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Evaluating Paramedic Independent Prescribing in Emergency and Urgent Care: A Mixed-Methods Case Study

Adam Bedson
adam.bedson@nhs.net

Symphony Healthcare Ltd
Joanne Turnbull
University of Southampton
Susan Latter
University of Southampton

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Abstract

Background

Paramedic independent prescribing was introduced in the United Kingdom in 2019 with the aim of enabling advanced paramedics to autonomously complete episodes of care. This is particularly relevant in emergency and urgent care, where rising demand and workforce pressures require a multidisciplinary workforce capable of autonomously providing prompt treatment. However, evidence remains limited on how paramedic prescribing operates in practice, including any benefits for patients and services, and the organisational and legislative factors shaping practice.

Methods

A convergent mixed-methods case study design was conducted in a United Kingdom emergency department and a urgent care clinical assessment service. Data comprised prescribing frequency data, 207 observation hours of 10 paramedic independent prescribers, 19 staff interviews and document analysis. Quantitative data were analysed using descriptive statistics and qualitative data through thematic analysis. Mixed-methods data integration was undertaken using joint display matrices and narrative synthesis.

Results

Emergency department paramedics contributed significantly to workload demands by independently prescribing fo serious infections, medical emergencies and trauma. In urgent care, prescribing enabled paramedics to promptly manage acute infections to avoid worsening illness or the need for hospital admission. The ability to issue electronic prescriptions as part of remote-first model of urgent care also improved access to treatment and service delivery. Paramedic autonomy was substantial but dynamic, with doctors in both settings consulted for more complex prescribing decisions involving frailty and chronic disease. Access to patient records, and close multidisciplinary relationships facilitated prescribing practice. Legislative restrictions prevented paramedics from prescribing all of the required Controlled Drugs, increasing work for other staff and delaying important treatments. Participants supported postgraduate education for paramedic prescribing but questioned national requirements for a full masters award.

Conclusions

In the face of high demand and workforce shortages, paramedic prescribers were integral to emergency and urgent care work, managing whole episodes of patient care across the range of typical presentations. This important contribution was facilitated by the ready availability of on-site access to detailed patient records, and doctors' expertise in managing frailty and chronic disease. Controlled Drug legislation is impeding paramedics' potential contribution and requires revision to maximise paramedic prescribing in emergency and urgent care.

Background

Independent prescribing enables appropriately qualified healthcare professionals to prescribe medicines within their competence as part of complete episodes of care [1]. Paramedic independent prescribing (PIP) was introduced in the United Kingdom in 2019 and from the start of 2024, paramedics were permitted to prescribe five Controlled Drugs [2]. Policy documents anticipated PIP would improve medicines access, autonomy, and the contribution of advanced paramedics within multidisciplinary teams. These expectations were however largely aspirational rather than informed by research evidence [3–5]. Whilst the United Kingdom is the only country to have introduced PIP to date, its implementation continues to gain momentum across Australia and New Zealand [6–8], suggesting further international expansion is likely. Therefore, research evaluating PIP in the United Kingdom is of international significance in informing policy, practice and implementation in other countries.

Whilst most research has been undertaken in primary and secondary care, data from nursing, pharmacy and other professions suggests that independent prescribing improves medicines access, practitioner autonomy and patient satisfaction[9–12]. Healthcare policy in the United Kingdom has promoted advanced practitioners with independent prescribing authority from nursing and the Allied Health Professions, including paramedics, as a solution to service pressures and workforce shortages across the United Kingdom National Health Service (NHS) [13–18].

Paramedic practice has evolved over the past two decades from a vocational role that provided emergency care and transport, to a graduate profession capable of managing a much broader range of presentations including minor illness and chronic disease exacerbations [19, 20]. In the United Kingdom, advanced paramedics holding post-graduate qualifications now work across emergency and urgent care (EUC) settings, including ambulance services, urgent care services and emergency departments, as well as working in both primary care and other secondary care specialities [21–28]. In emergency departments (EDs), as Advanced Clinical Practitioners in Emergency Medicine, paramedics and other healthcare professions practise at a level comparable to ED doctors [29, 30]. In community urgent care, advanced paramedics and other healthcare professions provide remote, face-to-face and home-based assessment within multidisciplinary teams [22, 24].Currently, the integration of advanced paramedic roles in the wider health system is most prominent in the United Kingdom. However, advanced paramedics are increasingly working in EDs, urgent care, and primary care in countries such as Australia and New Zealand [31–33].

Early studies largely based on interviews and surveys with small samples suggested that PIP improves autonomy, medicines access and completion of care in EUC [23, 24, 34]. Our previous research similarly found senior healthcare leaders associated PIP with greater efficiency and autonomy, although concerns were

raised regarding the introduction of only a restricted list of Controlled Drugs, and identified a low level of PIP uptake in ambulance-services [27]. However, prior research evidence is limited to self-reported findings, and some PIP participants had not gained any direct experience of prescribing in practice [22, 24]. None of the previously published research has examined practice since the change in Controlled Drug legislation [24]. Consequently, an in-depth study of PIP implementation in the context of EUC practice is lacking, together with an understanding of Controlled Drug use by PIPs, or how the current legislative restrictions may impact care and service delivery.

Against a background of historical concern about paramedic preparedness for PIP [35], national policy recommends master's-level education as a precursor. [4, 5, 22, 36, 37]. In practice however, educational preparation varies significantly, with some PIPs only completing under-graduate or limited post-graduate training [23, 24, 26, 34], with time, funding and employer support acting as barriers [26]. Previous research also reports mixed views on what level of educational preparation is adequate for PIP practice [21, 22]. However, since the further expansion of PIP in EUC, there has been a lack of research examining the reality of practice, or views on what is required for safe and effective prescribing by paramedics, and whether previous concerns are justified.

Substituting the work of doctors with advanced practice roles as a solution to workforce challenges remain contested in the United Kingdom and internationally [38–40]. A 2026 Cochrane review found little or no difference between nurse-led and doctor-led hospital care in mortality, patient-safety events, quality of life or self-efficacy, evidence certainty was moderate to low, and EUC settings were not specifically evaluated [41]. A 2026 British Medical Association survey of 5299 members, including 735 ED doctors, reported 83% perceived the way advanced practitioners currently fulfil roles and responsibilities in the NHS is either sometimes or always a risk to patient safety. Although respondents also reported views that experienced, appropriately credentialled advanced practitioners are essential to pressured EUC services [38].

Neo-Weberian theories of social closure describe how professions seek to maintain or extend control over areas of practice, while Abbott's (1988) theory of professional jurisdiction highlights how this control is negotiated between professions. Applied to prescribing, Weiss [42] argues that whilst non-medical professions have gained prescribing jurisdiction, the medical profession has retained its authority by retaining its jurisdictional claim over managing clinical complexity and uncertainty. How these theoretical constructs relate to PIP in EUC are, however, not well understood. Understanding how as advanced practitioners, PIPs contribute to care and negotiate professional jurisdiction in EUC is therefore important to informing the wider debate on workforce policy and patient safety.

