Optometrist therapeutic prescribing:

A rapid review of the literature

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Abbreviations

AC - Advanced Clinical

A&E – Accident and Emergency

AMED - Allied and Complementary Medicine Database

APCOS – Acute Primary Care Ophthalmology Service

AOS - Acute Ophthalmic Service

AS - Additional Supply

CoO – College of Optometrists

CFA – Common Final Assessment

COM-B – Capability, Opportunity, Motivation, and Behaviour model

CPD – Continuing Professional Development

CUES - COVID-19 Urgent Eyecare Service

DMP – Designated Medical Prescriber

DTC – Drug Therapeutic Committees

GPhC – General Pharmaceutical Council

GP – General Practitioner

GOC – General Optical Council

GOS – General Ophthalmic Service

GRRS – Glaucoma Referral Refinement Scheme

HCPC – Health and Care Professions Council

HEI – Higher Education Institutions

HES – Hospital Eye Service

IP – Independent Prescribing

IPs – Independent Prescribers

IPOS – Independent Prescribing Optometrist Service

MCQ – Multiple Choice Questions

MDT – multidisciplinary team support

MECS - Minor Eye Conditions Service

NHS – National Health Service

NMC – Nursing and Midwifery Council

NMP – Non-medical prescribing

NMPs – Non-medical prescribers

OHT – Ocular Hypertension

OSCE – Objective Structured Clinical Examinations

OTP – Optometrist therapeutic prescribing

PEARS - Primary Eye-care Assessment and Referral Service

PRISMA – Preferred Reporting Items

RCO – Royal College of Ophthalmologist

RPL – Recognition of Prior Learning

RPS – Royal Pharmaceutical Society

SP – Supplementary Prescribing

SPIDER – Sample, Phenomenon of Interest, Design, Evaluation, Research Type

TDF – Theoretical Domains Framework

UG – Undergraduate

UK – United Kingdom

1 Executive summary

Background: Optometrists in the UK can undertake training that entitles them to prescribe a range of medicines for patients with eye conditions. This training, and registration as an Optometrist therapeutic prescriber, is overseen by the General Optical Council (GOC).

Aim: This rapid review was commissioned by the GOC with the aim to identify known barriers and facilitators to implementing non-medical prescribing that impact on Optometrist therapeutic prescribing, related to additional supply, independent and supplementary prescribing. An additional aim was to identify literature on the scope of Optometrist therapeutic prescribing.

Methods: This rapid review comprises:

1. A review of systematic reviews to identify common barriers and facilitators to non-medical prescribing across all relevant professions,
2. A review evidence on Optometrist therapeutic prescribing (OTP) and additional supply to identify scope of OTP, state of current evidence base and barriers and facilitators to OTP
3. Conversations with key informants to identify key challenges and facilitators to OTP

Data: A total of 13 systematic reviews were included in the review of systematic reviews, 11 articles (8 empirical and 3 reviews) were included in the review of OTP and 8 conversations were held with key informants involved in OTP across England, Northern Ireland, Wales and Scotland.

Findings: A range of barriers and facilitators were found to impact on non-medical prescribing in the following stages: i) preparatory stage ii) training iii) early transition and iv) sustainment and development. This included the extent of organisational readiness, leadership, preparation of the infrastructure to support NMP (such as policy, access to prescription pads and a prescribing budget), practitioner readiness, continued support and professional development. Limited evaluative research evidence was available on OTP, with a lack of information about the current scope of OTP practice or service delivery. Challenges to OTP included a) limited practitioner skills and motivation, b) access to clinical practice training, c) limited organisational support and d) a lack of external/local policies to facilitate prescribing. Many of these barriers remained unchanged over the past decade and were also reported by key informants. A number of further challenges raised by key informants included: a need for greater strategic visioning and commissioning of OTP services; better alignment with governance, clinical and educational standards applied to other non-medical prescribing professions; preparation

of optometrists for the prescribing role (including undergraduate training); improvements to supervised practice; and greater support for transition and long-term sustainability of OTP. Innovative approaches to service commissioning and support for OPT taken in some of the devolved nations were reported to have reduced many barriers to implementation. Key informant conversations reiterated the important position of OTPs in meeting the needs of patients with acute and non-acute ocular conditions, providing accessible care and reducing burden on general practice and acute services.

Discussion and conclusion: The limited evidence base on OTP indicates that i) it has a positive impact within enhanced services in community and acute settings and ii) barriers and facilitators are similar to those experienced by other non-medical prescribing professions. Key differences were identified in the way that OTP is governed at national and organisation level compared to other NMP professions, however the justification for these differences were unclear. There are potential benefits to be gained from a greater alignment with NMP prescribing competencies, educational and governance standards and frameworks for advanced practice career development. Bottlenecks in accessing practice placements and a lack of integration and feedback between educational and practice components were a particular concern for key informants. Solutions to reduce barriers to the uptake and use of OTP were evident in some of the devolved nations, such as: improving strategic vision, pro-OTP leadership, and service commissioning to facilitate novel OTP roles, training costs and infrastructure support. There is potential to improve the sustainability of OTP and facilitate the development of novel and innovative OTP-led roles by greater recognition and support of OTP scope of practice. The recommendations of this review are timely given the role of non-medical prescribing in improving service capacity to meet increasing demand for medication.

2 Background

The 1999 Crown Report[1] recommended extension of independent prescribing (IP) responsibilities to a number of non-medical professional groups. In the UK, registered optometrists were already using a restricted range of prescription-only medicines in professional practice, under exemptions listed in the Medicines Act (1968), to support diagnostic procedures and management of common ocular conditions posing limited risk to sight. Examples include topical antibiotics for bacterial conjunctivitis, and pupil dilators such as cyclopentolate hydrochloride. In 2005, necessary changes were enacted to various relevant legislation to implement the recommendations of the Crown Report, followed by further amendments in 2008[2]. This created additional prescribing roles outlined in Table 1[3]. Introduction of these prescribing rights was intended to supplement existing shared care models for management of sight-threatening ocular disease[4].

Optometrists who wish to become independent prescribers (referred to in this report as Optometrist Therapeutic Prescribing) must have a minimum of 2 years in practice prior to undertaking the three stages of IP training. Stage one comprises completion of an ocular therapeutic course at one of the five approved UK universities. Secondly, a clinical placement comprising 24 x three-hour clinical sessions under the supervision of an ophthalmologist based in secondary care must be undertaken within two years of completing the theoretical component. The final step is successful completion of the Common Final Therapeutics Assessment (TCFA) via the College of Optometrists (GOC)[2]. Optometrists are awarded the dual qualification of independent and supplementary prescriber, with requirement for yearly renewal with GOC and a detailed log of prescribing activity. When qualified, optometrists should work within their scope of practice and acknowledge limitations of their practice[2].

Evidence suggests that there is consensus regarding barriers and facilitators to implementation of non-medical prescribing, which are known to commonly occur during i) preparation for the role ii) early integration and iii) on-going sustainment. Given the dearth of evidence exploring optometrist IP, this review will therefore consolidate the wider body of literature exploring non-medical prescribing and then map this against knowledge related to Optometrist Therapeutic Prescribing (OTP).

3 Aim

This rapid review addresses the following questions:

a) What are the known barriers and facilitators to implementation of non-medical prescribing that impact on Optometrist therapeutic prescribing, related to additional supply, independent and supplementary prescribing?

b) What is the scope of Optometrist therapeutic prescribing?

4 Objectives

1. Undertake a review of systematic reviews to identify common barriers and facilitators to non-medical prescribing across all relevant professions.
2. Review evidence on Optometrist therapeutic prescribing (OTP) and additional supply to identify scope of OTP, state of current evidence base and barriers and facilitators to OTP.
3. Undertake conversations with key informants, to identify key challenges and facilitators to OTP.

5 Methods

5.1. Review of systematic reviews of barriers and facilitators to non-medical prescribing

Adopting a rapid review[5] a narrative synthesis was conducted on the topic of barriers and facilitators experienced by non-medical prescribers including nurses, pharmacists, and optometrists.

5.1.1 Search strategy

A systematic search of literature reviews of barriers and facilitators to non-medical prescribing was conducted in March-April 2021, using search terms developed according to the Sample, Phenomenon of Interest, Design, Evaluation, Research Type (SPIDER) tool[6]. These were tested based on abbreviations of words related to non-medical prescribing by nurses, pharmacists, optometrists, and other relevant professional groups. Wild card and Boolean Search Operators were used. Search strings included keyword terms, such as (non-medical prescrib*) plus (optometr*, nurs*, pharmacist*) plus (e.g., meta-synthesis, meta-analysis). Search terms, and full example search string are available in Appendix 1. Databases included EBSCO (MEDLINE, CINAHL), OVID (EMBASE) and ProQuest (British Nursing Index, Nursing & Allied Health). Publications were searched from January 2010 to March 2021. Retrieved citations were downloaded to EndNote V.X9 software and duplicates removed.

5.1.2 Screening and eligibility

Two reviewers (JE, SvE) independently appraised titles and abstracts for eligibility in relation to the inclusion criteria shown in Table 2. Full texts of the remaining reviews were screened independently by all members of the research team (NC, KS, MC, JE, & SvE) using the Joanna Briggs Institute Critical Appraisal Checklist for Systematic Reviews and Research Syntheses[7]. All reviewers confirmed the eligibility of the identified reviews. Any disagreements about possible inclusion were resolved during group discussions. Reference list hand searching supplemented database searching. An overview of the selection process and search results are available in Figure 1**.**

5.1.3 Data extraction

Data extraction was conducted by one researcher (SvE) resulting in a bespoke table adapted from recommended templates[8]. The table included the basic outline of the evidence under study such as aims, study design, sample size (number of papers included), time frame, model of prescribing (independent/supplementary), profession (nurses/pharmacists/mixed), and care setting. To help contextualise barriers and facilitators, main findings were included (see Appendix2). Data extraction was iterative and involved repeated review and update between subsequent stages of analysis[9].

5.1.4 Data analysis and assessment

Data analysis followed a four stage, iterative process[10] (see Table 3).

Barriers and facilitators to implementation of non-medical prescribing, identified from the review of systematic reviews, were grouped under the following stages: i) preparatory stage ii) training iii) early transition and iv) sustainment and development (see Appendix 3).

5.2. Review of literature on optometry prescribing and scope of practice

5.2.1 Search strategy, screening, and eligibility

A secondary systematic search of literature on optometrist therapeutic prescribing and medicines administration/supply/optimisation conducted in the United Kingdom between 2010 and 2021 was undertaken in April 2021, using inclusion/exclusion criteria shown in Table 4. The search was designed to capture any literature relevant to IP in optometry, including primary and secondary research, non-empirical reviews, and reports. Search terms were developed following the PICO format and tested based on truncations of words related to prescribing, medicines optimisation, administration and/or supply, optometrists, and optometry. Wild card and Boolean Search Operators were used to capture relevant studies. Search strings, examples of which are shown in Appendix4, were adapted for 4 databases including MEDLINE, EMBASE, CINAHL and AHMED.

Identified citation records from electronic database searches were exported into EndNote V.X9. Screening followed a three-step process as shown in Figure 2 PRISMA to select studies according to inclusion/exclusion criteria. Titles were initially reviewed to identify and exclude non-NMP relevant literature (n=201), abstracts were then screened (n=28) and full texts of those appearing relevant sought (n=14). Reference list hand searching was additionally completed to maximise inclusion.

5.2.2 Data extraction and synthesis

Study data were extracted to a bespoke table designed to capture information on key study characteristics including study aim, design, setting, sample, main findings and - where evident- barriers and facilitators to implementation.

