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SYSTEMATIC REVIEW

Paramedics working in general practice: a scoping review

[version 1; peer review: 1 approved, 1 approved with reservations]

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Abstract

Background: The term ‘paramedic’ has traditionally related to a healthcare professional trained to provide pre-hospital emergency care; however, paramedics are increasingly taking on novel additional non-emergency roles. General practice is facing unprecedented demand for its services related to rising expectations, an aging society and increased prevalence of chronic disease. Paramedics may be recruited to work in general practice to meet some of these demands. We undertook a scoping review to map the current literature considering paramedics working in general practice and inform follow-on research.

Methods: We employed the six-stage scoping review framework developed by Arksey and O’Malley. Our research question was ‘to identify the scope of practice, nature of training/qualifications, challenges faced, and impacts of paramedics working in general practice’.

Results: After searching PUBMED (Medline, n = 487), EMBASE (n = 536) and the Cochrane Library (n = 0) in June 2020, we identified eleven full-text articles that met our inclusion criteria. The literature suggests that paramedics have diverse skills that enable roles within general practice, some of which are context specific. Additional training is considered necessary to facilitate the transition from emergency care to general practice. We found no research that quantitatively assessed the impact of paramedics working in general practice on healthcare expenditure or patient health outcomes.

Conclusions: There is a paucity of empiric scientific literature considering paramedic working in general practice. Further research is needed to inform training pathways, the structure of clinical practice and to measure outcomes.

Open Peer Review

Reviewer Status  

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1 2

version 1  
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Any reports and responses or comments on the article can be found at the end of the article.

Keywords

general practice, primary care, paramedics, scoping review

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Introduction

Increasingly health systems are attempting to shift their focus from a specialist-centred, hospital-based approach to a primary healthcare model that emphasises integration and continuity of care^{1,2}. This is true of the Irish health system and ‘Sláintecare’, Ireland’s ten-year health strategy³. Primary care services are under increasing workforce pressure due to a growing shortage of general practitioners (GPs)^{4,5}. Responses such as the development of primary care teams, the expansion of general practice nursing and the potential for new forms of provision of general practice-based care have been described¹⁻³. Do paramedics have a place in such an expanded spectrum of care?

Paramedics are healthcare professionals who are trained to recognise and treat acute presentations of a wide range of health problems with complex skillsets⁴⁻⁶. In future, the role of paramedics may go beyond emergency care to encompass the broader healthcare of the population and include chronic disease management⁶⁻⁸. Could such role expansion happen within settings other than the emergency services where they currently work?

The term ‘paramedic’ can be further classified based on qualifications and experience⁹⁻¹¹ but similar titles can also equate to differing scopes of practice in different jurisdictions^{10,12}. In the United Kingdom, paramedics can undertake further education to become advanced clinical practitioners¹²⁻¹⁴ and in the United States of America, may further qualify as physician assistants^{10,15}. In Canada, ‘community paramedics’ have expanded training and scope of practice¹⁶. Models of paramedic practice may ultimately be tailored to the needs of a specific community and paramedic capabilities vary depending on training^{6,17-19}.

In Ireland, the role of paramedics and advanced paramedics has focused on emergency care; however, a pilot project is ongoing to explore the feasibility of ‘community paramedicine’ where paramedics operate in expanded primary care roles within the ambulance service²⁰. In addition, the pilot ‘Pathfinder’ project aims to provide alternative care pathways for low acuity calls among the elderly²¹. Paramedic and advanced paramedic scope of practice in Ireland is determined by an independent statutory regulator, the Pre-Hospital Emergency Care Council (PHECC), who publish clinical practice guidelines (CPGs) and maintain a register of pre-hospital practitioners²². CPGs permit the administration of defined medications in specific circumstances which to date primarily relate to emergency care²². Paramedics in Ireland have traditionally qualified via a two-year university diploma and with two years additional post-registration experience can undertake the graduate diploma, Advanced Paramedic training program. Recently, entry level Bachelor of Science degree level qualifications have been introduced but are not yet a requirement for professional registration. For CPGs to be implemented, practitioners must be registered with PHECC, act on behalf of a

PHECC approved organisation and authorised by that organisation to implement a given CPG²².

Much of the previous literature has considered the broad concept of paramedics working in primary care or examined novel primary care interventions delivered by paramedics^{5,16,23-27}. In this current review we aimed to focus on the published evidence in relation to paramedics undertaking roles in the setting of general practice rather than considering novel primary care or ambulance service initiatives. Our goal was to map the relevant literature and identify key issues and gaps to inform follow-on research considering paramedics working in general practice in Ireland.

Methods

A methodologically rigorous scoping review framework comprising an iterative six-stage process developed by Arksey and O’Malley²⁸ was adopted to undertake a comprehensive search of the current literature. Unlike a systematic review, a scoping review does not include an assessment of study quality, as the focus is on covering the range of work that informs the topic rather than limiting the work to studies that meet particular standards of scientific rigour. The six stages of the scoping review process are described below.