As part of a larger research project on PIP in EUC (NIHR 302127), this study examined PIP implementation in an ED and an out-of-hours Clinical Assessment Service (CAS). As the roll out of PIP continues, the aim of the study was to address important gaps in research evidence pertaining to the reality of how PIPs' contribution to patient care is being enacted in EUC, including professional practice and service delivery, and the organisational and interprofessional factors that facilitate or constrain its use. The study also aimed to provide further evidence Controlled Drug use and the role of Master's education.

Methods

Design and philosophical approach

A convergent mixed-methods instrumental case study design was used, informed by critical realism and interpretivism [43–46]. Critical realism supported examination of the organisational structures and mechanisms shaping PIP [45, 46], while an interpretive approach to data analysis focused on understanding how participants understood and negotiated autonomy, risk and professional roles through their lived experiences [43, 47]. Pragmatism supported the use and integration of quantitative and qualitative methods to examine both the measurable scope of prescribing and how it operated in context [43].

Two purposively selected EUC services, an ED and an out-of-hours CAS were chosen. Established PIP practice, organisational willingness to support the study, and geographical feasibility informed selection. The selected sites were considered instrumental case studies, defined as case studies selected to explore a specific phenomenon [44]. Researcher insight and engagement with potential sites illustrated the selected sites were typical EUC settings, enhancing the transferability of findings to other similar settings [48]. Reporting was guided by the Consolidated Criteria for Reporting Qualitative Research (COREQ) and the Good Reporting of a Mixed Methods Study (GRAMMS) guidance.

Case settings

The ED provided 24-hour consultant-led emergency care to a mixed urban and rural population. As part of a multi-disciplinary team of doctors, nurses and clinical support staff, PIPs worked as Advanced Clinical Practitioners in Emergency Medicine across three main areas of the ED. These included the resuscitation room, where major trauma and illness were managed, the majors area, where higher acuity illness and injury were dealt with, and the minors areas, where lower acuity minor illness and injury were treated.

The CAS served more than one million people across a large urban and rural region, providing out-of-hours urgent care during public holidays, overnight on weekdays and 24 hours a day over the weekend. PIPs were based at one of five regional treatment centre locations and worked as urgent care practitioners as part of a multi-disciplinary team of nurses, pharmacists, physician associates and doctors. Referrals were received from NHS 111 service, a 24-hour telephone and online assessment service that directs patients to the most appropriate care. CAS clinicians managed cases predominantly through telephone assessment, and where needed, through subsequent treatment centre consultations or home visits. Adastra software supported clinical documentation and electronic prescribing to community pharmacies, while limited medicine stocks and handwritten prescriptions were available for face-to-face care. A senior on-site coordinating doctor authorised treatment-centre appointments and home visits and provided clinical support.

Participants, sampling and consent

Registered paramedics qualified in PIPs actively prescribing at either site were eligible. Doctors, nurses, pharmacists, managers and prescribing or governance leads were eligible for interview if they had direct experience of working with PIPs. Purposive sampling sought diversity of experiences across professions, grades and organisational responsibilities. Recruitment and the duration of fieldwork were guided by assessments of informational power, informational redundancy, reflexivity and research-team discussion, rather than seeking data saturation [49–51].

Clinician participants received written study information and provided written informed consent. Patients were not research participants, but verbal permission was obtained before each observed consultation. The patient information and consent approach were co-developed with the study Patient and Public Engagement and Involvement group. Where a patient lacked capacity, agreement was sought from a relative where possible or observation proceeded following discussion with the treating clinician. Participants could withdraw until analysis commenced.

Data collection

Anonymised PIP prescribing datasets for all PIPs in both the ED (n = 4) and CAS (n = 8) were obtained for the period 1 January to 31 December 2023. Following the legislation amendment, Controlled Drug prescribing data from 31 December 2023 to 1 August 2024 were requested. The ED supplied complete prescribing records for the latter, allowing comparison with 2023, and analysis of Controlled Drug prescribing. Equivalent CAS Controlled Drug data were unavailable due to a national delay in updating Adastra with the changes for PIPs. Whilst PIPs could issue handwritten prescriptions for the limited list of Controlled Drugs, or supply them from stock following the legislative change, this data was not captured by Adastra.

Qualitative data were collected between October 2023 and August 2024 and included non-participant observation of clinical practice, audio-recorded reflective conversations, semi-structured interviews, organisational documents and observations of relevant online Microsoft Teams meetings at each site. Observations focused on the clinical reasoning and organisational processes surrounding prescribing rather than medicines activity alone. Interviews lasted approximately 30–60 minutes and were undertaken face-to-face or through Microsoft Teams. An interview topic guide was developed for this study (Supplementary File 2), informed by previous PIP research, including interviews with senior healthcare leaders [22] and through evidence syntheses [22], to explore clinical scope, benefits and limitations, autonomy, risk, education, governance, records access, multidisciplinary working and service context.

The lead researcher (AB) adopted an observer-as-participant position, remaining sufficiently immersed to understand workflow and decision-making while remaining external to both organisations [52]. Field notes documented consultations, professional interactions, informal discussions and contextual influences. Interviews and recorded reflective conversations were automatically transcribed in Microsoft Word and manually checked against recordings. Relevant documents included job descriptions, prescribing policies, formularies, clinical guidance, audit processes and governance materials.

Analysis

Quantitative data were analysed descriptively using frequencies and percentages using Microsoft Excel. Qualitative data were managed and coded in NVivo [53] to undertake thematic analysis using an iterative inductive-deductive approach [47, 54]. Data were initially coded, and categories and broader themes were then developed through comparison with previous study findings, wider literature and evidence syntheses and emerging theoretical concepts [44, 55–57]. Constant comparison across interviews, observations, documents and case sites supported within-case analysis [44, 55, 56, 58].

The study design had a quan–QUAL structure, with qualitative data carrying greater explanatory weight [43]. Integration occurred throughout fieldwork and analysis. Quantitative findings informed areas to be explored during observation and interviews. Joint-display matrices compared prescribing activity, contextual conditions and qualitative interpretations, and narrative synthesis combined the two cases to develop overarching meta-inferences [59, 60].

Following completion of the within-case analyses, themes from both case studies were compared iteratively to identify patterns of convergence and divergence [44, 58, 61]. Consistent with multiple case study methodology, this cross-case analysis enabled the findings from the individual cases to be synthesised into higher-order themes that explained how PIP was implemented across EUC settings, while retaining the contextual contribution of each case [44, 58]. This paper presents the findings of this cross-case synthesis as three overarching themes (Table 5)[58].

Rigour was strengthened through methodological and data triangulation [43, 44, 47, 58, 62, 63], integrating quantitative prescribing data with qualitative evidence, research-team discussions of coding frameworks, data categorisation and interpretation. Neo-Weberian concepts of social closure [64] and Abbott's theory of professional jurisdiction [42] provided interpretive lenses that informed data collection and analysis. They focused observations and researcher attention on professional autonomy and the negotiation of responsibility, while enabling these issues to be explored with participants during interviews and interpreted during the later stages of analysis.[20, 42, 64, 65].