5.3. Conversations with key informants

Using established contacts and networks, and a snowballing technique, contact was made with leaders and key informants involved in OTP across England, Northern Ireland, Wales and Scotland (n=13). Conversations (n=8) were held with to gain insight into the evolvement of OTP and opinions on key enablers and challenges.

Additional relevant literature, including that recommended by informants, were used to further inform the review.

Handwritten notes made on informal conversations were analysed to identify key barriers, enablers, and suggestions for optimising OTP.

5.4 Data analysis and synthesis

Barriers and facilitators to implementation of non-medical prescribing, identified from the review of systematic reviews, were grouped under the following stages: i) preparation for the role ii) training iii) early integration and iv) sustainment and development. Using a process of framework analysis[11], these key barriers and facilitators were mapped against knowledge relating to OTP from the literature review and conversations with key informants in order to identify key issues and challenges and inform recommendations. This synthesis provides the basis of the discussion and recommendations.

Findings from each section are reported separately and then the overall synthesis is discussed.

6 Results

6.1 Review of systematic review of barriers and facilitators to non-medical prescribing

6.1.1 Search outcome

In total 3,474 total records were identified from initial database searches using MEDLINE (n=865), CINAHL (n=410), EMBASE (n=1,148), British Nursing Index (n=603) and Nursing & Allied Health (n=448). After duplicate removal (n=955) and exclusion of articles by title (n=2,337) and abstract (n=131), 51 full text articles were reviewed by the research team. A further 41 were excluded for reasons shown in PRISMA Figure 1, leaving 10 full text articles eligible for inclusion. Hand searching reference lists generated 3 more reviews fulfilling inclusion criteria; in total 13 systematic reviews were included.

6.1.2 Study characteristics

Thirteen articles fulfilled the inclusion criteria and were reviewed. This included: 9 systematic reviews using mixed methods [12-20], 3 systematic reviews focused on studies using qualitative methods[21-23], and 1 review included quantitative studies only[24] .Statistical meta-analysis was not possible due to the heterogeneity between studies[15, 20, 24] .Instead, findings were presented in a narrative form[13, 15, 16, 24], with qualitative data being analysed thematically [13, 14, 16-18, 20, 21] .In two of the reviews a meta-synthesis was conducted[19, 22] .One systematic review conducted a meta-ethnography[23] and one used framework analysis to synthesise the data [12]. All systematic reviews were international and included studies from the UK, apart from one systematic review[14] which focused on the UK only.

Studies addressed community (n=4), primary care (n=11), secondary care (n=9) and tertiary care (n=3). Participants included independent prescribers (n=13) and supplementary prescribers (n=9). Non-medical prescribing professions included: pharmacists (n=8), nurses (n=9), physiotherapists (n=2), podiatrists (n=2), radiographers (n=1).

6.1.3 Thematic synthesis findings

Several factors were identified that can inhibit or facilitate the uptake and implementation of NMP (see Appendix 3). For the most part, it appeared that NMP was largely acceptable to both service users and health care professionals. However, barriers are consistently reported and a lack of strategic planning to support wider scale implementation of NMP identified [14, 18, 23]. The implications of this are discussed in more detail below.

Theme i) Preparatory stage

a) Organisational readiness

Following approval of legislative frameworks and the appropriate regulatory body, optimising organisation readiness is key to supporting successful implementation of NMP. Having an up to date NMP policy; pro-NMP leadership, buy-in at a senior level and a supportive inter-professional climate were all factors reported to contribute to a conducive environment for NMP implementation

Local policy and infrastructure to support prescribing

In additional to professional registration, Trust policy and ratification of NMP, for each profession, must be in place within the organisation to enable NMP[14, 19]. For example, scope of prescribing is agreed by Drugs and Therapeutic committees and a prescribing budget identified[18 14]. Delays in registration of newly qualified NMPs were known to occur, particularly if they were the first NMP in the trust and there was, for example, no trust NMP policy in place[18 20]. Additionally, delays could occur where the infrastructure was not in place to provide access to prescription pads[17-19, 22] or access to medical records[18 13-15, 17, 18, 20]. Practicalities, such as space and time to engage in prescribing also needed to be considered[18 15, 17-19]. Pharmacist NMPs had concerns about not having access to private consultation rooms (i.e., lack of privacy[15]). They also reported issues regarding accessing confidential medical records and the necessity of being able to record prescribing actions in patients' medical notes within a community pharmacy setting [15].

NHS trusts had their own drug formularies, which imposed limits on which medications could be prescribed [14, 18, 19, 22, 23 14]. These formularies required updating and regular review to ensure they were fit for purpose for NMP use[18, 21]. In addition, some trusts required individual prescribers to have a personal formulary, which is an agreed list of medicines that they could prescribe [14, 19]. This could be useful in defining scope of practice but could also be a barrier if too restrictive and time consuming to adapt when NMPs want to expand their prescribing remit[18].

Leadership, support, and strategic vision

Strong pro-NMP leadership facilitated the development of NMP within an organisation [14, 19]. A lack of strategic vision for NMP[14 23] hampered innovative NMP-led service development and resulted in a perceived lack of need for NMP within an organisation[17]. Thus, it was important that stakeholders recognised the demand for NMP[17], that they had positive attitudes towards NMP and could see the

benefits associated with NMP in relevant roles [15, 18, 21, 22]. Funding to optimise the workforce could improve the supportive climate for NMP[15, 17].

A lack of management and Multi-disciplinary Team (MDT) support[12 17 19, 21]hindered the uptake of NMP, together lack of regular clinical supervision[21] and mentoring support [17]. Formal support mechanisms, including (clinical) supervision and feedback on NMP practice, were viewed as helpful [13, 21]. Support for NMP by doctors and MDT was crucial to facilitate NMP uptake and implementation from pre-training through to post-training [15-17, 19-22].

A lack of clarity regarding NMP roles often led to ambiguity, particularly regarding professional and legal boundaries of the role[14, 18, 19, 21, 22]. This was made worse by poor communication networks with NMPs expressing the need for better communication within MDTs [12, 14]. Furthermore, NMP often had to deal with role dissonance which manifested itself as a lack of acceptance, opposition, resistance, and professional rivalry, mostly from doctors [13-22, 24], but also from other pharmacists[17]. Some of the reviews used the word 'conflict' in this context[16, 20].

b) Practitioner readiness

Aspects highlighted as important to practitioner readiness included: practitioner selection, expectations, and motivation. It was recognised as beneficial that managers and HEI course providers select appropriate practitioners to undertake the prescribing programme, based on clearly defined criteria [18]. In addition, it was important that candidates had realistic expectations about what the NMP programme provided to avoid misunderstanding about the generic nature of NMP programmes that were multi-professional[12, 18]. However, variation in the content of NMP prescribing programmes[21], particularly in relation to pharmacology[12, 18, 22], and adherence to selection procedures were reported[18] .

Motivation to undertake NMP training included: an increased sense of autonomy [14, 18, 19], the desire to make better use of professional skills and expertise[22]. In addition, practitioners felt that it helped with their professional development [22] and that it increased their clinical competence, for example by improving their pharmacological knowledge[12, 19, 22]. Training as an NMP also provided practitioners with professional satisfaction[14, 15, 17-19, 21, 22]. Deterrents to undertaking NMP training were the added responsibility that came with prescribing[12, 17] together with a lack of financial renumeration[14, 18, 19]. The time and cost related to completing course prerequisites[18], combined with a lack of funding available for training[14, 18] made it less attractive for practitioners to train as NMPs.

Theme ii) Training

Feedback on the prescribing programme has highlighted inadequacies, according to the views of some NMPs[12, 13, 17, 21, 22]. Mainly, it was considered that applied pharmacology within courses was not adequate to compensate for the lack of grounding in pharmacology and bioscience at undergraduate level, particularly for nurses and physiotherapists [12, 19, 20, 22, 23 18]. Other shortfalls included preparation for assessment, physical examination, therapeutics, and diagnostic skills training[12, 15, 17, 21-24]. While some of the shortfalls mentioned may relate to poor pre-course selection, preparation and expectations, there were reports of disparity across NMP courses including duration, content, and relevance[21].

A multifaceted mixed methods approach was found to work well when undertaking training for the prescribing role[12]. For example, pedagogical methods, such as podcasts and virtual patients, facilitated history taking and developed diagnostic skills[12] . Repetition of key concepts and the opportunity to apply knowledge in the workplace further helped to consolidate NMP abilities acquired through training[12] .

Practitioners often had difficulty identifying an appropriate person to act as a designated medical prescriber (DMP), which in turn could prevent candidates from undertaking the training [12, 18]. Both peer and professional support were reported as lacking[14], and DMP supervision was patchy and sometimes poor quality[20] . Additionally, the course was reported to be challenging in terms of time and course commitments[14, 17].

Theme iii) Early transition

Transitioning to the prescribing role was commonly reported as a time of vulnerability where newly qualified NMPs needed to build confidence in prescribing[12, 13, 16, 17, 19, 20, 22, 23] . Some studies reported poor knowledge of pharmacology and therapeutics, and a need for CPD on pharmacology and drug interactions[16, 22] . At this time, continuing support and supervision from MDTs, management, and peers, appeared to be crucial, however was sometimes lacking [12, 17, 18] , leading to feelings of isolation, in particular for newly qualified NMPs[17].

The experience of prescribing was key for developing expertise, competence, and capability [12, 16, 19, 22]. NMPs who experienced a delay in putting their skills into practice and starting to prescribe resulted in a loss of confidence. At times, delays occurred due to local or national administrative processes required to obtain professional registration and authorisation to prescribe[18].

Newly qualified NMPs reported being fearful of making mistakes[12, 13, 17, 19, 20, 23 18], suggesting that they experienced a 'blame culture' within their workplace[19]. The anxiety associated with making mistakes was linked with increased accountability[12, 19], fear of liability[15, 18, 20]and litigation, particularly with respect to the perceived lack of legal protection practitioners had when working as an NMP[13, 18, 23]. This was further exacerbated by the excessive workload NMPs often had, which in turn was viewed as a risk factor when making difficult prescribing decisions [14, 17, 19] . Conversely, having appropriate clinic time meant that practitioners had enough time to assess and make appropriate prescribing decisions[13]. However, this was often not possible due to time pressures experienced in busy clinics[12, 16, 19] .

An additional area that newly qualified NMPs found challenging was establishing boundaries and expectations with colleagues and patients as to what they could prescribe[13, 16, 23]. A team approach to prescribing with support and encouragement from management, MDT, and doctors built NMPs confidence[12, 14, 17, 18, 22] and helped them to resist pressure from patients to prescribe[12, 16]. Peer support post- training [12, 13, 16, 18], including a buddy system and regular multidisciplinary continued professional development (CPD), was also found to have a positive impact on maintaining evidence-based medicines use[18].

Theme iv) Sustainment and development

Although benefits of NMP were clear, e.g., it provided improved access to healthcare [15, 17, 20, 21, 24] and better quality of care [20, 21] , there were still issues with developing and maximising NMP roles.

A lack of access to ongoing CPD to update and extend prescribing knowledge and remit was considered a barrier in the development and sustainability of NMP[12, 14, 19, 23] . This included the ability to keep up to date with evidence-based practice, including pharmacology, as well as regular updates on prescribing policy[12]. 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[12, 23]. This was of particular importance in the context of expanding NMPs formulary[22]. NMPs who had completed specialist training were found to prescribe more items, from a wider range of medications [12].