Stage 1: Identifying the research question

Much of the published literature has analysed the implementation of community paramedic programs where paramedics conduct routine health assessments and home visits to people with low access to primary care services or have urgent but non-life-threatening needs^{16,29}. Paramedics with an expanded ‘primary care’ scope of practice within the emergency medical services have also been explored within the literature^{16,23,29}. Literature considering the concept of paramedic working in general practice settings is more limited. This review aimed to answer the research question: ‘What is the evidence for the scope of practice, nature of training and qualifications, challenges faced, and impact of paramedics working in general practice settings?’

Stage 2: Identifying relevant studies

A general search was conducted with multiple search terms combining the two key constructs “general practice” and “paramedic” to inform the search strategy for this review. Different programs with varying designs have been implemented in several countries^{10-13,30} and titles of paramedics joining general practice were identified as relevant keywords. Such titles identified during the initial search included “advanced clinical practitioner”, “physician assistant/associate” and “advanced paramedic”. Search terms (Box 1) were grouped and entered to the electronic databases Pubmed (MEDLINE), EMBASE and the Cochrane Library. Further publications were identified through hand-searching reference lists of already identified relevant literature.

Box 1. Search terms**PUBMED [MEDLINE] & Cochrane Library**

["GP" OR "general practitioner" OR "family practitioner" OR "family physician" OR "family doctor" OR "primary care" OR "primary healthcare" OR "primary health care" OR "primary practice" OR "general practice" OR "family practice"] AND ["paramedic" OR "advanced paramedic" OR "advanced care paramedic" OR "advanced clinical practitioner" OR "physician assistant"]

EMBASE

[gp' OR 'general practitioner'/exp OR 'general practitioner' OR 'family practitioner'/exp OR 'family practitioner' OR 'family physician'/exp OR 'family physician' OR 'family doctor'/exp OR 'family doctor' OR 'primary care'/exp OR 'primary care' OR 'primary healthcare'/exp OR 'primary healthcare' OR 'primary health care'/exp OR 'primary health care' OR 'primary practice' OR 'general practice'/exp OR 'general practice' OR 'family practice'/exp OR 'family practice'] AND ['paramedic' OR 'advanced paramedic' OR 'advanced care paramedic' OR 'advanced clinical practitioner'/exp OR 'advanced clinical practitioner' OR 'physician assistant'/exp OR 'physician assistant'] AND [2000–2020]/py NOT 'nurse' AND [embase]/lim AND [abstracts]/lim AND [english]/lim

Stage 3: Selecting studies

The search process, as guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA), is summarised in [Figure 1](#).

Inclusion criteria were as follows:

- English language
- Published between 2000 and 2020 inclusive
- Healthcare professionals with primary training as a paramedic including those with additional qualifications
- Paramedics performing tasks within a general practice clinic including but not limited to clinical procedures, patient triage, patient assessment, and domiciliary care
- Studies which inform the scope of practice, description of training and qualifications, challenges faced, and impacts of paramedics working in general practice

Commentaries, grey literature, and personal accounts from paramedics working in expanded roles within general practice were all eligible for inclusion.

Stage 4: Charting the data

To facilitate comparison and thematic analysis the following data were extracted from the articles:

- Author, Year
- Setting
- Design

- Population/Participants
- Intervention, Control
- Principle Outcome Measures
- Key Findings

Stage 5: Collating, summarising, and reporting findings

A table ([Table 1](#)) was developed to summarise findings and enable better contextualisation for analysis considering the four key elements of our research question:

- Scope of practice
- Training and qualifications
- Challenges
- Outcomes

Stage 6: Consultation exercise

Consultation with relevant experts within this field (GA & MB) was conducted to gain additional insights and suggestions for any important studies that were not included for final review. Contributors also helped inform and validate findings from the main scoping review to enhance the quality of this study and contributed to the final authorship of this review.

Results**Search results**

Our initial database search identified 1023 records and an additional six records were obtained from hand-searching reference lists of key literature. After 171 duplicate records were removed, the remaining 858 records were screened by title, abstract and year of publication and fourteen records were selected for full-text review ([Figure 1](#)). Data were ultimately extracted from eleven records which met the eligibility criteria. Among the fourteen, one abstract describing an ongoing study of relevance from Wales was not included as it was not completed³¹.

Description of included studies

The eleven articles included in the final review ([Table 1](#)) incorporate case studies, cross-sectional studies, mixed methods studies, personal accounts, reports, commentaries, surveys and qualitative studies using interviews and focus group discussions. All but one article considered paramedics working in general practice in the United Kingdom. One report detailed developments in the expansion of paramedic roles in Australia referencing the origins and implementation of physician assistants in the United States¹⁰.