Wider literature informed a decision not to undertake formal member checking of interview transcripts and field notes by participants [55, 66, 67]. However, emerging interpretations were explored through reflective discussions with participants during fieldwork. The researcher (AB) that collected the data was a practicing PIP with ambulance, urgent care and primary care experience. Some of the participants were known to the researcher through prior professional relationships. This facilitated building rapport and researcher experience provided contextual insight. However, these factors were also recognised as potential sources bias and assumption [47, 68]. Reflexive diary entries, discussions with the wider research team and data triangulation were used to enhance rigor and transparency and minimise bias [47, 69].

Results

Participants and data overview

All four ED PIPs and 6/8 CAS PIPs participated. Eleven ED staff and eight CAS staff were interviewed, including doctors of different grades, nurses, prescribing leads, operational leaders and a non-clinical manager. Three CAS PIPs held organisational leadership responsibilities alongside their clinical roles and so also participated in an interview. Tables 1 and 2 provide a summary of all participants, with care taken to maintain anonymity in the level of detail provided. Fieldwork comprised 93 hours in the ED across 73 patient encounters and 114 hours in the CAS across 153 encounters, a total of 207 hours. Tables 3 and 4 provide a summary of the qualitative data sources collected at each site.

Table 1
ED Participant Summary

Participant	Participant Summary
ED PIP P1	Paramedic ACP-EM. Also works part-time for regional ambulance service.
ED PIP P2	Paramedic ACP-EM. PIP
ED PIP P3	Paramedic ACP-EM. PIP
ED PIP P4	Paramedic ACP-EM. PIP
ED Case Study Interview (CSI) 1	Emergency Department Consultant (Doctor).
ED CSI 2	Emergency Department Consultant (Doctor).
ED CSI 3	Associate Director of Pharmacy (Pharmacist).
ED CSI 4	Consultant ACP-EM (Nurse). Independent Prescriber (IP)
ED CSI 5	Non-Medical Prescribing Lead/Consultant Nurse. IP
ED CSI 6	Non-Medical Prescribing Lead (Nurse). IP
ED CSI 7	Emergency Department Registrar (Doctor).
ED CSI 8	Emergency Department General Practitioner and Ambulance Doctor.
ED CSI 9	Emergency Department Registrar (Doctor).
ED CSI 10	Trainee ACP in Cardiology (Paramedic).
ED CSI 11	Emergency Department Registrar (Doctor).

Table 2
CAS Participant Summary

Participant	Summary
CAS PIP P1	CAS PIP.
CAS PIP P2 (Also participated in a case study interview)	CAS PIP and Clinical Leader.
CAS PIP P3	CAS PIP also working part-time in ambulance service.
CAS PIP P4 (Also participated in a case study interview)	CAS PIP and Clinical Director.
CAS PIP P5	CAS PIP also working part-time in ambulance service.
CAS PIP P6 (Also participated in a case study interview)	CAS PIP and Clinical Director, also working part-time in ambulance service and primary care.
CAS CSI P1	Nurse IP in CAS. Clinical Lead.
CAS CSI P2	Nurse IP in CAS. Clinical Lead.
CAS CSI P3	Doctor in CAS. Former CAS medical director, GP in primary care.
CAS CSI P4	Doctor in CAS. Deputy Medical Director.
CAS CSI P5	Non-Clinician. Head of Integrated Urgent Care. CAS operational shift manager.

Table 3
Overview of ED Qualitative Data Sources

Data Source	Details
Observation of clinical cases	Total of 93 hours of field work observing 73 patient cases.
	Total cases involving all forms of drug activity: 53/73 (72.6%).
	Cases directly involving prescribing: 39/73 cases (53.4%), 48 drugs prescribed.
	Cases not requiring any form of drug activity: 20/73 (27.3%).
Meeting observations	ED staff handover meetings and daily huddles: 10.
	Medicines governance online meeting observation.
Field notes	Field note word count: 97860
Case study interviews	Online case study interviews: 11.
Case site documents	Case site documents: (n = 20) Including non-medical prescribing and CD policies, ACP job description, prescribing guidelines, proformas and checklists.

Table 4
Overview of CAS Qualitative Data Sources

Data Source	Details
Observation of clinical cases	114 hours of field work
	153 cases in total.
	Remote consultation: 107, (69.9%).
	Face-to-face consultations: 23, (15%).
	Home visits: 23, (15%).
	Drugs prescribed during observed cases: 67 (43.7%).
Meeting observation	Medicines governance online meeting observation.
Field notes	Field note word count: 128390.
Case study interviews	Eight.
Case site documents	Case site documents (n = 8) included medicines management policies, end-of-life prescription forms, prescribing proformas and PIP job description.

Scope and context of prescribing

PIP was embedded in autonomous advanced practice at both sites but reflected the different clinical contexts. ED prescribing primarily supported face-to-face, higher-acuity care, including sepsis, acute coronary syndromes and trauma. The 'remote-first' CAS focused on acute infections, respiratory illness, long-term condition exacerbations, and short-duration repeat prescriptions. At both sites, PIPs also reviewed, withheld, deprescribed or continued established treatment. The quantitative prescribing data for both case sites are summarised in Supplementary File 1.

In the ED, the work of the PIPs mirrored that of the middle-grade ED doctors, and both worked from a central triage list of patients waiting to be seen. Consequently, both PIPs and doctors managed patient presentations across the entire spectrum of acuity seen in emergency medicine. Three to four cases were managed simultaneously every 2–4 hours, whilst waiting for the results of investigations and tests. Prescribing was predominantly undertaken electronically, with medicines administered by nursing staff or supplied through discharge prescriptions. During 2022–2023, 79448 patients were seen in the ED, an average of 217.6 patients per day [70]. 193 different drugs were prescribed by PIPs 3646 times during 2023 (Supplementary File 1), an average of 303.8 prescriptions per month, and approximately 18 prescriptions per PIP each week. In the 2024 dataset, 3380 prescriptions were issued over 209 days by ACP-EMs (average of 422.5 prescriptions per month), a 39% increase in overall prescribing frequency compared to 2023, potentially reflecting increasing demand. During 2023, antibiotics (20.6%), intravenous fluids (20.4%) and paracetamol (16.3%) were most frequently prescribed. Most activity occurred in the major's area and 37.1% (n = 371/998) of prescriptions related to infection management, including sepsis. Field work mirrored these findings from the quantitative data, with 10/39 (25.6%) of observed prescribing cases involved acute, often severe infections.