The importance of governance and support for audit of prescribing practice was raised as a means to ensure transparency, accountability and safety of prescribing within areas of competence[18, 21]. Audit was also flagged as an important means to gather evidence on the cost-effectiveness NMP[18].

6.2 Review of literature on optometrist prescribing and additional supply

6.2.1 Study characteristics

Eleven articles including 8 empirical studies and 3 narrative reviews fulfilled inclusion criteria and were reviewed (see Table 4 and Appendix 5). However, due to the paucity of empirical studies identified, a relevant study outside published the review time was additionally included[25]. Empirical studies therefore included 7 quantitative studies, 1 qualitative study and 1 mixed-methods study. Quantitative designs included audits[26-28], national surveys[25, 29, 30], and 1 diagnostic agreement study [31]. Qualitative and mixed method studies employing interviews[32, 33], with the latter additionally employing focus groups and surveys [33].

Studies addressed community (n=3), acute eye hospital (n=2) and mixed community/hospital (n=4) optometry. Participants included optometrist independent prescribers (n=7 studies), non-prescribers (n=4), and relevant stakeholders including GPs, commissioners, and patients (n=2).

6.2.2 Focus of studies

Broadly categorised, studies focused on:

1. Auditing IP optometry service delivery [26-28]
2. Exploring views on extended prescribing [25, 30] and non-prescribing roles [33]
3. Describing prescribing practices [29, 31]
4. Identifying barriers and facilitators to OTP implementation [32].

6.2.3 IP service delivery

There was a lack of large UK national surveys which precluded overall estimate of IP adoption by the optometrist profession or enabled overview of the pattern of OTP service delivery. The literature was biased to community based optometry, with the majority of studies focusing on acute and/or chronic community/primary care ophthalmology services [26-29, 32], and fewer reporting optometrist IPs working in acute eye hospital services [29-32]. This is in contrast to Rumney's 2019 narrative reporting a bias in England to hospital uptake[34]. Estimates for Scotland (with analysis restricted to community-based optometrists proving eye examinations under the GOS) however suggested uptake of around 34%. Although overall studies reported an increase in the number of supplementary eye examinations undertaken within the community by optometrists since the 2012 Health & Social Care Act, there was no analysis indicating whether IP has facilitated/aided transfer of care to the community, although one study comparing pre-post lockdown figures estimated IP optometrist workload had increased by 20% following Covid-19. Studies looking at referrals from community optometrists to hospital eye

services reported a stable rate of around 4%, indicating 96% of patients could be independently managed to care completion by optometrist IPs, with one study asking optometrist IPs about referral patterns indicating that 20/39 qualified IPs (51%) believed they referred patients onwards less frequently post-IP [29].

6.2.4 Scope of IP practice

Data on scope of practice was restricted to prescribing frequency, drugs prescribed, independent case management (as above), referral sources, with some limited data on conditions managed by IPs. Loeffler found 87% of OTPs prescribed on a daily/weekly basis, amounting to prescription issue every 2 days, and a median of 10 prescriptions each month [29]. However, only 33% (n=18/54) of optometrists reported using a prescription pad to prescribe, with 33% (n=18/54) and 24% (n=13/54) indicating they requested prescribed medicines via a GP/ophthalmologist or used a written order. Asked their intentions to use IP to specialise in specific clinical areas, 75% (n=50) stated that they intended to or already had used IP to specialise in primary care conditions, with 61% (n=41/67) indicating glaucoma specialism. Although 40% of this sample of IPs (n=16) indicated that IP enabled them to manage conditions that they could not formerly address [29], there was no other data indicating how IP expanded scope of practice. One study presented clinical diagnostic agreement data for optometrists with standard reference to consultant ophthalmologist diagnosis/management, and although it addressed agreement in prescribing management, it did not provide finer details on prescribing or medicines management decisions related to IP skills [31]. However, the study identified 19 conditions which were considered as independently manageable by optometrist IPs.

6.2.5 Barriers and facilitators to optometrist IP implementation

Three empirical studies provided evidence of barriers and facilitators to OTP implementation including 2 cross-sectional surveys [25, 29] and 1 qualitative study [32]. Both surveys were conducted over a decade ago, either pre-legislation (and hence recruiting non-prescribers) [25], or in 2011 during early national adoption [29]. The latter recruited a mix of qualified OTPs (n=39) and those in part-training (n=21). IP pertained predominantly to community (independent and/or multiple practice) based optometrists (around 50%) with 20% [29] and 31% hospital based [32]. Studies collected data from Scottish, English and Welsh [29] and English and Welsh OTPs [32], with none reporting data from Northern Ireland. With only the recent study (set in England and Wales) focusing specifically on identifying factors to inform future implementation the contemporary empirical evidence base for implementation and its challenges is extremely limited.

Nevertheless, Spillane et al (2021)[35] and Loffler et al (2011)[36] identified a range of barriers to OTP, with some common challenges to implementation persisting over the review decade. Broadly categorised, barriers related to a) practitioner skills and motivation, b) training, c) organisational support and d) external/local policies.

a) Practitioner skills and motivation

IP was reported to be essential to hospital optometrist roles, proffered increased job satisfaction, enhanced professionalism and improved clinical autonomy and patient management [32]. Prior clinical experience and communication skills were deemed essential requisites, both to reinforce prescribing (and non-prescribing decisions), for patient treatment adherence and for holistic management [32]. Motivational deterrents to undertaking IP included lack of fair remuneration [25, 32] (a greater concern for independent optometrists, $p<0.001$[25]), a perception of increased workload (how workload increased was not fully elucidated), difficulty securing funding, fear of litigation, lack of time for training and costs incurred [25].

b) Training

From Loffler et al.'s 2011 survey (n=60 optometrists), satisfaction ratings for various components of OTP training were in general high, with 75% believing training was relevant and helpful to practice. However, 25% indicated they did not have adequate exposure to relevant clinical conditions/number of patients during training or had less opportunity for discussion of prescribing decisions with ophthalmologists. The main barriers to training were identified as difficulty finding a hospital clinical placement and the length of time it took for placement completion (38% took 6 months to 1 year).

c) Organisational support

Optometrists reported three main challenges to development of competence and prescribing scope of practice post NMP qualification: limited clinical caseload exposure, lack of availability of learning support and the constraints of College of Optometry practice guidelines [32]. In general, greater confidence was expressed by hospital optometrists, or those with access to support and/or IP peers, than those in community and/or independent settings. The latter reported isolation and less access to support channels. While College of Optometry clinical guidelines were a facilitator to early prescribing, they were perceived as draconian, outdated and at conflict with organisational clinical guidelines by more experienced optometrists. Overall, optometrists expressed strong desire for greater organisational input for continued professional development, including updates and targeted

educational events. Optometrists overall perceived the scope of prescribing practice as well as the utilisation of optometry IP in services was constrained by this lack of development opportunities.

d) External/local policies

Key policy/contractual limitations were a major barrier limiting the use and scope of community OTP with up to 50% of optometrists lacking access to prescription pads [29]. This required community OTPs to rely on private prescription issue in England (incurring patient costs) and/or GP referral for accessing medicines needs. Although OTP could in theory streamline and offset identified bottlenecks in medicines pathways for locally commissioned enhanced optometric services (as described by Baker et al (2016)), this lack of contractual agreement severely limited the ability to enact and engage in prescribing activities and hence develop and enhance services. It also restricted access to certain medicines which impeded equitable medicines access for community patients.

6.2.6 Summary of main findings

Overall, the review found a relative paucity of empirical work carried out on OTP within the past decade, with a tendency to small scale, local audit, and lack of national evaluation. As a result, there is limited knowledge and understanding about the current scope of OTP practice, its service delivery, and the challenges for national implementation. However, there was some evidence to suggest that barriers to implementation arise in four main areas including a) practitioner skills and motivation, b) training, c) organisational support and d) external/local policies, and that many are prevalent and unchanged over the past decade.

6.3 Conversations with key informants

There was agreement that Optometrists have a key role in supporting current government policy and transforming services to provide care that is safe and accessible close to home[37]. It was acknowledged that the knowledge and skills of optometrists mean that they are well placed to meet the needs of patients who present with acute and non-acute stable ophthalmology conditions, compared to services previously provided by general practitioners.

Discussion around the history and development of the General Optical Council provided an insight into some of the challenges experienced by the regulator over the past few decades. A number of difficulties arose from the historical association with the Royal College of Ophthalmologists. Concerns

were expressed about the GOC regulatory framework, comprising four professional groups, which currently bear little resemblance to original registration, and frustration regarding an apparent reluctance to modernise this aspect of the register by improving recognition of current practice, and associated nomenclature

There was evidence of some top-down resistance (at least initially) to OTP and a lack of support for autonomous practice from the Royal College of Ophthalmologists. Overall, there appeared to be a sense of resistance to change and a belief that OTP was somehow different to non-medical prescribing by the other professional groups e.g. nurse, pharmacists, and allied health professionals, although the basis for this understanding was not clear.

Conversations with the key informants focussed on a number of issues including: i) Strategic vision and commissioning for OTP services; ii) OTP preparation; iii) Supervised practice; iv) Undergraduate training; v) Early transition; vi) Long-term sustainability

6.3.1 Strategic vision and commissioning for OTP services

A lack of evidence exploring the benefits of OTP for patients and services limited understanding and appreciation of the value and potential scope of OTP in both primary and secondary care. This was thought to be hindered by the lack of recognition for different roles/ titles for OTP use within GOC and commissioned services. Despite the lack of evidence, and similarly to other professional groups of NMPs it was noted that OTP is more than just issuing a prescription. Eye conditions need to be considered holistically and this requires experience, knowledge, and skill. There also needs to be wider recognition of other decision making that requires prescribing skills, e.g., decision not to prescribe, deprescribing, and medicines optimisation activities. There were mixed views regarding how optometrists might align with HEE framework for Advanced Clinical Practice, and the potential opportunities this could offer to further extend optometrist scope of practice in new and innovative areas of practice.

OTP led services were reported to be very popular by GPs who were able to ensure access to care for patients within 36 hours. Patients prefer care that is provided closer to home, and commissioners value the fact that OTP is cheaper (90% of tariff cost) and helps reduce waiting lists.

Despite the popularity of OTP led services, different approaches to commissioning were evident across the devolved nations. The extent of commissioned services across the devolved nations varied, resulting in a wide range of service models. In England for example, service commissioning was patchy,

and lacked joined up thinking. Services had to adapt and follow the money over time. Examples of long-running and well established multi-disciplinary services were discussed, with reports of multiple NMPs working in teams providing services that had been responsive to Covid-19 challenges. The complexity of funding in England was highlighted and a need for local commissioners to be innovative, which had in some cases led to funding being drawn down from acute service budgets in the first instance.

In contrast, in Scotland and Wales, a strategic drive to invest in OTP models of care has resulted in OTP services as first contact, diverting patients from GP and from acute services. There is a current drive to support all primary care based optometrists to undertake IP training. Consequently, the Scottish government has allocated funds for IP training courses and placements, but not backfill. Similarly, in Wales there are commissioned IPOS (independent prescribing optometrist service (enhanced services)), to deal with a backlog of patients waiting to be seen with eye conditions. However, it was evident that are still some issues regarding spread and availability of OTPs who tend to be concentrated in urban rather than rural locations, leaving gaps in rural service provision. This is part of a shift from secondary to primary care optometry services in Wales called 'Transforming eye care in Wales', which has opened more opportunity for optometrist independent prescribing roles. More recently during 2021 a cohort of Optometrist IPs had been commissioned to undertake the theoretical component of the training by Health Education England, and commissioned practice placements in Northern Ireland were in the process of being introduced. Wales has similarly put in measures to increase the number of available placements.