Scope of practice**Roles and responsibilities within general practice**

Four articles – case studies in Mahtani *et al.*, a survey conducted in the mixed methods study by Schofield *et al.*, the personal account by Daly, and the editorial by Booker and Voss – outlined how paramedics already assume roles in chronic disease management, domiciliary visits, performing telephone and patient triage, seeing same-day and urgent

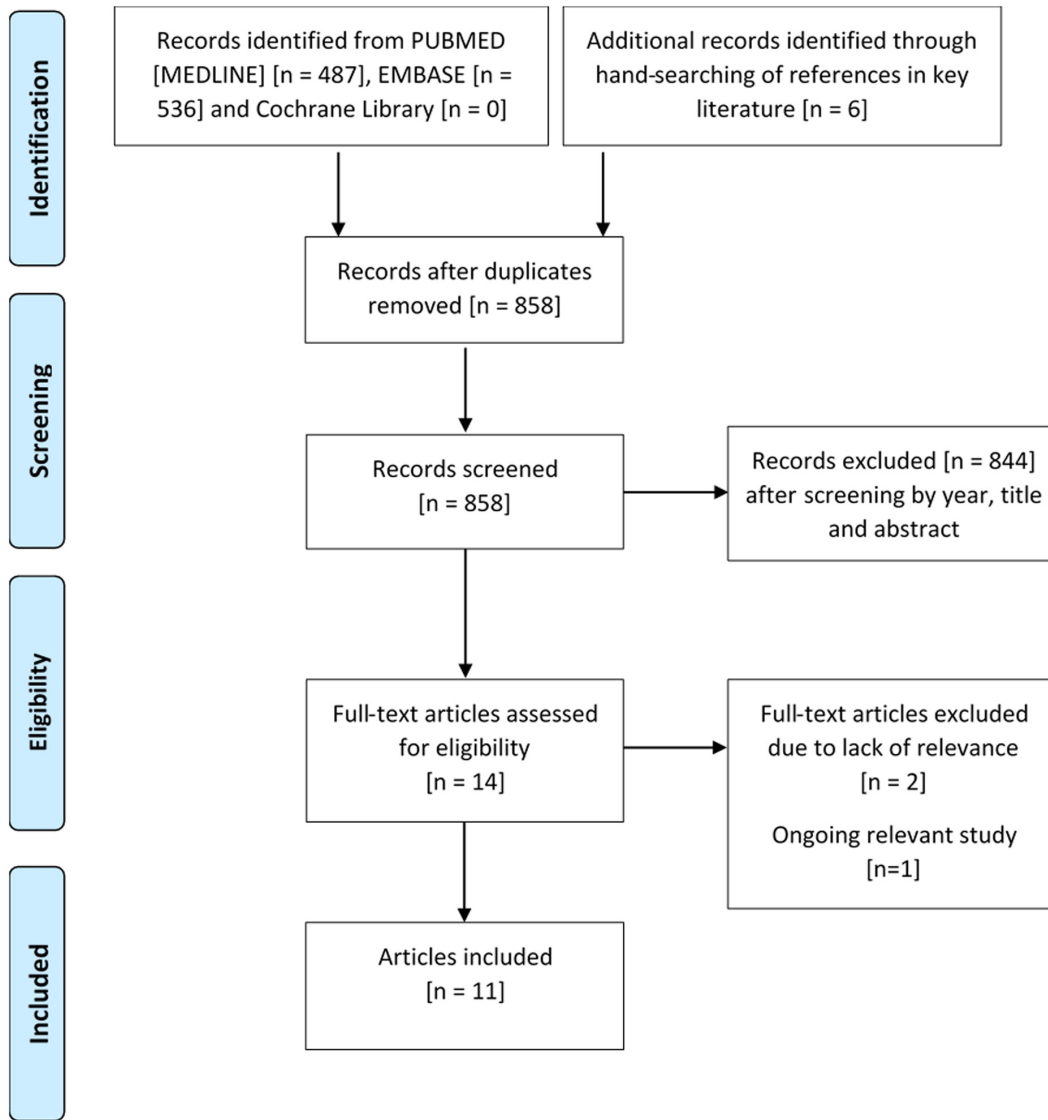


Figure 1. PRISMA flow diagram.

cases^{6,11,17,32}. Examples of paramedic skills already deployed in GP settings included taking blood pressures, understanding ECGs, phlebotomy, providing first aid and suturing for wounds³². These papers suggested that, by virtue of their training, paramedics could assist in assessing, treating, and arranging further care for patients with acute presentations such as chest pain or dyspnoea^{11,17,32}. Given their training as generalists, paramedics could contribute to the management of undifferentiated illness from a wide spectrum of demographics¹⁷.

Variations due to local context

Paramedics may be hired to work in general practice based on the unique demands of a given practice. For clinics with

large patient pools, paramedics may be relied on for their ability to provide domiciliary and out-of-hours care given their generalist ambulance service experience of dealing with a wide range of presentations^{9,32,33}. Schofield *et al.* noted that paramedic tasks and responsibilities in general practice could be related to different models of employment/local needs and suggested that individual GPs might have differing views on how best to deploy the abilities of paramedics⁶. The first-person account by Daly demonstrated a specific role in an immunisation program after the author was evaluated as competent by his GP supervisor and a patient group direction was signed to enable this practice³². Schofield *et al.* found in their survey that a majority of paramedics working in general practice were

Table 1. Summary of findings.