Observation demonstrated the integration of assessment, investigation and prescribing in high-acuity care. A typical example of this was a patient with chest pain which initially appeared less significant due to a normal electrocardiogram, until blood results were available which showed a significant cardiac event, prompting ED PIP P1 to rapidly prescribe treatment and arrange definitive cardiology care:

Field Note Extract: PIP P1 ... then reviewed the requested blood results… "his troponin is over 26000!"… highly indicative of a myocardial infarction. PIP P1 quickly … opened the electronic prescribing software… to …prescribe the required emergency cardiac drugs- Aspirin, Glyceryl Trinitrate, Clopidogrel and Fondaparinux.

Between June 2023-June 2024, 123,970 patient cases were received by the CAS, equating to approximately 2384 per week. Clinical navigators (a role fulfilled by doctors and urgent care practitioners in clinical leadership positions) maintained oversight of the call queue, allocating individual cases to different clinicians on duty. PIPs were allocated a combination of remote consultations, face-to-face treatment centre appointments and home visit requests. On average, phone consultations and face-to-face treatment centre cases required 15–30 minutes to complete, including time to write notes and issue prescriptions. Home visits took between 1–2 hours including travel time to and from the address. Field work, documentary analysis and interviews confirmed that doctors, nurse practitioners and PIPs were all allocated similar cases. Staff interviews and field work highlighted that some nurse practitioners were reluctant and not confident to undertake home visits. However, paramedics were confident and willing to manage these cases, which participants perceived was due to their ambulance service experience. PIPs were therefore frequently tasked to home visits. This included attending patients requiring end-of-life care and prescribing palliative care drugs.

Eight CAS PIPs issued 1,483 prescriptions for 149 different medicines during 2023 (Supplementary File 1), an average of 124 per month, 31 per week. Oral antibiotics accounted for the majority (59%), followed by oral steroids and inhalers (4.9% each). All other medicine groups individually represented less than 3%. Prescribing occurred in 49 of 153 observed consultations (32%). A further 36 involved prescribing-level decision making, including adjusting existing medication doses, or deciding a prescription was not indicated. This often involved managing pressure to prescribe antimicrobials that were not indicated. Therefore, 85 observed CAS contacts (55.5%) involved a prescription or clinically substantive medicines decision. 7/49 (14.2%) observed prescribing cases were for a repeat prescription request, with PIPs describing this as a regular prescribing activity. Quantitative data included long term disease treatments such as anti-hypertensives, steroid inhalers, statins, mental health drugs and topical skin treatments. Requests often arose following delays in these being issued by primary care providers.

Of the 153 cases observed, over two thirds were remote consultations (n = 107, 69.9%). The remainder were split equally between face-to-face consultations at treatment centres (n = 23, 15.0%), and home visits (n = 23, 15.0%). Participants described a fundamental post-COVID 19 pandemic shift from the pre-pandemic face-to-face model of care to a predominantly remote model. The case site provided data which showed between June 2023-June 2024, of the patient cases received by the CAS (n = 123,970), 87.2% (n = 108,192) were managed through remote assessment. PIP was considered by participants to be essential in the context of remote consulting, as it allowed paramedics to send electronic prescriptions to pharmacies for patients to collect. However, the limitations of telephone assessment were recognised, even when video consulting or photographs were used, and face-to-face review at a CAS treatment centre, or home visit were arranged when required.

“I’m not sure that remote working is always the right thing for patients… there is no substitute to having a patient in a room to put your hand on their tummy.” (CAS CSI P3- Former CAS medical director, GP in primary care).

Safe prescribing was supported by longitudinal primary care record access in both sites through the primary care record system EMIS Viewer. Records were particularly important for checking allergies, renal function, previous treatment, long-term medication and documented management plans. Participants contrasted this with the limited summary information commonly available in ambulance services, expressing concern about PIP occurring without the level of information available to CAS PIPs.

I think ... visibility of longitudinal medical records fundamentally makes prescribing safer... I'm not sure, that prescribing paramedics in [regional ambulance service] would have the same level of contextual information... you just don't get that … [if a patient’s] own GP has declined to issue [a] drug ... unless you can see that…, there is a real risk [you] undermine continuity of practice. (CAS CSI Participant 4 - Deputy Medical Director, GP)

Field work reflected these insights and EMIS Viewer access enabled a PIP to decline restarting an antidepressant after identifying a documented withdrawal plan:

Field Note Extract: When CAS PIP P3 rang the nurse, they explained the patient ... had been prescribed Sertraline ...and then later...Mirtazapine as well...They asked CAS PIP P3 if they could prescribe some so the patient had this to take over the weekend. However, the EMIS notes ... detailed… a plan to then stop both drugs once the course of Mirtazapine had finished [leading CAS PIP P3 to decline the prescription request].

Controlled-Drug restrictions

Legislative amendments enabled PIPs to prescribe the Controlled Drugs Morphine, Codeine, Diazepam, Lorazepam and Midazolam from 31/12/2023. Findings from both case sites demonstrated this was an important expansion of PIP, although the limited list was not fully aligned with clinical practice. Controlled Drug restrictions therefore impacted patient care, service delivery and were a source of frustration for PIPs and the wider multi-disciplinary team. In the CAS, delays in updating the Adastra system nationally also meant PIPs could only prescribe the five permitted drugs using handwritten prescriptions or immediate supply from medicines stock.

Controlled Drugs are frequently required and important treatments

The introduction of the limited list of Controlled Drugs was seen as a positive and important development, with quantitative data confirming these drugs are frequently needed in EUC (Supplementary File 1). In 2024, Controlled Drugs represented 15.1% of all ED PIP prescriptions, with Morphine accounting for 73% of these (n = 375). Field work and interviews confirmed this enabled faster provision of analgesia as well as delegation of Morphine administration to nurses. Qualitative data from the CAS demonstrated that being able to prescribe Morphine and Midazolam using hand-written prescriptions or immediate supply from stock enabled PIPs to manage end-of-life cases.

We see a lot of end-of-life patients... and usually the paramedic workforce are the ones who do the home visits. So if they are able to prescribe those drugs ... it's a huge benefit... that's the type of stuff that [in the past] we've avoided giving to paramedics. (CAS CSI Participant 1, Clinical Lead, Nurse IP).

The restricted list was, however, not fully aligned with advanced practice in EUC. Other ED clinicians prescribed Oxycodone 1,079 times (14.6%) in 2023 (Supplementary File 1). Field work and analysis of ED documents such as prescribing proformas highlighted that Oxycodone is an important, first-line treatment for frail elderly patients presenting with painful hip-fractures and chest-wall injuries. Although other CAS prescribers issued only 243 Oxycodone prescriptions in 2024, participants considered it important for end-of-life care when Morphine was unsuitable. PIPs therefore had to obtain third-party prescriptions from doctors, causing difficulties and delays at both sites.

PIPs and other ED clinicians also identified Chlordiazepoxide, which is also not included in the limited list, as central to acute alcohol withdrawal management. Fentanyl and Ketamine were also reported to be important for procedural sedation and analgesia. Although neither drug was prescribed frequently by non-PIPs (Fentanyl n = 256, 3.6% doctors, n = 11, 5.1% consultant nurse, Ketamine n = 51, 0.8% doctors, n = 7, 3.2% consultant nurse), qualitative data demonstrated their importance when required, and the impact of restrictions on practice and care.