Despite positive comments regarding OTP, concerns were expressed about ophthalmologists who appeared to be protecting their role and its potential erosion by OTP. Challenges were noted around the commercial aspects of Optometrist practice, many of whom were employed or self-employed in High Street Opticians, plus a lack of critical cases in primary care.

6.3.2 Pre-course requisites

Current guidance states that those wishing to undertake OTP must have a minimum of two years post-registration experience. Informants agreed that current undergraduate Optometrist curriculum and preparation is limited in its clinical component. There was agreement regarding a general desire to improve UG role preparation where, similarly to nurses, optometrists would be more 'prescribing ready' at initial registration or, that OTP became embedded into undergraduate preparation and initial registration.

6.3.3 OTP preparation

Mixed views on the adequacy of preparation for the OTP role were expressed amongst the key informants. Pre-course expectations regarding the role were felt to be adequate by course providers, but concerns were raised regarding how 'prescribing ready' OTPs were on qualification, and an apparent lack of awareness regarding the wider aspects of the NMP role e.g. prescription pad safety, and governance aspects of the OTP role.

Higher Education Institutes reported good success rates on the taught aspect of OTP preparation, which comprised blended learning, and commonly 45 credits at master's level. Assessments were reported to have a strong clinical focus e.g. MCQ, OSCEs, case scenarios, computer-based exams. In contrast to other NMPs there was no provision to assess numeracy @ 100% and or requirement to obtain 80% in a pharmacology-based exam. Upon completion of the practice element one course provider explained how OTPs can apply for Registered Prior Learning of clinical placement 15 credits so students can exit with a post-graduate certificate.

Current preparation for the OTP role is however fragmented and there is poor alignment between OTP standards, competencies and learning outcomes for OTP. Additionally, there is poor alignment between current OTP competencies and the RPS prescribing competency framework[38] which has been adopted by all other NMP professional groups.

The theoretical aspect of OTP is currently delivered only to optometrists, resulting in a lack of interprofessional learning compared to other NMP programmes, the majority of which are taught together. However, it was not clear if the different registration process for OTP meant that training needed to be separate as well. In contrast to other NMP programmes theoretical and practice-based components of OTP training are separate, leading to a potential disconnect between theory and practice, delays in obtaining practice hours and course completion. The disjointed approach and lack of joined up thinking between HEI providers and practice means no one person or organisation has oversite of the OTP preparation journey, with little opportunity for students or ophthalmologists undertaking the supervisory role to provide feedback, and or address any issues that may arise.

6.3.4 Supervised practice

Clinical placements, organised only at the point of completion of the theoretical component, are quite separate, and unaudited, resulting in a lack of quality assurance and there are no links between HEIs and placement providers. There is an over reliance on hospital-based systems to provide placements

for supervised practice. The prescriptive nature of clinical hours, where Ophthalmologists, in secondary care, are the only people who can provide this, has resulted in a large backlog of people waiting (>2,000) to undertake this aspect, and hence a delay in people registering as IPs. Additionally, there is a cost to students for OTP supervised practice placements many of whom are required to self-fund. As noted above, this is in contrast to other professional groups who routinely undertake supervised practice within their home organisation.

Suggestions to overcome the backlog included, aligning with other professional groups who have recently enabled any NMP to take on the role of practice assessor/ supervisors. The use of telometry was also suggested as way of addressing the need to develop clinical skills using a tablet device or split lamp linked up to Ophthalmologists, which was reported to has been successfully used in practice during the current pandemic.

6.3.5 Early transition

Completion of OTP training and registration is a lengthy process sometimes with more than 2 years between the taught element, supervised practice and the final exam. This resulted in long gaps before OTPs were in a position to prescribe, leading to potential deskilling, lack of prescribing confidence and implementation. The level of available support from HEIs, and practice supervisors to OTPs during this time was not clear. As with other NMPs, it was evident that a team approach enabled peer support and opportunities for multi-professional learning.

Initial governance procedures in some of the devolved nations were discussed and appeared robust in nature. However, the extent to which these are in place, particularly when providing a non-commissioned service, across the UK needs further exploration. Implementation of the OTP role was much easier when part of a commissioned service, providing access to prescription pads and a prescribing budget e.g. in NI, Wales and Scotland. In England where commissioned services are patchy, a lack of prescribing budget and pad were reported to hinder OTP practice, although the proportion of OTPs that this affects was not clear. There were mixed reports on the scope and frequency of prescribing practice, with some OTPs prescribing infrequently, for a narrow range of products, whereas others were quite prolific and prescribed across the formulary. Reasons for this variation in terms of scope and frequency are unknown and would benefit from further exploration.

There were mixed reports regarding the amount and type of formal and informal support for OTPs in practice. The majority of OTPs work in isolation, and concerns were raised about a lack of peer support and clinical supervision. Examples of good practice were mentioned including peer to peer support, a

'Whats App' group and regional OTP events. A lack of remuneration and or increased banding in recognition of IP status was reported and the approach to managing this inconsistent across the UK, with particular challenges noted in Wales.

6.3.6 Long term sustainability

There was agreement regarding the importance that OTP develops in a way that is responsive to wider changes in the NHS, patient needs and to manage long term sustainability. Examples of long-running services, where NMP was integral were discussed. Wider benefits of having an embedded service were highlighted including enhanced relationships in the local landscape, and improved referral systems in and out of the service. Similarly, the ability of commissioned services to adapt and continue during the pandemic, ensuring stable access to services for patients, provided further confirmation of a successful OTP commissioned service.

Frustrations were expressed regarding the regulatory requirement to record every prescribing decision, regardless of whether a prescription is issued, and for it to be available for inspection as an audit by the regulator that has no current mechanism to manage this process. A lack of CPD relevant to current practice and or NMP was also found to be frustrating. Knowledge and awareness of the various types of support available to other NMPs however appeared limited, and or how OTPs might engage with the wider body of NMPs across the UK through national NMP events and/ or the Association for Prescribers.

7 Discussion

This rapid review has systematically explored the evidence of barriers and facilitators to non- medical prescribing across all professions, including optometrist therapeutic prescribing along with conversations with key informants to identify key challenges and potential solutions. Given that non-medical prescribing is likely to be increasingly important for services to overcome predicted workforce deficits and inadequacies, this review is timely and of significant importance.

The results suggest a lack of joined up thinking which appears to have hampered advancement and improvement in relation to many aspects of the preparation, education and use of the prescribing role by OTPs. Evidence reporting benefits of OTP is limited but indicates that that OTP-led community services are able to manage the vast majority of the case load (96%) independently, with few referrals being made from these services to acute care[36]. There is evidence of isolation between OTPs and other professional groups who are NMPs. 'Silo' thinking, resulting in a lack of shared learning,

threatens to hamper the development of novel and advanced roles for OTP that are occurring in other NMP professions to meet the increasing demand for medication.

Organisational level

Issues were identified at a national/GOC level in terms of recognition of OTP scope and the leadership and support of developing innovative OTP roles. Concerns about role erosion and examples of resistance to NMP, in particular from the medical profession, have been long noted as a barrier to the acceptance and implementation of NMP [13-15, 19-22]. Indications from this review are that similar resistance exists with regards to OTP. Gaining acceptance and approval for OTP from key stakeholders and leaders is a crucial step towards uptake within an organisation and is also essential for supporting the implementation and individual development of NMPs throughout each stage. Negative views and concerns about NMP are known to dissipate once colleagues gain experience of working alongside NMPs, understand the benefits and have opportunity to develop a trusting relationship[39].

Discussion of advanced practice within optometry services was lacking, particularly non-clinical components such as leadership and research[40] . In other professions, the development of roles and agreement of competencies for advanced practice have coincided with the development of prescribing, and more recently the HEE ACP framework, providing[40] a backbone to career development and clinical pathways e.g., paramedics and physiotherapists. The alignment of prescribing with advanced clinical practice career development is a strong motivator for paramedics undertaking prescribing training[41].

Delays in organisational preparation to provide the infrastructure required to support NMP, such as access to a prescribing budget, prescribing pads and access to medical records were barriers experienced by OTPs [35, 36, 42]. Similar barriers reported by other NMPs [13-15, 17-20, 22]. Such problems are usually overcome once the first NMPs have become established in an organisation, however problems of accessing patient medical records and agreements to prescribe across primary care networks have been persistent barriers in community services[43]. A strategic approach to commissioning, as reported by key informants, can help facilitate the development and longevity of innovative service models, within which IP is key to providing care.

Practitioner readiness

Barriers and facilitators to undertaking NMP reported by optometrists are similar to those reported by other NMPs, in particular lack of remuneration, lack of funding and the time required to complete

NMP training[35, 36, 42] . Motivation to undertake NMP training, as reported by other NMPs, is primarily to gain the autonomy of practice to be able to improve patient care (e.g., by reducing waiting time and improving the quality of care [14, 18, 19, 22]. Where barriers are in place, as is the case with OTP access to prescribing pads or budget[35, 36, 42], the motivation to undertake training is reduced. A common secondary motivation is to improve job satisfaction and professional status [14, 19, 22]. These motivational aspects often win out over deterrents, such as lack of renumeration, time and effort to complete the course[14, 19, 21]. There is little information on the uptake of OTP but was reported as 34% in one study[44]. It is likely that barriers to OTP and additional complications such as payments for clinical practice placements, can act as deterrents that need to be addressed to promote uptake and implementation of the OTP role[35, 42] .

OTP role preparation

Pre-course requisites

There were mixed opinions regarding current guidance which states that those wishing to undertake OTP must have a minimum of two years post-registration experience. There is a lack of consensus within other regulators who have adopted different approaches to supporting uptake of the IP role. For example, recent regulatory changes have increased accessibility to independent/supplementary prescribing training for nurses as the requirement for post registration experience has been reduced from 3 to 1 years[45, 46]. Original policy supporting prescribing by allied health professionals, such as physiotherapist, podiatrists and paramedics [47, 48] however, recommended that only clinicians working at a highly skilled and specialist level, in a relevant clinical/service area should progress to independent prescribing, with at least 2-3 years post registration experience prior to undertaking the prescribing programme.

OTP preparation

Preparation for OTP is very different to all other groups of NMPs. OTP prescribing training is for example divided into three distinct stages (academic modules, practice-based learning, and final exam). This is in contrast with prescribing programmes for other NMPs who simultaneously undertake the taught component along with the required period of supervised practice. Practice-based learning which is integral to the prescribing programme is a Health and Care Professionals Council (HCPC) requirement [49] central to which is the integration of theory and practice[49]. Separation of these components may prevent consolidated learning in practice; a positive educational process that enable students to translate theory into practice. There is also a lack of alignment between prescribing standards set out by the GOC and those in the RPS Competency Framework for all Prescribers, adopted

by all the other professional groups who undertake NMP training[38]. This makes it difficult to compare OTP prescribing competencies with those of other NMPs in the UK. The taught component of OTP is uni-professional, and hence there is missed opportunity for multi-professional learning for OTPs and a lack of awareness amongst OTP HEI course providers of how other NMP programmes work. This prevents shared understanding of best practice in NMP education. By training together, NMPs from different professions gain mutual understanding of their professional roles, which can enhance communication and working across boundaries.