Author, Year	Setting	Design	Population/ Participants	Intervention, Control	Principal Outcome Measures	Key Findings
1. Booker & Voss, 2019 ¹⁷	UK	Editorial	N.A.	N.A.	N.A.	<ul style="list-style-type: none"> • 3 main theories on how paramedics may support primary care • Challenges in implementing and evaluating models due to contextual heterogeneity
2. Brown, 2017 ¹³	UK	Personal account of working in an inner-city GP practice while training as an advanced clinical practitioner	N.A.	N.A.	N.A.	<ul style="list-style-type: none"> • Programme description, requirements and qualifications achieved for pilot Advanced Clinical Practitioner programme • Elaboration of the scope of practice with a summary of administrative and clinical tasks and the range of conditions that can be handled successfully • Personal perspective on effectiveness of the programme
3. Daly, 2012 ³²	UK	Personal account of a paramedic working in one general practice/ survey of practice staff & patients	Patients and staff at one general practice	N.A.	N.A.	<ul style="list-style-type: none"> • Outline of paramedic skills that can be deployed in general practice setting • Role of paramedic working in GP is novel and still in development • Patients appear satisfied with care provided by paramedic
4. Mahtani <i>et al.</i> , 2018 ¹¹	UK	Commentary including anonymised practice case studies	N.A.	N.A.	N.A.	<ul style="list-style-type: none"> • Growing recognition that the generalist skills of paramedics should be deployed into in hours general practice • Specialist & Advanced Paramedics can work in primary care with differing autonomy and scope of practice
5. Moule <i>et al.</i> , 2018 ³³	UK	Mixed methods evaluation of out-of-hours [OOH] general practice training program for paramedics	Paramedic OOH trainees [n=2] Medical Director [n=1] Clinical Practice Supervisors [n=1] Graded feedback for consultations [n=403]	N.A.	N.A.	<ul style="list-style-type: none"> • An out-of-hours general practice training program for paramedics supported students in transitioning to a key primary care role • Course content and timeframe needs to be tailored to individual needs • Role and challenges of mentorship highlighted • Inability to prescribe identified as a barrier
6. Nelson <i>et al.</i> , 2019 ¹²	UK	Qualitative comparison of three non-medical roles in General Practice using semi-structured interviews and focus groups	Participants included training/service leads, role holders and practice staff [n=38]	N.A.	N.A.	<ul style="list-style-type: none"> • Adapting to the general practice context is demanding and involves challenge related to risk management; training practice gaps and managing expectations • Demonstrating the impact of new roles is challenging with implications for future role retention
7. Proctor, 2019 ⁹	UK	Qualitative exploration of patients views on paramedic practitioner home visits using semi-structured interviews	Six patients age 65 or older at one GP surgery who had a home visit by a paramedic practitioner	N.A.	N.A.	<ul style="list-style-type: none"> • Variation in understanding of the role of paramedic practitioner in general practice • Patients' willingness to be seen by a paramedic practitioner in place of a GP if their problem was appropriate • Patient's desire for more information regarding the paramedic practitioner role

	Author, Year	Setting	Design	Population/ Participants	Intervention, Control	Principal Outcome Measures	Key Findings
8.	Raven <i>et al.</i> , 2006 ¹⁰	Australia,	Report on potential expanded paramedic roles in Queensland Australia	N.A.	N.A.	N.A.	<ul style="list-style-type: none"> • Considered the role and history of physician assistants in the UK, USA, Canada and the Netherlands as medical care extenders including in general practice • Majority of students hold a bachelor or master's degree combined with 4 years of health care experience • Some physician assistants have backgrounds as paramedics
9.	Schofield <i>et al.</i> , 2020 ⁶	UK	Mixed methods study incorporating literature review, national survey & qualitative interviews	Survey of GPs/paramedics/practice managers/others [n=165], key informant and stakeholder interviews [n=19]	N.A.	N.A.	<ul style="list-style-type: none"> • Paramedic working in general practice is largely viewed positively and perceived to aid in GP workload reduction • Significant variation in how paramedics are deployed in general practice with little evidence of safety, clinical or cost effectiveness
10.	Silverston, 2019 ¹⁸	UK	Commentary	N.A.	N.A.	N.A.	<ul style="list-style-type: none"> • Advocates for the creation of a new allied healthcare professional role called primary care practitioner [PCP]. • Suggests having a shared curriculum and training with GPs to allow better understanding and collaboration between GPs and PCPs
11.	Spence, 2017 ⁴	UK	Commentary	N.A.	N.A.	N.A.	<ul style="list-style-type: none"> • Suggests 'new reality' is that other professionals are going to do the work of GPs given workforce crisis • Highlights paramedics as degree level professionals who see the same types of patients as GPs and are already linked to various community teams

employed directly by that practice but others worked across a primary care network or were employed by an ambulance service or other community service provider⁶.

Variations due to paramedic's qualifications and experience

Mahtani *et al.* summarised the higher qualifications and greater competencies acquired by paramedics as they progress within their field to become specialist paramedics, advanced paramedics and consultant paramedics¹¹. Mahtani *et al.* included two case studies that demonstrate that in the UK, specialist paramedics conducted home visits and out-of-hours care in place of GPs for acute presentations¹¹. Advanced practitioners/paramedics in the UK have recently been granted independent prescribing rights which many articles highlight as having specific relevance to working in general practice settings^{11,12,17}. Daly noted that with additional qualifications in teaching, paramedics can facilitate life support training programmes and provide additional training support to general practice in niche areas³². A personal account by Brown¹³ highlighted how an advanced clinical practitioner program allowed him to work autonomously to evaluate a range of patients presenting with varied conditions and arrange appropriate diagnostics and onward referral where necessary. Brown noted that the care provided to patients in general practice required extended skills and knowledge that were not core to paramedic basic training¹³.