So, for things like ... fentanyl, ... we're expecting these ACPs (Advanced Clinical Practitioners) to practice at this really senior level, and then they have to go and ask somebody else to prescribe those certain medications. (ED CSI Participant 4, consultant ACP/nurse).

Controlled Drug restrictions increased work for other prescribers

The Controlled Drug restrictions reduced PIPs' ability to complete episodes of care autonomously, increasing work for other prescribers who were already very busy due to wider service demands and pressure.

A lot of the work in ED is being interrupted forty-five times an hour while you're doing your main role...And then the poor paramedics... can't give [Controlled Drugs]… I think that that has slowed things down... part of having ACPs working at [middle grade doctor] level, actually that's kind of their job to do that... if they can't prescribe ... a good deal of what we often do… that all falls down onto the senior doctors and frankly, there's enough to do. (ED CSI Participant 9 - ED doctor).

Controlled Drug restrictions delayed care

In the CAS, PIPs described how being unable to electronically prescribe Controlled Drugs led to them frequently having to re-enter cases into the clinical queue for another prescriber to issue them. Fieldwork reflected participant views, with one patient who had severe back pain being unable to obtain an electronic Codeine prescription before the pharmacy closed, as the case would not be picked up by another prescriber in time, and so the patient remained in pain overnight. In another case, CAS PIP P6 was unable to fully manage a repeat prescription request from a patient who required several of the medications urgently during the out-of-hours period. CAS PIP P6 issued the other drugs requested but had to then refer the case to another prescriber for the Controlled Drug (Gabapentin) to be issued, creating inefficiency and delaying patient access to treatment.

Whilst ED PIPs were co-located with their colleagues, they were often too busy to provide timely third-party prescriptions. This delayed patient care and increased the time it took for PIPs to complete episodes of care, increasing inefficiency in an already busy department:

Field Note Extract: After around 15 minutes of standing in the corridor outside, the doctor finally emerged from the cubical appearing quite stressed and distracted. He did however… say 'no problem' when asked he if would be happy to issue the prescription [of Oxycodone]. He followed this with "but… I've got several things on the bounce now" ... Due to the length of time which had now passed in getting this prescription, the patient was getting more concerned about being able to get to the pharmacy in time...before it closed.

Professional implications from Controlled Drug restrictions

Frustration about Controlled Drug restrictions were expressed by most participants. They described during interviews and field work the professional impact of the restrictions on PIPs as senior clinicians in the multidisciplinary team.

An ACP is the equivalent of [a middle grade doctor] ... a senior clinical decision maker ...I don't see why they've got a limited list... If you've got that much clinical responsibility, you should be able to decide what you can and cannot prescribe. (ED CSI Participant 4, ED Doctor).

It's ludicrous that I can knock somebody completely out with Propofol but nothing else…. It just you feel a bit impotent... you feel like you're an annoyance... And it almost feels like it devalues the role a little bit. (ED PIP P1 Participant 1 reflective conversation transcript).

CAS participants also described a mismatch between clinical responsibility and legal authority when prescribing was transferred to clinicians without first-hand patient knowledge. Their colleagues were often based remotely at another treatment center and were reluctant to prescribe Controlled Drugs due to a lack of direct patient oversight.

Some… said... I don't feel comfortable... signing Codeine ... [or] they would want to speak to the patient again. And so it sort of prolongs that patient contact ... we're having to get them to make clinical decisions when they haven't been directly... speaking to the patient to get that clinical history. (CAS PIP Participant 6)

Findings from cross-case thematic analysis

Table 5 provides overview of the key themes generated from thematic analysis of qualitative data within each case site. Cross-case comparisons of qualitative and quantitative analysis facilitated the creation of three cross-case themes.

Table 5
Summary of within case and cross-case themes.

ED Themes	ED Sub Themes	CAS Themes	CAS Sub Themes	Cross-Case Themes
ED Theme 1: Benefits from paramedic independent prescribing in ED		**CAS Theme 1: The benefits from the introduction of PIP in the CAS**	1.1 **Improved professional practice.** 1.2 **Improved service delivery efficiency.**	**Cross-case theme 1**: **PIP enabled complete episodes of care, improved patient access and efficiency**
ED Theme 2: Managing complexity and risk in a bubble of autonomy	**2.1 Complexity and uncertainty in prescribing practice** **2.2 Managing, accepting and sharing risk: the importance of medical support** **2.3 Challenges in seeking medical support**	**CAS Theme 4: Paramedics in a multi-disciplinary urgent care role**	**4.1 Educational and experiential requirements.** **4.2 Professional differences across the multi-disciplinary Workforce.**	**Cross-case theme 2**: Negotiated prescriptive autonomy and sharing of risk
ED Theme 3: The front door of the NHS - prescribing practice in the post-pandemic era		**CAS Theme 3: An overflowing bowl: demands from the wider healthcare landscape**	**3.1 An overflow of prescribing work from primary care.** **3.2 An overflow of prescribing work from the ambulance service.**	**Cross-case theme 3**: PIP operates within an overflowing EUC system

PIP enabled complete episodes of care, improved patient access and efficiency

Across both sites, prescribing was integral to advanced paramedic practice. It aligned responsibility for assessment and diagnosis with authority to treat, reducing reliance on doctors for third-party prescriptions and avoiding repeated clinical assessment or verification.

So I think [PIP is] fundamental. If we're expecting those individuals to be practicing at a senior autonomous and independent practice level, then then they need to be able to prescribe … in order to be able to deliver effective and safe care to patients... (ED CSI Participant 4, consultant ACP/nurse).

In the ED, PIPs independently assessed, diagnosed and treated patients by prescribing drugs and delegating administration to nurses, managing patient's care from arrival to admission or discharge. Nurses described PIP's prescribing as careful and guideline-consistent, supporting confidence in the role's safety. Doctors valued fewer interruptions and prescribing requests within an already crowded department.

The Royal College of Emergency Medicine have done some research in this... if I do a 10-hour shift, that's three hundred to six hundred times that I'm getting interrupted whilst also trying to see patients... ..., if the paramedic ACPs weren't able to prescribe, that would be an extra person in that situation ...And I just think if you're ...an independent practitioner ... Why do 80% of the job? (ED CSI Participant 11, ED doctor).

In the CAS, PIP enabled complete remote consultations and avoided unnecessary onward referral. Participants considered prescribing essential to effective urgent care practice because patients presented with undifferentiated illness and often required treatment during the same contact.

[PIP has] really, absolutely enhanced my practice. I think it is very difficult to work in an ... urgent care environment without being a prescriber... because... you have to be that autonomous clinician and managing so many different undifferentiated conditions... and I think it helps your colleagues as well, because unfortunately you do slow down a lot if you're not a prescriber. (CAS PIP Participant 6).