The restriction of practice-based learning to an acute ophthalmic care setting under the supervision of an ophthalmologist was reported to problematic in terms of availability and accessibility, creating a bottleneck in the availability of clinical placements. For those working in community settings, it was argued that low frequency of relevant clinical cases required to complete supervised practice could create further delays. The problem of a shortage of relevant clinical placements and problems accessing practice supervisors is not isolated to OTP and has been reported by other NMPs. Recent regulatory changes have allowed suitably qualified NMPs to undertake the role of practice assessor [45, 49, 50] , a role that previously could only be undertaken by a medical doctor or dentist, known as 'designated medical practitioner' (DMP). However, there was significant concern that limited availability of DMPs in some areas was acting as a barrier to those wishing to access training[51-53]. The growing workforce of experienced NMPs and a desire to make best use of their skills led to the regulatory changes outlined above[45].

It was found that there were few effective 'feedback loops' through which OTP course providers and practice-based educators could learn from student experiences, preparation for the prescribing role, or outcomes/success in practice or quality assure clinical placements., This is similarly in contrast to the HCPC, whose standards for prescribing set out the need for regular and effective collaboration between education providers and practice education providers.

There is a lack of clear justification for the differences between OTP educational and clinical standards for prescribing training and those of other NMP professions. From the little feedback that exists on OTP learning experiences, a quarter reported a lack of clinical exposure and support from practice educators[36] . Delays in initiating prescribing are known to reduce confidence[18] . The extended time between educational and practice components for OTPs may reduce confidence in prescribing practice and thereby reduce use of the qualification. Financial barriers deterring OTPs from undertaking practice placements also need to be considered.

Early transition

The extent to which NMPs use their qualification in practice is one indicator of the success of NMP implementation. However, it is important to capture the range of ways that prescribing knowledge can be used in addition to issuing prescriptions. For example, to acknowledge benefits of providing advice or information to patients on medication and deprescribing inappropriate medicine, and the longer-term cost implications of these actions[54]. Once qualified, the rate at which NMPs issue prescriptions, as highlighted by key informants, is known to vary enormously depending on the role and setting in which they work[43]. Those working in urgent and emergency services such as A&E and walk-in-centres tend to prescribe more frequently than NMPs in mental health, community nursing. Prescribing rates by OTPs[36] appear to be in line with average prescribing rates of other NMPs, which fall between 1-10 items per week. However, Loeffler et al.'s finding that 33% were referring patients to a GP for a prescription or using written orders suggests that barriers may be preventing greater use of prescribing, as found by Spillane et al 2021[35] .

Ongoing sustainment and development

Problems faced by OTPs over the long term include isolation, poor access to clinical supervision and CPD to support development of the prescribing role. These issues, as discussed by key informants, can be resolved, by schemes such as buddying [18], peer support [12, 13, 16, 18]and pan organisational provision for CPD[12, 14, 18, 19, 23] opportunities, and improved awareness of generic NMP study days and conferences, and support offered by the Association for Prescribers. Long term sustainability could be facilitated by more strategic approaches to service commissioning for OTP services, including robust service evaluation, to avoid instability, with services 'chasing the money' to survive.

7.,1 Limitations

This rapid review would have benefited from the input of a wider range of key informants including patients, OTP students, practicing OTP prescribers and ophthalmologists supervisors. As this was a rapid review, there was no assessment of the quality of included articles, however the review of NMP literature excluded reviews that did not follow a systematic process which is an indicator of quality. Furthermore, the timescale of literature included in these reviews reflects historical issues throughout the progression of NMP, some of which have since been addressed, such as provision of preparatory education on physical assessment and diagnosis prior to entering NMP programmes. The impact of changes, such as recent regulatory changes to NMP the practice supervision and assessment, have yet to be assessed. Literature on non-medical prescribing outside of the UK was excluded, limiting the international relevance of this review.

8 Further Research

The review indicates a number of issues related to OTP that may warrant further investigation. We recommend:

1) Evaluation on the uptake, use and impact of OTP on patient care and service delivery.
2) Exploration of the wider benefits of improved knowledge gained from OTP training on quality of care, safety and services provided by optometrist independent prescribers. This work should feed into commissioners and service leaders to inform future service development.
3) Evaluation of patient and carer views.
4) Evaluation of the appropriateness and effectiveness of OTP preparation.
5) Research into the medicines management activities of OTPs e.g. deprescribing, decision not to prescribe. This would help improve understanding regarding the true value of OTP with respect to patient outcomes and efficiency of care processes.
6) Research into the cost effectiveness of OTP.

9 Recommendations

These recommendations are designed to support OTP implementation by addressing reported challenges and building on good practice.

It is recommended that:

1. There is a need for review and alignment of current GOC standards for prescribing with those of other regulatory bodies i.e., HCPC, Nursing and Midwifery Council (NMC) and General Pharmaceutical Council (GPhC) and adoption of the RPS Competency Framework for all Prescribers.

2. Current professional preparation programmes are reviewed with respect to improving the integration of basic pharmacology within this provision and potential to revise existing pre-course requisites for Optometrists to have acquired 2 years post-registration experience prior to undertaking preparation for the OTP role.

3. There is a need to establish robust systems to capture data on OTP involvement in medicines management activities to support ongoing evaluation and clinical audit.

4. The use of the ACP framework to support Optometrist advanced clinical practice is reviewed in more detail with a view to providing guidance for clinicians with respect to developing innovative service models in primary and secondary care.

5. Those involved in OTP preparation should reconsider opportunities for shared learning with other groups of professionals undertaking NMP training.

6. There is a need to review current arrangements and provision for practice placements and consider alignment with recent changes adopted by other regulatory bodies and the newly introduced Competency Framework for Designated Prescribing Practitioners[55].

7. A national UK evaluation is required in order better understand uptake, scope and implementation of OTP and its impact on team configuration, costs and patient experience.

8. There is a need to review current governance arrangements, practical challenges associated with accessing prescribing budgets for non-commissioned services, and provision of CPD and support for OTPs who work in different practice settings.

10 Conclusion

This rapid review has identified similar barriers and facilitators that impact on the uptake and use of non-medical prescribing and optometrist therapeutic prescribing across different stages, from initial preparation through to long-term sustainability. A review of relevant literature on OTP, together with input from key informants, has highlighted key challenges along with potential solutions. While research evidence is limited, OTP has been positively received. There is however clear scope to further extend it OTP in order that its potential is fully realised.

A lack of joined up thinking appears to have hampered advancement in relation to many aspects of the preparation, education and use of the prescribing role by OTPs. Future development of OTP would benefit from greater strategic oversight and alignment with educational and governance procedures in place for other NMPs. Arrangements for practice placements require review to address bottlenecks in course completion and the impact this has on prescribing practice. Acknowledgement and support for novel and advanced roles for OTP may facilitate role development in line with other NMP professions. These changes are timely given the role of non-medical prescribing in improving service capacity to meet increasing demand for medication, especially considering current and predicted workforce deficits in primary and secondary care, particularly ophthalmology.

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Tables

Table 1: Additional prescribing roles

Prescribing role	Role description	Training requirements	Prescribing access (As Prescription-Only Medicine)
Additional supply	Write orders for, and supply in an emergency, a range of drugs in addition to those which can be ordered or supplied by a normal optometrist according to CoO Formulary	2 years post-registration experience Taught educational course Clinical placement hours (6 x 3-hour sessions) Pass CoO Common Final Assessment	Acetylcysteine Atropine Sulfate Azelastine Hydrochloride Diclofenac Sodium Emedastine Homatropine Hydrobromide Ketotifen Lodoxamide Nedocromil Sodium Olopatadine Pilocarpine Sodium Cromoglicate
Independent and supplementary prescribing (includes additional supply)	Take responsibility for clinical assessment of patient, establish diagnosis and determine clinical management required (including prescribing where necessary)	2 years post-registration experience Taught educational course Clinical placement hours (24 x 3-hour sessions) Pass CoO Common Final Assessment	Any licensed, non-controlled medicine for ocular conditions, affecting the eye and adnexa, within the recognised area of expertise and competence of the optometrist. Drugs requiring injection excepted.

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)	► Literature and scoping reviews without documented transparent and replicable process
► Qualitative, quantitative, and mixed methods systematic reviews	► Primary research
► Reviews addressing NMP (this includes NMIP by legislated non-doctor health care professionals, reviews addressing supplementary and/or collaborative models of prescribing)	
►Reviews addressing NMP in primary/ community/secondary/mixed primary and secondary care	
► Reviews presenting empirical evidence of barriers and/or facilitators to NMP implementation	
► Peer reviewed, full text articles published between 01 January 2010 and 25 March 2021	► Abstracts, conference reports
► Reviews published in English	► Reviews published in non-English language

Table 3: Four stage, iterative process of data analysis

Stage 1: In-depth reading and familiarisation with individual systematic reviews and data extraction. **Stage 2:** Inductive line-by-line coding by one reviewer (SvE). Using NVivo 11 the reviewer created a codebook which included an overview of all the individual codes. **Stage 3:** The individual codes were discussed with the full research team (NC, KS, MC, & JE). Wherever there was any lack of clarity or consensus about the naming of a code or the interpretation of a concept, this was discussed and where appropriate the coding was revised accordingly. Further to these discussions the reviewer (SvE) grouped the codes into descriptive themes. This codebook created in NVivo was applied to all papers. **Stage 4:** Descriptive themes were organised into analytical themes (see Appendix 3).

Table 4: Inclusion criteria optometrist prescribing and additional supply review

Inclusion Criteria
►Primary and secondary empirical studies, abstracts, conference reports, literature reviews, reports
►Studies employing any quantitative, qualitative or mixed methods design
►Studies addressing non-medical prescribing (including supplementary and independent prescribing), medicines administration and/or supply undertaken by legislated optometrists
►Studies addressing IP in any healthcare setting
► Full text articles published between January 2010 and March 2021 in the English language
►Studies undertaken in the United Kingdom

Figures

Figure 1: PRISMA flowchart of paper selection process for barriers and facilitators in non-medical prescribing review of systematic reviews