Proposed models that underpin paramedic working in general practice

Silverston highlighted potential duplication in workload where GPs are uncertain of paramedic capabilities and proposed a new category of primary care practitioner for allied health professionals that would have a shared set clinical curriculum with GPs¹⁸. He suggested that such a role could improve delegation of tasks from GPs to paramedics¹⁸.

Booker and Voss propose three models for paramedic working in general practice: paramedics see routine patients thus freeing GP time to manage more complex patients; paramedics create additional capacity to allow general practice as a whole to manage urgent problems in a timely manner; paramedics have the potential to improve patient satisfaction and clinical outcomes if patients can enjoy timelier and longer consultations¹⁷. Booker and Voss also noted that paramedics can bring additional skills and knowledge that may not be already developed in general practice¹⁷.

Training and qualifications

The included literature considered additional training in terms of both new professional titles (Advanced Clinical Practitioner & Physician Assistant) and specific areas of professional practice such as prescribing and out-of-hours care^{10,13,17,33}.

Advanced Clinical Practitioner & Physician Assistant role training

Brown outlined training to work in general practice via an advanced practitioner program representing a two-year MSc

course open to health professionals from various clinical backgrounds¹³. Trainees study at university for two days per week and work in clinical settings under an assigned medical mentor for the remaining three days. Modules offered included pathophysiology, advanced clinical examination and history-taking, clinical reasoning, and project management¹³. Raven *et al.* provided detail on physician assistant programs in the United States which were originally developed in response to a shortage of healthcare professionals and allowed military paramedics to take on other roles in healthcare such as primary care¹⁰. Students entering a physician assistant program hold a bachelor or master's degree and have four years of health care experience, including as a paramedic¹⁰. The program duration is usually 24–27 months and the core content of the curriculum is similar to that of physician students¹⁰. To be certified upon completion of the program, students sit a Physician Assistants National Certifying Examination and to renew the certification, physician assistants have to complete 100 hours of continuing medical education every two years¹⁰.

Out-of-hours care training

Moule *et al.* employed a mixed methods approach involving interviews, questionnaires and data review from electronic health records to analyse a programme designed to allow paramedics to participate in out-of-hours services³³. The 450-hour programme included 12 weeks of full-time employment divided into 30-hour clinical practice and 7.5-hour self-study per week. The program was overseen by a medical director and had training and mentorship provided by GPs and Advanced Nurse Practitioners³³. Trainees completed a competency framework with 127 items and job proficiencies were graded on three rating descriptors³³.

Independent prescriber training

Booker and Voss highlighted independent prescriber training for paramedics working in general practice in the UK and provided basic details¹⁷. Paramedics are required to have a minimum of three years post-registration experience and general practices need to have necessary governance policies and safeguards¹⁷. One concern highlighted was a potential increase in unnecessary prescriptions such as for antimicrobials, however the authors noted a lack of evidence to support this concern¹⁷. Nelson *et al.* also highlighted the importance of prescribing training and privileges for successful working in general practice¹².

Challenges

Role ambiguity for paramedics working in the general practice setting

Stakeholders report differing views on the type of patients in general practice that paramedics should provide care for^{6,12}. Schofield *et al.* reported that a varying range of patient groups are sometimes excluded from review by paramedics working in general practice for example infants, pregnant women, and patients with mental health difficulties⁶. The overlap of responsibilities with other professionals such as nurse practitioners was also noted to sometimes represent a source of confusion¹².

Such confusion has been shared by some patients, who report being unsure of the role of the paramedic in the GP clinic^{6,12}.

Multiple publications noted that the emergence of new job titles for paramedics was a further source of confusion for GPs, other allied health professionals, and patients^{6,9,10,12,17,18}. Uncertainty as to the core competencies of a trained paramedic was itself noted as a barrier to the integration of paramedics into general practice¹⁸. In Daly's personal account of working in general practice he found his team were unaware of some of a paramedic's clinical skills³². Unclear professional boundaries may at times create tension within the workplace due to significant overlap in clinical tasks and responsibilities^{10,12,18}. Regarding the awarding of prescribing rights to paramedics by the Health and Care Professionals Council (HCPC), Booker and Voss noted that paramedics are expected to be working at an "advanced level of practice"; however, the term 'advanced practice' has not been consistently defined¹⁷. Multiple bodies such as the College of Paramedics and Health Education England were noted to have provided role descriptors but these in turn had not been adopted uniformly across the UK¹⁷. Antagonism towards new roles in general practice has been reported but can be resolved once roles become familiar and scope of practice is clarified before work is commenced^{10,12}.