PIP also supported nuanced medicines decisions, including reviewing previous treatment, deprescribing, and resisting unnecessary antimicrobial requests.

Field Note Extract: CAS PIP P1 then rang and spoke with the paramedic from the attending ambulance crew…the paramedic clearly was not in agreement with [a decision not to prescribe antibiotics] ... and told CAS PIP P1 as the patient would not come with them to hospital, they would feel much happier if they were prescribed antibiotics just in case they had a [urinary tract infection].

Contribution was therefore not measured solely by prescription volume. Deciding not to prescribe or changing an anticipated plan following reassessment was considered equally important to advanced prescribing practice.

It's not just the prescription... It's the change in the medications, especially in our frail patients. It's deciding to stop certain medications and it's understanding the pharmacology ...which is just as important. ... which is why you need that level of practice and that autonomy. (ED CSI Participant 4, consultant ACP/nurse).

PIP was reported to strengthen professional identity and observed to provide continuity and enhance paramedics' contribution as full multidisciplinary team members. Doctors and service leaders largely viewed PIPs as a practical response to workforce shortages and demand, particularly overnight and during periods of pressure.

From a patient perspective, it's ... enabling us to meet patients' needs at the point of contact ... and a better patient experience and... outcomes... From a professional perspective, I think it's satisfying to be able to complete and close your own cases rather than be reliant on other clinicians... And then from a service delivery perspective, you've ... the efficiency gain and the additional resource pool ... to delivering services in what is a difficult climate for resourcing and staffing (CAS PIP P4, Clinical Director/PIP).

Although participants recognised wider professional scepticism about healthcare professions undertaking work traditionally performed by doctors, this was not prominent in everyday case-site relationships. Competence was established through close multidisciplinary working, and PIP was valued amid sustained service pressures.

I think it would have been a damn sight easier if we just trained enough doctors. We haven't. Therefore, we need, clinicians…I think it does definitely make medicine threatened ... I don't think it's quite so much at an ACP level because we see them going through a very similar training process (ED CSI Participant 8, ED doctor).

I think if you talk to the majority of emergency medicine doctors, the more [PIPs] the merrier please! Just because there's just not enough of us like for the amount of patients that we see through the front door... I don't really see a negative to it (ED CSI Participant 11, ED registrar).

Negotiated prescriptive autonomy and sharing of risk

Prescribing autonomy was substantial and influenced by paramedics' experience, knowledge and education, alongside collaborative risk management and shared decision-making with doctors. PIPs independently managed the entire spectrum of cases in the ED, including routine presentations, emergencies and complex cases, although multimorbidity, polypharmacy and diagnostic uncertainty prompted senior medical discussion. This was however not viewed as surrendering independence. Participants described that an ability to recognise limitations and seek advice and support, whilst retaining responsibility for the final decision were central to safe autonomy.

Regarding diagnostic uncertainty:

Field Note Extract: [The patient had] both a raised CRP (C-reactive protein) and D-Dimer [and] some evidence of fluid on both lungs. … ED PIP P4 explained that he could either have congestive heart failure, or they may have a pulmonary embolism. … if they were to prescribe diuretics, or drugs to control his fast atrial fibrillation, which might be causing the fluid overload, but the patient actually had a pulmonary embolism, this could make them more unwell … ED PIP P4 asked the consultant [for guidance], who [advised] to first order a CT scan to make the diagnosis clearer [before later autonomously prescribing the required treatment- a diuretic].

In the CAS, PIPs balanced community management against hospital referral when examination and diagnostics were limited. These decisions required diagnostic reasoning and tolerance of uncertainty, alongside clinical knowledge and experience to manage the broad range of conditions encountered and associated wide scope of prescribing.

It's quite high-risk roles in out-of-hours... you can be on your own quite a lot... working at I think a more of an advanced level, [and the] scope of what we can prescribe is massive. You know, technically it's the whole [British National Formulary- BNF] ... the risks that are there are huge… we're not comparing it to someone else who works in a specialist department who only prescribe a few different drugs (CAS PIP Participant 5).

Participants described managing risk and making defensible decisions where guidance could not identify one correct course. Experienced PIPs accepted that incomplete information and uncertainty could not be eliminated but could be managed through assessment, patient involvement and explicit safety-netting to seek further help if symptoms worsened. "Courage-based medicine" was a term used by a participant to describe a culture supporting reasoned judgement rather than defensive avoidance of decisions.

One of the things in out-of-hours that our medical director talks about is about courage-based medicine… being able to… with gaps in a clinical picture…have the courage [to make prescribing decisions in the face of uncertainty]… but importantly, have safety netting in place to be able to support if things change (CAS PIP Participant 6, PIP and Employee Director).

Medical support was enabling in this process rather than supervisory. Senior doctors provided a "sense check" and shared consideration of risk, while PIPs retained case ownership. Reflective discussions generated the concept of a continuum of autonomy within a "bubble of support", along which PIPs moved according to patient complexity, from fully independent care to collaborative discussion without routinely transferring the patient or prescribing responsibility. This interaction changed with experience. Newly qualified prescribers were more likely to ask, "What should I do?", while experienced PIPs presented an assessment and proposed plan: "I'm thinking of doing this, do you agree?" Medical advice therefore supported immediate safety and informal education.

PIPs prehospital experience and emergency-care training equipped them to manage and prescribe for highest-acuity ED cases with little or no senior support. Participants considered them more confident than junior doctors in some presentations because of this previous experience.

If you look at a lot of [junior] doctors that won't have done any [pediatrics] ... they are... really reticent about seeing children… Whereas if you've got a wheezy child …or a child that's had a febrile convulsion, paramedics are much more comfortable with that because they have been exposed to it in the pre-hospital setting (ED CS Participant 1, ED consultant).

Conversely, medical education and rotational training were considered to prepare doctors for complexity and uncertainty, particularly in frailty, multimorbidity and polypharmacy.

I think the key difference [between paramedics and doctors] is that when you're going through medical school and when you're going through foundation years, you tend to rotate through different areas, so you've become more used to kind of prescribing say for certain conditions such as you know for Parkinson's and elderly care or say working in GP and prescribing certain medication as well (ED CSI Participant 7,ED Doctor).

Education and experience were viewed as complementary foundations of autonomy. All the PIP participants had either completed a Master's degree or were in the final stages of doing so. Research and leadership modules supported broader advanced practice but were not considered direct determinants of

prescribing competence. Clinically focused study, supervised prescribing, mentorship and progressive exposure to complexity were considered more influential than the full Masters award.

Field Note Extract: [CAS PIP P1 explained… they did not agree completing a master's was integral to supporting prescribing practice. They explained that key components that are required ... such as clinical examination and diagnostic reasoning skills [which] can be taught in a variety of ways and importantly, must be underpinned by significant experience and mentorship in practice ... being able to complete assignments at a certain academic level did not benefit prescribing practice.

