, 112		√		
	Time and course commitments make completing NMP training challenging		93, 96, 106, 112		√		
	Lack of peer and professional support during training		93, 96, 112	√			
Delays to prescribing initiation	Administrative processes: e.g., initial registration/endorsement and organisational approvals		93, 97, 98, 104, 110, 113		√		Enact NM logistical strategy
	Diminution of confidence post-qualification with delayed administrative processes		93, 96, 97, 99-101, 107-110, 113, 114			√	
	A lack of an agreed scope of practice	Having an agreed scope of prescribing practice with local Drugs and Therapeutic committee	93, 96-98, 101, 110, 113		√		
	Anxiety associated with increased accountability, risk of error & professional consequences		93, 98-101, 104-108, 112-114			√	
	Lack of pre-agreed prescribing budget		98, 113, 114		√		
	Lack of access to prescription pads/electronic prescribing		96, 98, 106, 114		√		
	Lack of medical record access		96, 98, 100, 103, 105-107, 113		√		
Multi-disciplinary support	Lack of managerial/MDT support	Managerial/medic/ multi-disciplinary team support and supervision	93, 96-99, 101, 104, 109, 110, 112		√		Access to support

	Lack of access to clinical supervision	Prescribing opportunity	93, 98, 99, 101, 104, 109, 112-114		✓		
	Lack of peer support	Peer support	93, 97-101, 104, 109, 110		✓		
	Time pressures / workload constraints	Adequate consultation time	93, 96, 98-101, 103-106, 110, 112-114		✓		
	Role isolation		93, 101, 106, 113		✓		
	Managing patient demand for medicines		100, 108, 109		✓		
Impact on healthcare		Improved access to healthcare	93, 96, 98, 101-107, 110, 112-114		✓		Demonstrates benefits service efficiency
	Lack of service user acceptability	High level of acceptability to service users and healthcare professionals	93, 96-98, 102-108		✓		
		Better quality of care	93, 96, 98, 101, 102, 104-107, 112, 114		✓		
		NMP addresses issues with workforce planning supporting staff recruitment & helps cater for contingency and succession planning in health services.	96-98, 103, 113	✓			
	Inadequate workforce planning		97	✓			
	A lack of adequate funding to support sustainability of prescribing roles		97	✓			
		NMPs who had completed specialist training prescribed more items from a wider range of medications	99			✓	
	Organisation restrictions on personal formulary/ scope of practice prevents expansion of prescribing into new areas of practice	Knowledge from NMP course beneficial to enhancing prescribing scope of practice	93, 96, 98			✓	
Access to CPD	A lack of organisational provision to support CPD	Access to CPD includes updates on prescribing policy (for pharmacists)	93, 96, 98, 99, 101, 108, 114		✓		Availability and access appropriate
	A lack of adequate tailored, and up-to-date knowledge not met		93, 99, 104, 108, 114			✓	