Preparing paramedics for transition to general practice

Schofield *et al.* and Booker & Voss highlighted how the specialised skillset required to work in general practice in order to manage patients with multi-morbidities and chronic diseases may not be part of a paramedic's core capabilities^{6,17}. Other core tenets of general practice such as continuity of care, forming therapeutic relationships and management plans over time may also be unfamiliar to paramedics¹⁷. Stakeholders interviewed by Schofield *et al.* noted that the personality and adaptability of individual paramedics were crucial to effective integration within general practice⁶. Nelson *et al.* found that a key challenge was preparing advanced clinical practitioners to work in a clinical setting with higher levels of uncertainty, pace, and responsibility¹². The authors highlighted a need to match paramedics to the right general practice which could facilitate appropriate on-the-job training and support for new trainees¹². Nelson *et al.*, Moule *et al.* and Schofield *et al.* highlighted significant mentorship requirements amongst paramedics transitioning to working in general practice and further highlighted how the time commitment required by mentors may represent a significant cost and barrier^{6,12,33}.

Moule *et al.* noted that providing additional training for paramedics while they may already be working full-time could be challenging due to night shifts and "unsocial hours"³³. The paramedics in this study highlighted a steep learning curve and considered the inability to prescribe as a hindrance³³. Interviews with the program medical director and participants noted that a 12-week training timeframe was too short for trainees³³. The medical director perceived this to be due to paramedics' lack of experience with diagnosis and forming management plans³³. Paramedics did however report greater understanding

of pathophysiology and increased confidence in their capabilities to manage a range of conditions after the programme³³. Although participants appreciated having support from a range of GPs and nurse practitioners, there was a suggestion that having one designated supervisor would be preferable as it may be easier to adapt to a consistent working style³³.

Outcomes. Booker & Voss, Schofield *et al.* and Nelson *et al.* highlighted a lack of literature evaluating cost-effectiveness, resource allocation and health outcomes in both current and theorised models of paramedic working in general practice^{6,12,17}. Booker & Voss did note a perspective that the potential benefits of paramedic working in general practice far outweigh potential limitations due to the sheer scale of the crisis in primary care capacity at present¹⁷.

Patient satisfaction

Proctor *et al.* performed a qualitative study (6 participants) that considered patient satisfaction in receiving home care by paramedics⁹. The study found that patients viewed paramedic practitioners favourably and were satisfied with the care provided if their needs were met. However, patients preferred to see a GP when requesting a home visit if they considered their problem severe or complicated⁹. Daly conducted a patient survey on a new paramedic-GP role³². It achieved a response rate of 90/140 and found that 95% of patients had a satisfactory impression of being treated by a paramedic in primary care³². Most patients (86%) reported that being treated by a paramedic did not delay treatment³².

Paramedic perspectives on the value of specific paramedic skills brought to general practice

In his personal account Brown, as an advanced clinical practitioner, noted that his paramedic training allowed him to bring additional value to general practice by managing emergency situations and supporting nursing colleagues with ECG interpretation¹³. Daly's teaching certificate allowed him to be involved in annual basic life support training within his general practice and demonstrate the unique skillset paramedics can offer³². Mahtani *et al.*¹¹ and Spence⁴ highlighted how paramedic training facilitates assessment of patients during home visits then onward direction to appropriate services if needed.

Impact on the ambulance services

Schofield *et al.* noted that there were concerns of recruitment competition with the ambulance services during key informant meetings; however, they also noted that cooperative approaches with general practice could be a means to promote retention of paramedics within both sectors⁶.

Discussion

Summary of key findings

Our search of the literature published within the last twenty years resulted in the inclusion of only eleven articles that considered the concept of paramedics working directly in general practice. This is somewhat surprising given that this concept has been promoted for some time²³. The literature suggests that paramedics already actively participate in general

practice in some jurisdictions most notably in the United Kingdom and contribute to care delivery in a variety of ways. There appears to be variability in how paramedic involvement is structured, some of which reflects local arrangements and responses to service needs, more of which reflects the diverse post qualification training pathways paramedics undertake. In this context it is perhaps unsurprising that there is evidence of confusion both on the parts of clinicians and patients as to the role of paramedics in general practice.

In general, it appears that additional training and education is considered necessary for paramedic involvement in general practice and there already exists a variety of approaches to providing such training. Some pathways involve university-based substantial additional training that lead to novel qualifications, others are shorter and focused on specific domains of practice. To date the training programs referenced in the literature appear to involve a combination of classroom learning and on the job training.

The literature outlines some key challenges that emerge from paramedic working in general practice. Paramedics are likely to require additional training in chronic disease management and multimorbidity. They are likely to have to adapt from a protocolised model of practice to working in a clinical setting with higher levels of uncertainty. It may also be that medication prescribing is necessary to contribute to care in an effective and efficient manner. Further potential systems challenges including funding models, clinician and organisational indemnity, regulatory changes to address a widened scope of practice and maintaining competence across a wide spectrum of roles were not considered in any detail but also represent important considerations.

The value of paramedics working in general practice has been posited from a variety of perspectives including increasing capacity, facilitating a timelier service, freeing GP time to manage complex issues and bringing additional skills. Beyond some evidence to suggest that patients are satisfied with care provided by paramedics and anecdotal reports of positive outcomes^{6,9,32,34}, there exists little quantitative evidence to support the theories that underpin paramedic involvement in general practice. Notably we found no research that robustly examined health economics, safety, morbidity, or mortality effects.