Participants therefore supported postgraduate preparation, although most did not consider a complete master's programme necessary, a view also shared by their ED colleagues.

*I think that we keep using academic qualifications as proxies for clinical qualifications and they're not the same really. (*ED CSI Participant 8, ED doctor).

Overall, safe PIP depended on competence, confidence, experience and education, with access to medical expertise within close teams. The "bubble of support" did not negate autonomy but enabled PIPs to accept responsibility for increasingly complex prescribing while recognising when uncertainty required collaboration.

PIP operates within an overflowing EUC system

PIP practice was shaped by sustained demand, workforce shortages and reduced capacity across primary, urgent and emergency care.

Emergency departments are the front door of the NHS. When everything else fails... you can't close the doors… you can't hang up the phone" (ED CSI Participant 4, consultant ACP).

The COVID-19 pandemic was perceived as having caused a shift in patient demand, after which pressures did not return to previous patterns.

I mean, nothing's really normal anymore since COVID, I think that was the tipping point. nationally ... urgent care...primary care and ... emergency care have borne the brunt of what appears to be a really complicated shift.... (CAS CSI Participant 2, Clinical Lead, nurse IP).

The ED and CAS increasingly absorbed work from elsewhere, blurring boundaries between emergency, urgent, primary and inpatient care. Consequently, CAS PIP prescribing extended beyond acute treatments to long term disease management and repeat medicines (Supplementary File 1). In the ED, crowding and delayed inpatient admission extended practice beyond emergency stabilisation. PIPs prescribed regular medicines, prolonged insulin and antimicrobial infusions [not captured in quantitative data due to being recorded on paper drug charts], intravenous fluids, and repeated treatment for patients remaining in the department for many hours, sometimes more than a day, after an admission decision. This work affected capacity to manage wider EUC demand.

I've seen the transition pre COVID, in COVID and post COVID into what we have now, which is just truly like 24/7 patient attendance to the emergency department with very little respite (ED CSI Participant 11 ED registrar).

If I could wave one magic wand, I'd be saying invest in primary care [to] avoid… the overflow... fewer people would potentially be turning up to ED when they don't need to be there... it's a really difficult landscape. (CAS CSI Participant 4, Assistant Medical Director, urgent care doctor).

Ambulance clinicians also contacted the CAS for prescriptions when patients could otherwise remain safely at home. This created circular pathways through NHS 111, ambulance assessment and urgent care because prescribing capability or governance was unavailable within the ambulance service.

Field Note Extract: [CAS PIP P1] rang the paramedic back and they explained they were with a 60-year-old patient ...[who] had decided not to take the Codeine they had been prescribed on discharge, as this had previously caused constipation... The 111 service had then sent the paramedic crew ... CAS PIP P1 then advised the paramedic they would prescribe the patient some laxatives... and issued an electronic prescription for Macrogol.

Some CAS and ED PIPs also worked part-time in ambulance roles but were contractually prohibited from prescribing there. Participants considered there was a need for PIP in the ambulance sector, especially given the current demands on the wider EUC system, and the overspill of prescribing work into the CAS. However, inadequate organisational readiness and governance, limited records access, and a lack of remote electronic prescribing capability were perceived to have limited implementation.

Service demand also restricted access to medical support in the ED and CAS:

Field Note Extract: ED PIP P2 then embarked on a protracted process of trying to speak with one of the four consultants ... This entailed several attempts to engage one of them in conversation, before quickly being interrupted as they were both distracted by another task...

Supporting PIPs also increased senior doctors' workload, requiring them to balance advice with their own clinical responsibilities:

So, there's always the balance … because obviously everyone that you put in there that needs to discuss with a senior is an extra workload on one of the registrars or the consultants in the department. So that's always something to weigh up (ED CSI P11- ED Registrar).

PIP therefore operated within an increasingly overstretched EUC system, where sustained demand, workforce shortages and blurred boundaries between primary, urgent, emergency and inpatient care expanded prescribing beyond short acute episodes to include chronic disease, repeat medicines and prolonged treatment.

Discussion

As far as we are aware, this is the first mixed-methods study to examine how PIP is enacted in real-world EUC practice by integrating prescribing activity with direct observation of clinical practice and multidisciplinary staff perspectives. This has shown how PIP functions as an enabling component of advanced paramedic practice, aligning assessment, diagnosis, medicines decision-making and treatment within a single episode of care across both high-acuity emergency medicine and remote urgent care. These findings move the evidence beyond previously reported perceptions and anticipated benefits to demonstrate how PIP changes clinical practice and patient care. The breadth of medicines and clinical situations managed, shaped by sustained EUC pressure, extends earlier interview and survey-based evidence to demonstrate how PIP has become embedded in the practical delivery of advanced paramedic roles and the workload of multidisciplinary teams in contemporary EUC [23, 24, 34].

Remote consultations account for around one-third of primary care encounters and are a routine component of post-pandemic healthcare delivery [71]. National policy promotes remote working to expand urgent care capacity and improve access to care [11], and as such remote electronic prescribing is essential. Previous research found that primary care PIPs were reluctant to prescribe remotely, preferring face-to-face consultations [28]. However, the CAS case study findings demonstrated that this appears to have changed. Remote electronic prescribing, supported by robust clinical assessment and appropriate escalation to face-to-face review is now routine. This enabled PIPs to safely complete episodes of care, improve timely access to medicines and respond to increasing urgent care demand.

In both case sites, PIPs were noted to have a unique skill set and adaptability to confidently manage and prescribe for a broad range of conditions, from a wide formulary of drugs. Based on detailed ethnographic research in the ambulance sector, McCann[65] describes how the unique skill set of paramedics is developed through 'street-level' practice', where considerable autonomy and judgement are exercised, often working in isolation in the community. Ambulance practice also requires paramedics to respond to 'anything and everything', operating between the 'extreme and mundane' across high- and low-acuity care, which has been identified as an important source of adaptability [19, 72, 73].

Our findings build on this by showing how PIPs draw on this distinctive professional background to manage complex EUC presentations and make a complementary contribution within multidisciplinary teams. These findings support previous accounts of paramedics as 'disruptive innovators' whose expanding capabilities enable them to cross traditional professional and service boundaries and contribute to new models of care. [20, 65]. Whilst the exact number of PIPs working nationally in urgent care is unknown, paramedics represented 15% (n = 123/835), the second largest group of Advanced Clinical Practitioners in Emergency Medicine in a United Kingdom 2023 workforce census (n = 835/1197). This indicates the potential national contribution from the introduction of PIP in ED settings as part of a multidisciplinary workforce.

Our findings highlight the importance of multidisciplinary working and collaborative relationships between PIPs and doctors, contributing to ongoing debates about the expansion of advanced practice and medical substitution [38–41]. PIPs competently and safely undertake clinical work traditionally performed by doctors but work within close multidisciplinary teams and seek medical input for complex or uncertain cases. These findings suggest that autonomy in advanced practice should not be conceptualised as practice undertaken in isolation. Rather, PIPs negotiated autonomy by retaining responsibility for assessment and treatment, while drawing flexibly on medical expertise as clinical complexity and uncertainty increased. The 'bubble of support' identified in this study provides an empirically grounded model for understanding how advanced practitioners can manage increasingly complex care while maintaining access to complementary professional expertise. This model may have relevance beyond PIP to the organisation of advanced practice more broadly.