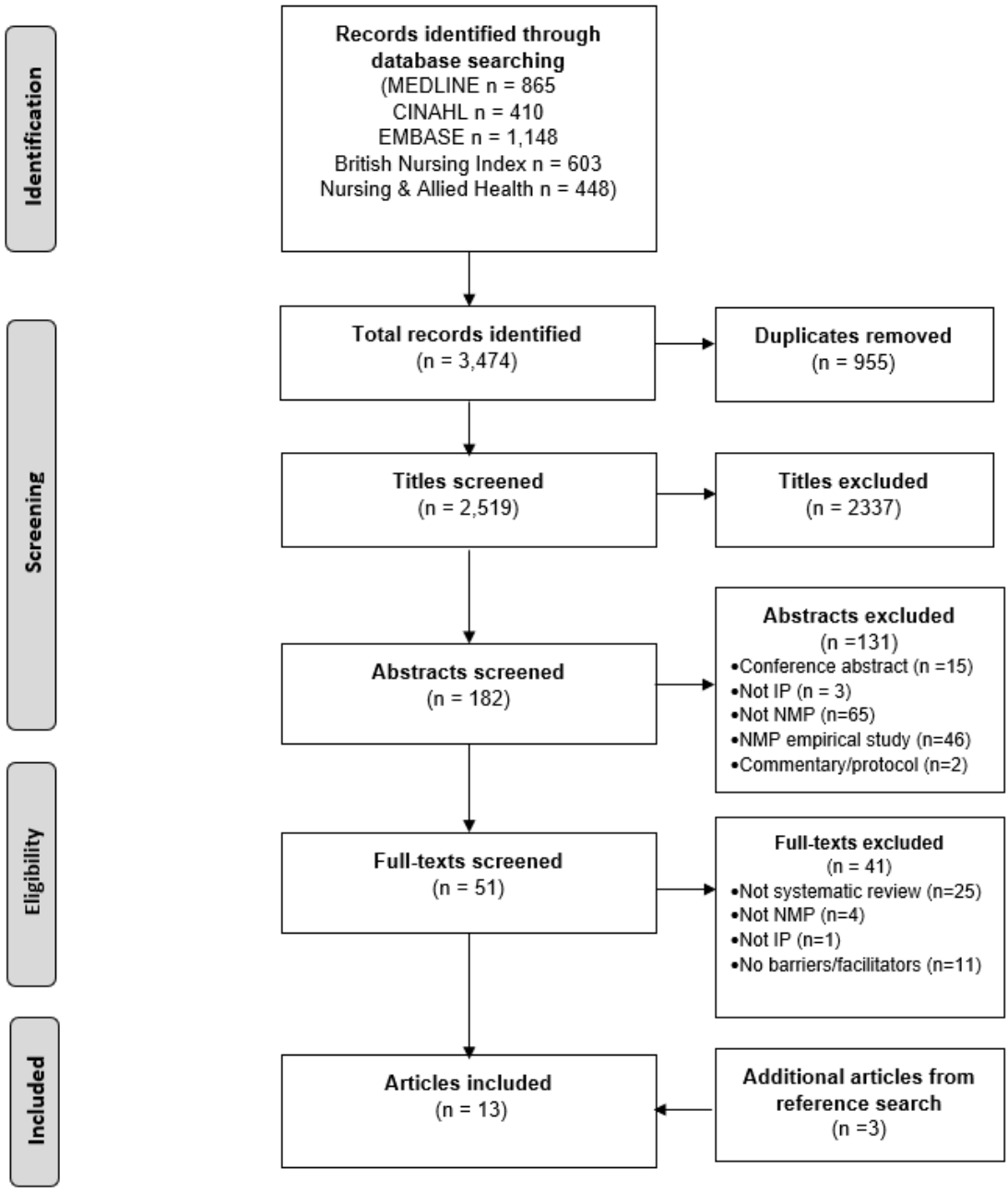
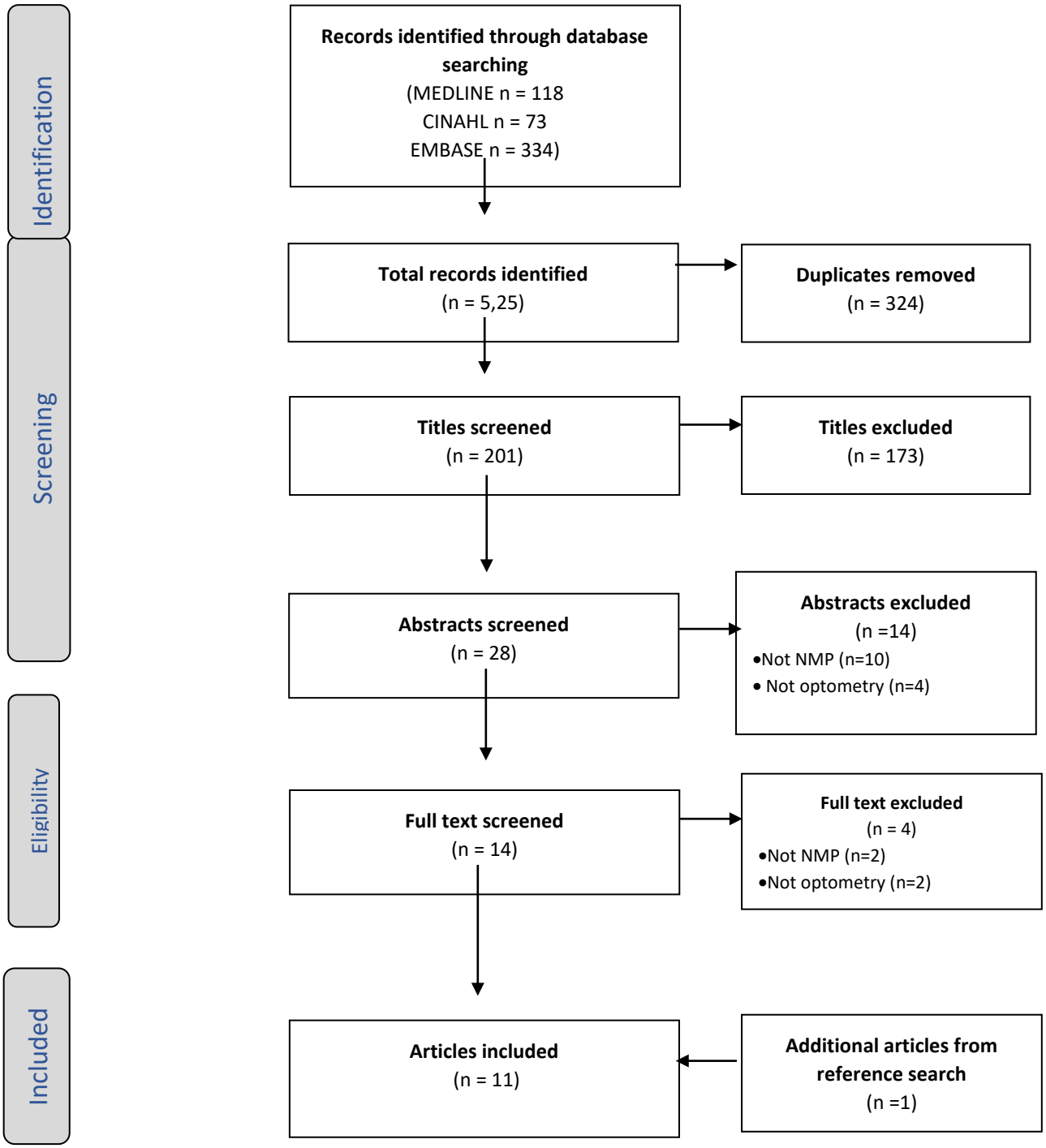


Figure 2: PRISMA flowchart of paper selection process for optometrist prescribing and additional supply review



Appendices

Appendix 1: Example search string for barriers and facilitators to non-medical prescribing

	EBSCO host; CINAHL	
1	AB prescrib* OR TI prescrib*	154,192
2	AB independent prescrib* OR TI independent prescrib*	510
3	AB non-medical prescrib* OR TI non-medical prescrib*	173
4	AB patient group direction* OR TI patient group direction*	260
5	AB exemption* OR TI exemption*	3,593
6	AB medicine* exemption* OR TI medicine* exemption*	20
7	AB medicine* endorsement* OR TI medicine* endorsement*	41
8	AB standing order* OR TI standing order*	884
9	AB medicine* administration* OR TI AB medicine* administration*	3,297
10	AB medicine* supply OR TI medicine* supply	904
11	AB medicine* optimisation OR TI medicine* optimisation	268
12	AB medicine* management OR TI medicine* management	5,024
13	AB medication administration OR TI medication administration	8,004
14	AB prescribing right* OR TI prescribing right*	152
15	AB prescribing authority OR TI prescribing authority	205
16	OR/1-15	162,670
17	AB nurs* OR TI nurs*	462,694
18	AB physiotherap* OR TI physiotherap*	26,750
19	AB physical therap* OR TI physical therap*	30,633
20	AB pharmacist* OR TI pharmacist*	34,605
21	AB (podiatr* OR chiropod*) OR TI (podiatr* OR chiropod*)	3,293
22	AB radiographer* OR TI radiographer*	1,764
23	AB (dietician* OR dietician*) OR TI (dietician* OR dietician*)	1,770
24	AB paramedic* OR TI paramedic*	8,019
25	AB optometr* OR TI optometr*	4,888
26	OR/17-26	560,565
27	16 AND 26	14,369
28	AB nurse N3 prescrib* OR TI nurse N3 prescrib*	1,599
29	AB pharmacist N3 prescrib* OR TI pharmacist N3 prescrib*	1,261
30	AB physiotherap* N3 prescrib* OR TI physiotherap* N3 prescrib*	162
31	AB paramedic* N3 prescrib* OR TI paramedic* N3 prescrib*	10
32	AB podiatr* N3 prescrib* OR TI podiatr* N3 prescrib*	23
33	AB dietician* N3 prescrib* OR TI dietician* N3 prescrib*	6
34	AB dietitian* N3 prescrib* OR TI AB dietitian* N3 prescrib*	32
35	AB radiograph* N3 prescrib* OR TI radiograph* N3 prescrib*	97
36	AB optometr* N3 prescrib* OR TI optometr* N3 prescrib*	62
37	OR/20-28	3,148
38	19 OR 29	14,483
39	(MM "Systematic Reviews as Topic")	8,923
40	AB systematic review* OR TI systematic review*	207,733
41	AB scoping review* OR TI scoping review*	8,579
42	AB realist review* OR TI realist review*	472
43	AB "literature review*" OR TI "literature review"	358,083
44	AB "rapid review*" OR TI "rapid review"	3,135
45	AB meta-synthesis OR TI meta-synthesis	1,002
47	AB metasynthesis OR TI metasynthesis	361
39	AB "qualitative review*" OR TI "qualitative review*"	7,633

Appendix 2: Summary of barriers and facilitators to non-medical prescribing

Authors	Aims/objectives	Number of papers included	Time frame	Model of prescribing	NMP profession	Care setting	Main findings
Abuzour (2018)	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.	34	2006-2016	Independent prescribing	Pharmacists & nurses	Primary, secondary, & tertiary care	Focused on transition of prescribing into practice. Knowledge, pre-registration education, experience, support and confidence were some of the intrinsic and extrinsic factors influencing IPs. Difficulty in transferring theory to practice due to lack of basic pharmacology and bioscience content in pre-registration nursing rather than the prescribing programme. Students saw interventions using virtual learning or learning in practice as more useful with long-term benefits. IPs were able to develop their expertise when integrating their competencies in a workplace context with support from colleagues and adherence to guidelines.

Chater (2020)	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).	8	All relevant papers published up to July 2019	Independent prescribing	Mixed	Not specified	Review aimed to identify what evidence exists regarding the influences on NMP's antimicrobial prescribing behaviour and analyse the operationalisation of the identified drivers of behaviour using the Theoretical Domains Framework (TDF). Key issues centred around strategies for managing challenges experienced during consultations, managing patient concerns, peer support and wider public awareness of antimicrobial resistance. The two most common TDF domains highlighted as influences on prescribing behaviour, represented in all studies, were social influences and beliefs about consequences.
Cleary (2017)	To identify and summarize qualitative research that focussed on mental health nurse prescribing, synthesize findings, and outline key themes discerned.	12	Not specified	Independent & supplementary prescribing	Mental health nurses	Not specified	Three general themes were identified: (i) patient-centred care; (ii) professional role; and (iii) professional support. Nurse prescribers embrace a patient-centred approach, providing timely and effective medication management. Adequate education and continuing professional development inclusive of clinical supervision enable competency development in nurse prescribing, supportive professional relationships, and patient safety.
Darvishpour (2014)	This review aims to combine and interpret existing literature reviews and systematic studies to obtain new insights on nurse prescription.	11	No time limitation used	Independent & supplementary prescribing	Nurses	Primary & secondary care	Eight themes were identified: leading countries in prescribing (i.e., the UK), positive views on nurse NMP, features (i.e., prescribing patterns, areas of nurse prescribing, confidence in prescribing and quality and safety of practice), infrastructures, benefits (i.e. for health system, patients and nurses), disadvantages (additional work, safety concerns), facilitators (educational factors, managerial factors, organisational factors) and barriers (legal limitations, executive factors, humanistic factors, educational deficiencies and, research weaknesses) of nursing prescription.