The perspective that the potential benefits of paramedic working in general practice far outweigh potential limitations given a crisis in primary care capacity is problematic. Although benefits of primary care paramedics working within general practice teams have been identified³⁵, there is a dearth of evidence to guide training and practice in what represents a complex health systems intervention. Such a perspective also minimises the potential for significant unintended consequences including an exodus of senior clinicians from the ambulance services to general practice. Surprisingly, we found a lack of literature that explored the motivation of paramedics to transition to general practice roles. This issue would

warrant consideration if further/future paramedics are to be recruited into general practice.

Implications for practice in Ireland

Sláintecare was introduced in Ireland to deliver universal integrated healthcare that caters to changing population demographics and the increasing burden of chronic diseases³⁶⁻³⁸. General practice is known to be central to Sláintecare, however, recruitment of general practitioners is already challenging due to emigration and perceived unfavourable working conditions³⁸⁻⁴⁰. In the future, paramedics could form part of the general practice work force but will need appropriate training and supported integration to do so. Any such innovation should proceed with caution, be guided by the limited existing evidence, and be further embedded in a research framework that can inform its evolution. While GP workload might decrease when paramedics take over urgent non-complex patients, this may be offset by the time taken for GPs to train and supervise paramedics⁶. Paramedics may struggle to adapt to the unpredictable nature of general practice and limited autonomy in terms of prescribing, may reduce productivity and in fact increase work duplication. Existing research demonstrates that patients may be open to assessment and treatment provided by paramedics in general practice, but a percentage are likely to still prefer being cared for by their own GP^{6,11}. More integrated working relationships may arise for paramedics as a result of initiatives to bring their skill sets into the primary care setting. While preserving professional identities, such initiatives will also require new alignments between different disciplines and new models of partnership.

Strengths and limitations

This scoping review adds to existing literature by providing an overview of the variations in employment models, skillsets, training programmes, and challenges faced when paramedics deliver general practice care. Findings from this review may form the basis for the exploration and potential implementation of novel paramedic-general practice partnerships in Ireland. This literature review serves to guide future empiric research in this field as it has identified notable gaps in the current literature base.

The scoping review methodology described by Arksey and O'Malley has some limitations. Whilst we adopted their rigorous approach and employed a comprehensive search strategy, it is possible that not all publications relevant to the inclusion criteria were identified by the searches or databases used. Scoping reviews do not include an assessment of study quality as the focus is on covering the range of work that informs the topic rather than limiting the work to studies that meet standards of scientific rigor. Finally, only articles published in the English language were considered for inclusion in our review, and this could have resulted in the exclusion of equally relevant literature published in other languages.

Data availability

No data are associated with this article.

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This paper reviews the existing literature on the role of the paramedic in primary care. It is well-written and provides a comprehensive picture of what is known and what is not known about this subject.

May I make the following points, please, which I hope that the authors will find helpful?

1. With regard to the situation in England:

- a) Paramedics work in two different systems, one where they are employed by the Ambulance Service & the other whether they are employed by individual practices and primary care organisations. Their roles reflect this, as does the training that they receive.
- b) Additional training has included the Emergency Care Practitioner and Specialist Paramedic Programmes, as well as primary care specific and generic MSc in Advanced Practice Programmes. Paramedics can also attend multi-professional, stand-alone modules in subjects such as Minor Illness & Non-Medical Prescribing.
- c) The lack of a defined role and training programme has led to concerns over patient safety and quality of care, as a result of which this document has been produced, which defines the roles and training required for paramedics working in primary care: [https://www.collegeofparamedics.co.uk/COP/Professional_development/FCP_ACP_Roadmap/COP/P%20AP%20Roadmap.aspx?hkey=1c8bff8d-dbb9-4f27-93f2-4cb9259b0fb3#:~:text=The%20First%20Contact%20Practitioner%20\(FCP,Centre%20of%20Advancing%20](https://www.collegeofparamedics.co.uk/COP/Professional_development/FCP_ACP_Roadmap/COP/P%20AP%20Roadmap.aspx?hkey=1c8bff8d-dbb9-4f27-93f2-4cb9259b0fb3#:~:text=The%20First%20Contact%20Practitioner%20(FCP,Centre%20of%20Advancing%20)

2. I recently reviewed an article that described the role and training required for what was termed nurse paramedics, which is a profession that exists in some Scandinavian and European countries, which offers yet another model. This model involves training staff from the outset to work in this specific role, rather than the model is used in England, which involves a generic paramedic training programme, followed by a role-specific training programme for paramedics wishing to

work in primary care later in their career.

3. As you say, the increase in the primary care workload combined with the decrease in the existing primary care workforce has increased the opportunities for paramedics to work in new roles in primary care. However, it is a steep learning curve to transition from emergency care to primary care and appropriate training is required for all health care professionals transitioning into primary care. In England, the GP training programme is 3 years long, which is an indication of the level of knowledge, skills and experience required for safe practice in primary care. Recently, the GP training model was adopted for training Physician Associates in Primary Care, so, perhaps, a multi-professional training programme might offer a solution, too?

Just some points for you to consider in your discussion.