Neo-Weberian theories of professionalisation provide a useful lens to consider these findings, through the concept of social closure, which considers how professions seek to maintain or extend control over areas of practice [64, 74–76]. PIPs' expansion into prescribing work historically controlled by medicine can be viewed as *usurpationary closure*, while doctors' continued involvement in higher-risk and diagnostic uncertainty reflects the persistence of professional boundaries. This aligns with Abbott's theory of professional jurisdiction and Weiss's [42] analysis of independent prescribing, which suggests that medicine has not retained an absolute monopoly over prescribing but has instead maintained greater jurisdiction over its more complex domains. Importantly, these boundaries were not strongly contested in this study, with relationships between PIPs and doctors characterised by mutual respect, acceptance and collaborative practice. Rather than suggesting paramedics and doctors are interchangeable, the findings demonstrated that experienced, appropriately educated PIPs can safely undertake broad, autonomous practice within multidisciplinary teams, supported by collaborative risk management and senior medical support. PIPs are also able to offer a unique contribution within EUC multidisciplinary teams by drawing on a unique skill set of adaptability and manage a wide range of presentations across the acuity spectrum. Whilst Advanced Clinical Practitioners are situated within wider policy and literature as a solution to workforce shortages in medicine [13, 14, 29, 30], the findings from this research suggest that workforce planning in EUC may be better conceptualised around complementary capabilities rather than profession-for-profession substitution.

The findings demonstrate that current legislative Controlled Drug restrictions are an example of policy lagging behind practice. The legislative extension to enable PIPs to prescribe five Controlled Drugs was viewed as beneficial, particularly for PIPs to autonomously manage pain, delegate administrative responsibility for analgesia, and provide end-of-life care. However, Oxycodone, Fentanyl and Ketamine are required in routine pathways yet remain unavailable, generating third-party prescribing, delaying care and fragmenting accountability. Other prescribing professions in the United Kingdom have different Controlled Drug prescribing rights despite undertaking comparable advanced roles, with nurses and pharmacists permitted to prescribe any Controlled Drug [1, 29, 77, 78]. Previous research suggests that both PIPs and healthcare leaders perceived PIPs require unrestricted Controlled Drug prescribing rights to autonomously practice in EUC [27 22]. Our study corroborates these views, highlighting that urgent legislative reform is required to maximise the potential of PIP in EUC.

Education was a further area where policy and practice were not aligned. Participants valued post-graduate education in advanced assessment and diagnostic reasoning. However, confidence was associated more strongly with practice experience and supportive, collaborative team working

thancompletion of a full Master's degree. Given the financial cost and time required for Masters study [13, 26], our findings suggest that the Royal College of Paramedics policy [37] could instead recommend clinically focused post-graduate education rather than a full Master's award as the educational standard for PIP.

Although ambulance services were not studied directly, our findings indicated potential gaps in PIP implementation. Governance restrictions meant PIPs at both case sites could not prescribe during any part-time work, and participants reported concerns about a lack of access to detailed records in the ambulance sector. Patients were also referred to the CAS due to a lack of prescribing capability in the ambulance service. Previous research similarly reports restricted access to records and an absence of electronic prescribing as contributing factors to the limited uptake of PIP in ambulance services [19,21,22,29]. Together, the evidence does however suggest that remote PIP could support timely care in the ambulance sector, provided it is underpinned by longitudinal record access, electronic prescribing, senior clinical support and cross-organisational working and governance.

Whilst this study has provided the first detailed overview of PIP in EUC, further research is still required to evaluate PIP outcomes. Multicentre comparative studies are needed to examine safety, clinical outcomes, patient experience, re-contact, admission avoidance, workforce effects and cost-effectiveness from PIP.

Strengths and limitations

A major strength of this mixed-methods study was the direct observation that enabled participants' accounts to be compared with clinical practice and interprofessional interaction. The integration of prescribing data to show the breadth and frequency of prescribing with observation of practice and staff interviews contextulised how PIPs managed risk and uncertainty when prescribing for the wide range of conditions encountered in EUC. Integration of quantitative and qualitative data also provided a more complete understanding of Controlled Drug prescribing in EUC and the impact of legislative restrictions on practice and patient care. The researcher's clinical knowledge (AB) supported interpretation of complex prescribing decisions, with reflexivity and team review used to challenge assumptions.

A limitation of the study was that the CAS Controlled Drug activity could also not be comprehensively captured. Observation during field work may also have influenced behavior, and the lead researcher's PIP background created potential for bias and changes in participant behaviour, despite reflexive safeguards.

Conclusion

PIP was integral to advanced paramedic practice in EUC. It enabled complete episodes of care to be delivered across high-acuity emergency and remote urgent-care settings. The ability to deprescribe medication further optimised patient care, while issuing urgently needed repeat prescriptions ensured ongoing management of long-term conditions. These benefits enhanced the contribution of paramedics, improved patient care and overall service delivery within a pressured EUC system. Autonomy was not practiced in isolation and depended on multidisciplinary relationships in which PIPs retained responsibility while seeking medical support for complexity and uncertainty. The findings challenge simplistic accounts of non-medical clinicians replacing doctors and instead demonstrate negotiated, complementary practice within cohesive teams. Controlled Drug restrictions and ambulance-service barriers continued to limit implementation. Policy should align prescribing authority and education with demonstrated competence and clinical scope, while ambulance services require the digital and governance infrastructure needed for remote and cross-setting prescribing.

Abbreviations

ACP
Advanced Clinical Practitioner
CAS
Clinical Assessment Service
CD
Controlled Drug
ED
Emergency Department
EUC
Emergency and Urgent Care
NHS
National Health Service
PIP
Paramedic independent prescribing or paramedic independent prescriber(s)

Declarations

Ethics approval, consent to participate and for publication

Ethical approval was obtained from Camden & Kings Cross NHS Research Ethics Committee (IRAS project ID: 310457) and the University of Southampton Faculty of Environmental and Life Sciences Ethics Committee (ERGO 69751.A2). NHS Health Research Authority was also obtained (23/HRA/3145). The study was conducted in accordance with the principles of the Declaration of Helsinki. Clinician participants provided written informed consent to participate and for publication of findings.

Availability of data and materials

The case study datasets are not publicly available because they contain potentially identifiable contextual information. Anonymised data may be available from the corresponding author subject to ethical and organisational approvals.

Competing interests

The authors declare no competing interests.

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Authors contributions

AB conceived the study, collected and analysed the data and drafted the manuscript. JT and SL contributed to study design, analysis, interpretation and critical revision. All authors approved the final manuscript.

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