Djerbib (2018)	The aim of this review is to discover and understand the factors that influence prescribing decisions made by iNMP nurses in primary care.	10	1994 - July 2016	Independent & supplementary prescribing	Nurses	Primary care	A total of 14 common descriptive themes were identified across the papers included in the review. These were further analysed and gave rise to three interpretative themes: perception of confidence, perception of risk and impact on the patient. Appropriate education and training are pivotal in improving prescribers' competence, reducing risk and preventing harm to patients.
Graham-Clarke (2017)	The aim of this review is to evaluate the use of, as well as facilitators, and barriers of independent non-medical prescribing in primary and secondary care in the UK.	42	2006 - 26 March 2017	Independent prescribing	Mixed	Primary & secondary care	This systematic review & thematic synthesis focused on b & f's of NMP - please note that the authors argued that each theme and subtheme could act as a barrier or facilitator depending on the circumstances: a. Where there was a lack of understanding on NMP role, or lack of trust in the individual NMP, then the factors were more inclined to be barriers. b. For example, medical professionals were less likely to support NMP where there was a lack of clarity about who took responsibility for the prescribing practice. c. Because of budgetary constraints factors may become barriers, such as the use of restrictive formularies as a cost saving measure. d. Themes and subthemes do not stand in isolation, but are interdependent on each other
Jebara (2018)	The aims of this systematic review are 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.	65	No date limit until November 2017	Independent & supplementary prescribing	Pharmacists	Primary care, community, & secondary care	The main benefits were ease of patient access to healthcare services, improved patient outcomes, better use of pharmacists' skills and knowledge, improved pharmacist job satisfaction, and reduced physician workload. The main barriers were pharmacists' skills (clinical examination and diagnostic skills), resources (workforce, access to medical records, space, time), physicians and organisational support, funding, legal aspects (accountability, conflict of interest), pharmacy practice recognition.

McIntosh (2016)	To critically appraise, synthesize and present evidence on the influences on prescribing decision-making among supplementary and independent NMPs in the United Kingdom.	3	2003 - June 2013	Independent & supplementary prescribing	Mixed	Primary care	Regarding prescribing decision-making, complex influences were evident such as experience in the role, the use of evidence-based guidelines and peer support and encouragement from doctors; these helped NMPs to feel more knowledgeable and confident about their prescribing decisions. Opposing influences included prioritisation of experience and concern about complications over evidence base, and peer conflict.
Mills (2020)	To explore the views, opinions, and attitudes of pharmacists and graduates towards non-medical prescribing.	14	January 2003 - September 2017	Independent & supplementary prescribing	Pharmacists	Primary care & community setting	NMP was considered a natural extension to the role of a pharmacist despite difficulties in completing the required training. The ability to then prescribe was dependent on funding and access to medical records, time, and support staff. Pharmacists experienced professional rivalry with both support and resistance from members of the primary care team. The provision of training was frequently referred to as unsatisfactory. Pharmacists were motivated to prescribe, deriving increased job satisfaction and a sense of professionalism; however, they often felt underprepared for the reality of unsupervised practice. Furthermore, pharmacists reported a cautious approach with a fear of making errors frequently discussed.
Noblet (2017)	To explore the factors that affect the implementation or utilisation of independent non-medical prescribing (iNMP)?	43	2001-2011	Independent prescribing	Mixed	Primary, secondary, & specialist care	Qualitative studies identified barriers and facilitators to non-medical prescribing in political/ organisational factors; whether a formulary is used; education and support; personal and professional factors among the medical profession, other professions, and service users; and financial factors. Quantitative studies confirmed these factors.

Nuttall (2018)	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.	37	1999-24 April 2015	Independent & supplementary prescribing	Nurses	Primary care	Nine themes were identified: patient-centred care; benefits to the service; the need for knowledge (particularly pharmaceutical); professional accountability and boundary-setting; safety consciousness; barriers to effective prescribing (e.g., lack of access to training, lack of support); role-preservation; power-shifts and interprofessional relationships and culture of prescribing.
Poh (2018)	To synthesize the best available evidence on the safety and effectiveness of pharmacist prescribing on patient outcomes in patients who present to hospital.	15	Until 24 January 2017 (from database inception?)	Independent & supplementary prescribing	Pharmacists	Secondary care	This review explored the impact of pharmacist NMP on patient outcomes in a hospital setting. It provided low to moderate evidence that pharmacists could prescribe to the same standards as doctors. Pharmacists were better at adhering to dosing guidelines when prescribing by protocol and made significantly fewer prescribing errors when charting patients' usual medications on admission to hospital.
Stenner (2018)	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.	21	January 1985 - May 2016 (physiotherapy) + January 1968 - May 2016 (podiatry)	Independent & supplementary prescribing	Physiotherapists & Podiatrists	Primary & secondary care	This review focused on physiotherapist and podiatrist NMP. No studies were identified that specifically evaluated prescribing by physiotherapists or podiatrists and no studies relating specifically to podiatry met the inclusion criteria. Four main themes were identified in the data relating to physiotherapy: 1. Extent of involvement in medicines advice or administration; 2. Knowledge levels and training needs relating to role in medicines management or advice; 3. Attitudes towards physiotherapist prescribing or extended medicines role; 4. Care outcomes and costs.

Appendix 3: **Overview of barriers and facilitators to non-medical prescribing**

Analytical themes	Barriers	Facilitators
1a. Preparatory stage - Organisational readiness	• No local legislation and policies in place (Noblett 2017; Stenner 2018) • Administrative processes are long and arduous and can lead to delay in practicing (Noblett 2017) • Restrictive formularies are used as a cost saving measure (Graham-Clarke 2018) • Lack of agreement regarding budgetary arrangements (Noblett 2017) • No access to prescription pads (Darvishpour 2014; Mills 2020; Noblett 2017; Nuttall 2018) • No access to medical records (Chater 2020; Graham-Clarke 2017; Jebara 2018; Mills 2020; Noblett 2017; Stenner 2018) 1. Lack of space and time to prescribe (Jebara 2018; Mills 2020; Noblett 2017; Nuttall 2018): 2. No access to private consultation rooms (Jebara 2018) 3. Issues with confidentiality regarding accessing patients' medical records (Jebara 2018) • Formulary limitations making scope of what NMPs can prescribe too restrictive (Darvishpour 2014; Djerbib 2018; Graham-Clarke 2017; Noblett 2017; Nuttal 2018) • Lack of strategic vision (Djerbib 2018; Graham Clarke 2017; Noblett 2017) • Perceived lack of need for NMP (Mills 2020) • Lack of management and MDT support (Abuzour 2017; Cleary 2017; Mills 2020; Nuttall 2018)	• Clear local NMP policies, guidelines, and protocols in place (Chater 2020; Djerbib 2018; Graham-Clarke 2017; McIntosh, 2016; Noblett 2017; Nuttall 2018; Poh 2018) • Scope of prescribing agreed by Drug Therapeutic committees and a prescribing budget identified (Noblett 2017; Graham-Clarke 2017) • Regular review and updates of policies and formularies (Cleary 2017; Noblett 2017) • A strong pro-NMP leadership (Graham-Clarke 2017; Nuttall 2018) • MDT and doctors understand and appreciate NMP (Cleary 2017; Graham-Clarke 2017) • Acceptance and positive attitudes towards NMP (Cleary 2017; Darvishpour 2014; Jebara 2018; Noblett 2017) • Funding to optimise the workforce (Darvishpour 2014; Jebara 2018; Mills 2020) • Formal support mechanisms, including (clinical) supervision in place (Chater 2020; Cleary 2017; Nuttall 2018) • MDT and doctors support NMP (Cleary 2017; Darvishpour 2014; Jebara 2018; McIntosh 2016; Mills 2020; Nuttall 2018; Stenner 2018)

	• Lack of regular (clinical) supervision (Cleary 2017) • Lack of mentoring support (Mills 2020) • Ambiguity around NMP roles led to lack of clarity regarding professional and legal boundaries (Darvishpour 2014; Cleary 2017; Graham-Clarke 2018; Nuttall 2018) • Poor communication networks (Abuzour 2017; Graham-Clarke 2017) • Role dissonance from doctors (Chater 2020; Cleary 2017; Darvishpour 2014; Graham-Clarke 2017; Jebara 2018; McIntosh 2016; Mills 2020; Noblett 2017; Nuttall 2018, Poh 2018; Stenner 2018) and from colleagues (Mills 2020)	
1b. Preparatory stage - Practitioner readiness	• Inadequate pre-training knowledge of pharmacology and numeracy (Abuzour 2018; Noblett 2017) • Added responsibility is perceived as a deterrent (Abuzour 2018; Mills 2020) • Lack of financial renumeration (Cleary 2017; Graham- Clarke 2017; Noblett 2017; Nuttall 2018) • Time and cost of completing course prerequisites (Noblett 2017) • Lack of funding for training (Graham-Clarke 2018; Noblett 2017)	• An increased sense of autonomy (Darvishpour 2014; Graham-Clarke 2018; Noblett 2017; Nuttall 2018) • Making better use of existing skills and expertise practitioners (Darvishpour 2014) • Helps with professional development and increases clinical competence (Abuzour 2017; Darvishpour 2014; Graham-Clarke 2018; Nuttall 2018) • Professional satisfaction (Cleary 2017; Darvishpour 2014; Graham-Clarke 2018; Jebara 2018; Mills 2020; Noblet 2017; Nuttall 2018)
2. Training	• NMP training is inadequate (Chater 2020; Cleary 2017; Darvishpour 2014; Mills 2020), due to lack of: 1. Applied pharmacology (Abuzour 2018; Darvishpour 2014; Djerbib 2018; Noblet 2017; Nuttall 2018; Stenner 2018) 2. Bioscience (Abuzour 2018) 3. Advanced clinical activities training (Abuzour 2018; Darvishpour 2014; Cleary 2017; Djerbib 2018; Jebara 2018; Mills 2020; Poh 2018)	• Multi-faceted mixed methods approach to teaching students how to prescribe (Abuzour 2018) • Pedagogical methods (e.g., podcasts and virtual patients) (Abuzour 2018) • Identify learning needs of students, e.g., repetition of key concepts and applying knowledge in the workplace (Abuzour 2018)

	• Difficulty finding DMPs and/or mentors (Abuzour 2018; Noblett 2017) • Lack of peer and professional support during training (Graham-Clarke 2018) • Lack of quality supervision during training (Stenner 2018) • Time and course commitments make completing NMP training challenging (Graham-Clarke 2017; Mills 2020)	
3. Transition – post-training	• Lack of confidence (Abuzour 2018; Chater 2020; Darvishpour 2014; Djerbib 2018; Graham-Clarke 2017; McIntosh 2016; Nuttall 2018; Stenner 2018) • Delay in obtaining authorisation to practice as NMP after qualifying can mean that practitioners lose confidence • Fearful of making mistakes (Abuzour 2017; Chater 2020; Djerbib 2018; Mills 2020; Noblett 2017; Nuttall 2018; Stenner 2018) • Anxiety is associated with (increased) accountability (Abuzour 2017; Nuttall 2018) • Fear of liability (Jebara 2018; Noblett 2017; Stenner 2018) and litigation (Chater 2020; Djerbib 2018; Noblett 2017) • Lack of legal protection (Chater 2020; Djerbib 2018; Noblett 2017) • Time pressure and excessive workload (Abuzour 2018; Graham-Clarke 2018; Mills 2020; Nuttall 2018) • Lack of support by management and MDT (Abuzour 2018; Graham-Clarke 2018; Noblett 2017) • Lack of peer support (Noblett 2017) • No adequate supervision post-training (Noblett 2017) • Feelings of isolation (due to lack of support) (Mills 2020)	• Increasing expertise, competence, and capability by gaining experience of prescribing (Abuzour 2018; Darvishpour 2014; McIntosh 2016; Nuttall 2018) • Having enough time to make prescribing decisions (Chater 2020) • A team approach to prescribing (Abuzour 2018; McIntosh 2016) • Adequate support from management (Graham-Clarke 2017), MDT and doctors helped build NMPs' confidence (Abuzour 2018; Darvishpour 2014; Noblett 2017) • Peer support post-training (Abuzour 2018; Chater 2020; McIntosh 2016; Noblett 2017)