Are the rationale for, and objectives of, the Systematic Review clearly stated?

Yes

Are sufficient details of the methods and analysis provided to allow replication by others?

Yes

Is the statistical analysis and its interpretation appropriate?

Yes

Are the conclusions drawn adequately supported by the results presented in the review?

Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Current research is in the fields of patient safety and primary care workforce development. Visiting Professor of Primary Care. Formerly, a programme developer for an Emergency Care Practitioner and a Specialist Paramedic in Primary Care Programme.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Reviewer Report 30 April 2021

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The rationale and aim of the review were clearly stated. Whilst the need for the precise focus of

this review was explained, there is a danger that this precision cannot draw comparisons when the workforce (and much of the evidence base) includes novel primary care and ambulance service initiatives that the authors sought to omit from their review.

There is a good overview of the difference of the paramedic in Ireland in relation to the rest of the UK and in consideration of the global literature. It would have been helpful if this was returned to in the discussion in order to relay the findings back to the Irish workforce, given that this was the aim of the review.

Whilst the search is repeatable, I have four comments to feedback regarding the rigour of the approach – which I believe could be strengthened:

- It is unclear why the focus was on only three databases.
- Despite the supporting literature outlined in the background of this article, the search terms do not include ‘community paramedic’. Whilst not a MeSH term, it’s widely used in the literature and clinical trials on this subject area. Furthermore, it is unclear why the search term of ‘physician assistant’ is used when the articles’ focus is on paramedics. Within Ireland, and globally, physician assistants are a distinct clinical role to that of the paramedic. However, with this limitation in the search terms noted, the literature included in the review does not feature physician assistants as the primary focus.
- The inclusion criteria are very broad, and there is no exclusion criteria reported. With this in mind, it is unclear why so few papers were included in the review. There is no clarity regarding excluded papers, and the benchmarks applied when considering the relevance of paper. Even if exclusion criteria were developed post-hoc, including this in the review would be beneficial for replicability (and better meet the process outlined by Arksey and O’Malley, 2003¹).
- The authors also outline that one returned paper was not included in the review as the study was incomplete (Reference 3: Bulger et al 2019). However, this poster presentation concerns paramedics, who are employed by the ambulance service, undertaking home visits within general practice. As the authors outline that the review’s focus was not on novel primary care or ambulance service initiatives, it is unclear why this paper was considered suitable for inclusion.

Whilst the analysis is generally appropriate, as the authors have adopted Arksey and O’Malley’s (2003) approach to scoping review, I would expect to see more than a short summary or profile of each study. In their methodological framework, Arksey and O’Malley (2003) explicitly cite Pawson’s work on this, who outlined that “*simply producing a short summary or profile of each study does not guarantee helping those readers who might have to make important decisions based on the study findings*” (Pawson, 2002²).

The authorship team for the paper include Agarwal and Booker following their engagement as consultants. Whilst such a consultation exercise is applaudable, the contribution of these authors to the search results (for example, additional references regarding potential studies to include, or not) should be made clearer. In my opinion, this would firmly root their involvement as ‘added value’ to the scoping review.

Finally, the subsection *on role ambiguity for paramedics in the general practice setting* also does not

cite Proctor's (2019³) study, despite this being one of the main findings of this research.

The discussion is an accurate summary of the included papers, though I would expect to see the focus of the research (paramedics working directly in general practice) better illustrated within the limitations of the research. Whilst this does indeed occur (as outlined in Brown's and Daly's case studies included in the review), such an employment model is not representative of the global workforce – which includes novel primary care and ambulance service employment models for paramedics in general practice. Whilst the conclusions this paper present are still valid, they should be viewed in the context of this limitation and I would expect to see this better outlined.

I particularly enjoyed the last paragraph of the discussion (opening with the problematic perspective that the potential benefits of paramedics in general practice outweigh any limitations). This was a refreshing stance, and quite original, certainly prompting the reader for directions for future research.

¹ Arksey H, O'Malley L: Scoping studies: towards a methodological framework. *Int J Soc Res Methodol.* 2005; 8(1): 19–32.

² Pawson, R (2002) Evidence-based policy: in search of a method. *Evaluation*, 8, 157–181.

³ Proctor, A (2019) Home visits from paramedic practitioners in general practice: patient perceptions. *Journal of Paramedic Practice* 11(3): 115-121

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Are the rationale for, and objectives of, the Systematic Review clearly stated?

Partly

Are sufficient details of the methods and analysis provided to allow replication by others?

Partly

Is the statistical analysis and its interpretation appropriate?

Partly

Are the conclusions drawn adequately supported by the results presented in the review?

Partly

Competing Interests: Georgette is supported by a National Institute for Health Research (NIHR) Doctoral Research Fellowship (NIHR300681), which aims to understand the impact of paramedics in NHS primary care by using realist approaches to improve understanding, support intelligent policy and future workforce planning. Georgette also co-authored a systematic scoping review

within this topic area, which was cited by the authors in the introduction of this research article (DOI: <https://doi.org/10.3399/bjgp20X709877>) but which was not included in this review.

Reviewer Expertise: My specific research interests centre around paramedics working within urgent and primary care, and the development of the profession within this sector.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.