	• Problems with setting boundaries with patients (Chater 2020; Djerbib 2018; McIntosh)	
4. Development and sustainability	• Difficulty accessing formal CPD (Abuzour 2018; Djerbib 2018; Graham-Clarke 2018; Nuttall 2018) • Lack of structure in CPD (Abuzour 2017; Djerbib 2018) • Need for adequate and up-to-date knowledge not met (Abuzour 2018; P 2020; Nuttall 2018)	NMP has lots of benefits: • Improved access to healthcare (Cleary 2017; Jebara 2018; Darvishpour 2014; Mills 2020; Poh 2018; Stenner 2018) • Better quality of care (Darvishpour 2014; Cleary 2017; Stenner 2018) • NMPs who had completed specialist training prescribed more items from a wider range of medications (Abuzour 2017)

Appendix 4: Example search string for OTP

	EBSCO host; MEDLINE/CINAHL	
1	(MM "Family Practice")	42, 101
2	(MM "Primary Health Care")	51,956
3	(MM "Physicians, Family")	11,166
4	(MH "Community Health Nursing")	19,631
5	(MH "Community Health Workers")	5,455
6	(MH "Community Health Services")	31,960
7	(MH "Community Health Centers")	117, 681
8	TI (community N1 health) OR AB (community N1 health)	41, 115
9	TI (community N1 care) OR AB (community N1 care)	13,480
10	TI (community N1 clinic) or AB (community N1 clinic)	3,944
11	TI (primary N1 health) OR AB (primary N1 health)	28,106
12	TI (primary N1 care) OR AB (primary N1 care)	137,751
13	TI (general N1 practice*) OR (AB general N1 practice*)	45,372
14	TI (general N1 practitioner*) OR AB (general N1 practitioner*)	53,331
15	TI (family N1 practice*) OR AB (family N1 practice*)	10,889
16	TI (family N1 practitioner*) OR AB (family N1 practitioner*)	2,941
17	TI (gp N1 practice*) OR AB (gp N1 practice*)	2,042
18	TI (gp N1 service*) OR AB (gp N1 service*)	428
18	TI (gp N1 clinic*) OR AB (gp N1 clinic*)	336
19	(MM "Secondary Care")	373
20	TI (secondary care) OR AB (secondary care)	12,642
21	TI hospital* OR AB hospital*	1,314,737
22	TI acute care OR AB acute care	39,857
23	TI outpatient* clinic* OR AB outpatient* clinic*	44,771
24	TI ambulatory care OR AB ambulatory care	14,090
25	TI outpatient service* OR AB outpatient service*	8,357
26	TI outpatient care OR AB outpatient care	16,227
27	TI health centre* OR AB health centre*	41,779
28	TI health center* OR AB health center*	17,060
29	TI walk in centre* OR AB walk in centre*	173
30	TI residential care OR AB residential care	5,783
31	TI day centre* OR AB day centre*	2,032
32	TI long term care OR AB long term care	29,507
33	OR/1-32	518,224
34	TI prescrib* OR AB prescrib*	151, 614
35	TI independent prescrib* OR AB independent prescrib*	501
36	TI non-medical prescrib* OR AB non-medical prescrib*	205
37	TI supplementary prescrib* OR AB supplementary prescrib*	123
39	TI dependent prescrib* OR AB dependent prescrib*	239
39	TI collaborative prescrib* OR AB collaborative prescrib*	97
40	OR/34-41	155,308
41	TI nurs* OR AB nurs*	979,276
42	TI physiotherap* OR AB physiotherap*	26,282
43	TI physical therap* OR AB physical therap*	30,126
44	TI pharmacist* OR AB pharmacist*	34,045
45	TI (podiatr* OR chiropod*) OR AB (podiatr* OR chiropod*)	3,264
46	TI radiographer* OR AB radiographer*	1,730
47	TI (dietician* OR dietician*) OR AB (dietician* OR dietician*)	1,733
48	TI paramedic* OR AB paramedic*	7,872

Appendix 5 Summary of barriers and facilitators to OTP

Author	Title	Aim	Design	Setting	Sample	Findings	Barriers/ facilitators
Ansari 2021 England	*Acute Community Ophthalmology Services Provided by Independent Prescribing Optometrists Supporting Hospital Eye Services during the COVID-19 Outbreak. Journal of Optometry 2021*	Describe re-organisation of emergency eye services in Kent.	Audit pre/post Covid-19	Acute Primary Care Ophthalmology Service (APCOS)	n=1032 cases seen by APCOS January-June 2020.	Transfer of referral/ care from hospital to community with introduction of Acute primary Care Ophthalmology services (with optometrist IP).	No barriers/facilitators or data relevant to implementation
Baker 2016 England	*Multi-stakeholder perspectives of locally commissioned enhanced optometric services*	To explore views of stakeholders regarding operation of community-based enhanced optometric services (including IP).	Qualitative study using mixed methods	Minor eye conditions scheme (MECS) and glaucoma referral refinement scheme (GRRS) provided by accredited community (non-IP) optometrists.	189 patients 25 community optometrists (non-IP) 4 glaucoma specialist hospital optometrists (non-IP) 5 ophthalmologists 6 GPs 4 commissioners.	Inability to prescribe resulted in re-referral to GP, multiple consultations. Service pathway bottle necks, lack of service streamlining. Suggested PGDs may overcome.	entified clinical/service need for prescribing, and service gap
El-Abiary 2020 Scotland	*Assessing the effect of Independent Prescribing for community optometrists and referral rates to Hospital Eye Services in Scotland*	Determine distribution of IP optometrists and associated hospital referral rates across Scotland. Assess impact of IP on referral rates into Hospital Eye Service since 2010.	Audit	Service data on community optometry visits and outpatient hospital attendances 2010-2019	278 /1189 (23.4%) community optometrist IPs in Scotland	• 23% optometrists hold IP • Strong positive correlation between location of IP optometrists and population served. • No association between number of IPs and referral to Hospital Eye	• Uptake of IP higher in population dense areas; limited uptake in rural areas

						Services, i.e. no impact of IP on referral rates.	
Golash 2021 England	*Specialised Independent Prescribing Optometrists Delivering a Community Shared-Care Glaucoma Service: A Pilot Study*	Contribution of IP to stable glaucoma and ocular hypertension (OHT)	Retrospective service audit	Community Ophthalmology Team - shared care scheme run by specialised IP optometrists for stable glaucoma and ocular hypertension (OHT)	N=2 optometrist IP N=80 patients (157 eyes)	• Community follow-up of stable glaucoma and ocular hypertension by IP optometrists was safe, with stability of disease maintained and few referrals back to HES	• IP enabled independent care episode completion • No barriers or facilitators
Harper 2015 UK wide	*Scope of practice of optometrists working in the UK Hospital Eye Service: a national survey*	Describe results of national survey on scope of practice of UK hospital optometry.	Cross-sectional survey – hospital eye service optometrists	70 hospital eye service units/departments (N = 60, 86% in England),	N=67/70 (96%) HES stated included optometrists in extended roles. N=32 (48%) in IP roles	83% used GP prescriptions 48% used IP formulary 14% used PGD 8% requested via GP 1 (<2%) SP	• Availability of medical support underpins extended role activity; 33% clinics always require medical input. • Calls for national qualifications in specialist areas of practice
Loffler 2011 UK wide	*Therapeutic prescribing for optometrists: an initial perspective prescribing for optometrists: an initial perspective*	Describe impact of the IP by therapeutic optometrists on practice.	Cross-sectional survey (1 HEI)	32 (53%) community 20% hospital 27% mixed community/hospital.	n=60 optometrists who had completed theoretical training for IP qualification.	47 (78%) completed clinical placement; 39 (65%) passed common final assessment. 92% improved confidence with diagnosis & management. 75% regarded IP helpful for practice (rating ≥8 scale 1-10. 93% would recommend IP. 87% prescribing at least weekly	70% prescribed via GP, ophthalmologists, or OTC. 50% no access to FP10.

						(median 10/month).	
Needle 2009 UK wide	*A survey of the scope of therapeutic practice by UK optometrists and their attitudes to an extended prescribing role*	Investigate clinical practices in ocular disease management within UK optometrists, elicit views on extended prescribing roles.	Cross-sectional survey	90% community.	N= 1288 members of the College of Optometrists.	8% respondents in training for extended prescribing role (additional supply or supplementary prescribing)	Describes conditions treated with IP, prescribing rates, views about training, confidence levels, patient satisfaction. 51% referring less patients to secondary care; 41% reported no noticeable difference in referring behaviour
Rough 2017	*The challenges of rural optometry and how independent prescribing has helped*	Narrative on role of IP in rural optometry	Narrative				Describes one optometrist's experience of IP and use in rural community optometry in Scotland. No barriers and facilitators.
Rumney 2019	*Optometry and independent prescribing*	Describes the pathway to independent prescribing, both professionally and individually.	Narrative – discusses education/training for IP, clinical placement, governance and barriers and argument for NOT including IP as undergraduate training.				Piecemeal CCG-led approach to commissioning affected IP optometry. English DH resisting change by GOS and national contract – promotes local developments to formalise optometric skills. IP underutilised and cannot find a way to include NHS prescribing to IP qualified optometrists.
Spillane 2021	*Factors influencing the prescribing behaviour of independent prescriber optometrists: a qualitative study using the Theoretical Domains Framework*	Identify barriers and facilitators using TDF, map to COM-B to identify behaviour change techniques for intervention	Qualitative: interviews	Hospital (n = 6) Community (n = 10)	16 optometrist IP	Used TDF imp framework to analyse data; 8 key themes identified facilitating behaviours for implementation.	•**Organisational readiness** - MDT Support - Lack contract with hospital (i.e. for prescribing) led to GP referral for medicines - England and NI – IPs issue private prescriptions – cost to patient - No access to prescribing budget

							- Good relationships - Role clarity/ identity •**Practitioner selection/ preparation** - Communication skills - Clinical experience - Lack of motivation/ remuneration - Job satisfaction •**Transition support** - GOC guidelines barrier •**Sustainability** - Increased workload
Todd 2020	*Agreement in clinical decision-making between independent prescribing optometrists and consultant ophthalmologists in an emergency eye department*	Test concordance between 4 IP optometrists and 9 consultant ophthalmologists for diagnosis and management	Prospective diagnostic agreement study	Eye hospital	321 patient presentations	Percentage-agreement between all IP optometrists and the staged reference standard per diagnosis was 82.0%	Agreement between IP optometrists and ophthalmologists was: 'almost perfect' for diagnosis (K = 0.882 ± 0.018), 'substantial' for prescribing decision (K = 0.745 ± 0.034) and 'almost perfect' for onward management (0.822 ± 0.032).