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# INTERDISCIPLINARY STRATEGIES TO ENHANCE PATIENT CARE PATHWAYS: A SYSTEMATIC REVIEW OF THE COLLABORATIVE ROLES OF PHARMACISTS, SOCIAL WORKERS, RADIOLOGY TECHNOLOGISTS, AND SPECIALIST NURSES

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**Abstract**

**Background:** Inter-professional collaboration is increasingly promoted to address the complexity of modern health care, yet the specific, combined contributions of pharmacists, social workers, radiology technologists and specialist nurses to patient care pathways remain incompletely synthesized. **Methods:** This systematic review of reviews followed PRISMA 2020 guidance. We searched major biomedical and social-science databases for systematic reviews, meta-analyses and overviews that evaluated inter-professional or multidisciplinary models including at least one of the four target professions and reported patient, service or process outcomes. Eligible reviews were screened in duplicate, data were extracted using a standardized form, and methodological quality was appraised with established critical appraisal criteria for systematic reviews. Findings were summarized narratively by professional role and care setting. **Results:** Six publications met the inclusion criteria: five completed systematic reviews and one scoping review protocol. Collectively, they synthesized a large body of primary studies and secondary reviews spanning primary care, inpatient care, radiology services and general practice social work. Pharmacist-involved collaborative models consistently improved clinical indicators such as blood pressure, glycated hemoglobin and lipid control, with signals of enhanced safety, adherence and cost-effectiveness. Specialist and advanced practice nurses contributed to reduced readmissions and mortality and better self-management and quality of life in chronic disease pathways. Social workers embedded in primary care were associated with improved psychosocial support, care coordination and mental health outcomes,

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although high-quality comparative evidence was limited. Radiology technologist advanced practice roles showed potential to reduce waiting times and maintain diagnostic accuracy and patient satisfaction, but the evidence base was small and methodologically heterogeneous. Across reviews, unclear role boundaries, funding constraints and fragmented information systems emerged as key barriers, while co-location, shared protocols, case conferences and supportive leadership facilitated collaboration. **Conclusion:** Interdisciplinary strategies that integrate pharmacists, social workers, radiology technologists and specialist nurses can enhance patient care pathways, particularly in chronic disease management and complex psychosocial care. However, evidence remains uneven across professions, and robust evaluations of integrated models involving all four roles are needed to inform policy, workforce planning and education.

**Keywords:** Inter-Professional Collaboration; Multidisciplinary Care; Pharmacists; Social Workers; Radiology Technologists; Advanced Practice Nursing; Patient Care Pathways; Systematic Review.

## INTRODUCTION

Inter-professional and multidisciplinary collaboration has become central to managing the growing burden of chronic and complex illness. Non-communicable diseases account for more than 70% of global deaths, with ageing populations and multi-morbidity placing increasing pressure on health and social-care systems (Pascucci et al. 2021). In conditions such as type 2 diabetes, where cardiovascular risk is driven by multiple behavioral and biomedical factors, traditional physician-centred models often struggle to deliver optimal control of blood pressure, lipids and glycaemia in routine primary care (Tu et al. 2024). These challenges have prompted a shift towards integrated care models in which teams of diverse professionals share responsibility for patient-centred care pathways.

Inter-professional collaboration is typically defined as a work-sharing process in which professionals from more than one health or social-care discipline cooperate with the explicit goal of improving care quality, underpinned by high levels of communication, shared planning and collective responsibility for outcomes (Pascucci et al. 2021). Qualitative syntheses of primary-care teams describe teamwork as a user-centred, day-to-day practice characterised by interdependence of roles, shared decision-making, mutual respect and trust, but constrained by organisational, structural and relational barriers such as biomedical dominance and unclear role boundaries (Sangaleti et al. 2017). These findings highlight both the potential and the fragility of collaborative practice in real-world services.

A growing body of trial-based evidence suggests that well-designed collaborative models can improve clinical outcomes. In a recent systematic review and meta-analysis of multidisciplinary teams including at least three health professions in primary-care diabetes management, Tu et al. reported significant pooled reductions in systolic and diastolic blood pressure, glycated haemoglobin and low-density lipoprotein cholesterol compared with usual care (Tu et al. 2024). Similarly, a meta-analysis of interprofessional collaboration interventions in chronic disease management found modest but consistent improvements in blood pressure, HbA1c, lipids and hospitalisation days relative to standard practice (Pascucci et al. 2021). Lee et al. demonstrated that interprofessional collaborative practice involving three or more professions in primary care was associated with clinically meaningful reductions in HbA1c, systolic and diastolic blood pressure in

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adults with diabetes and hypertension (Lee et al. 2021). Together, these reviews support the effectiveness of collaborative models but also reveal substantial heterogeneity in team composition, intervention components and settings.

Within this broader field, the roles of specific professional groups remain unevenly described. Systematic reviews of radiography and radiotherapy advanced practice show that diagnostic and therapeutic radiographers have assumed extended responsibilities such as image reporting, leading review clinics, contrast studies, treatment review and toxicity assessment, with signals of reduced waiting times, high diagnostic agreement and maintained patient satisfaction, albeit on a limited and often single-centre evidence base (Hardy et al. 2016; Oliveira et al. 2022).

Qualitative syntheses indicate that nurses, pharmacists and social workers are central to care coordination, education, self-management support and addressing social determinants across primary-care teams (Sangaleti et al. 2017; Pascucci et al. 2021). Most existing reviews focus on specific conditions or single professions rather than the combined collaborative contributions of pharmacists, social workers, radiology technologists and specialist nurses across the continuum of care.

The present systematic review therefore aims to synthesise available evidence on how these four professional groups work together within interdisciplinary strategies to enhance patient care pathways, and to identify implications for practice, education and future research.

## METHODS

This study was conducted as a systematic review of systematic reviews and meta-analyses, following the PRISMA 2020 reporting guideline (Page et al. 2021). The protocol defined the population as patients receiving health or social care in any setting, the intervention as interprofessional or multidisciplinary care models, and the key exposure as the collaborative roles of pharmacists, social workers, radiology technologists and specialist/advanced practice nurses within patient care pathways.

### Eligibility criteria

We included peer reviewed systematic reviews, meta-analyses, or overviews of reviews that: examined inter-professional or multidisciplinary team-based care; reported at least one model in which pharmacists, social workers, radiology technologists/radiographers or specialist nurses were part of the team; and described patient, service or process outcomes (for example clinical indicators, patient-reported outcomes, service use, costs, or measures of collaboration and team functioning). Reviews of qualitative, quantitative or mixed-methods primary studies were eligible. We excluded narrative reviews without explicit methods, commentaries, editorials, single primary studies and conference abstracts. Review protocols were eligible when they presented a clearly described, ongoing review directly relevant to the topic, and were used to contextualize emerging work.

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### Information sources and search strategy

A comprehensive search of international biomedical and social-science databases was undertaken, including MEDLINE (via PubMed), CINAHL, Scopus and Web of Science, from database inception to the most recent search date. Search strategies combined controlled vocabulary and free-text terms for interprofessional or multidisciplinary collaboration, team-based care, pharmacists, social workers, radiology technologists, radiographers, specialist or advanced practice nurses, systematic reviews, and meta-analyses.

### Study selection

Titles and abstracts retrieved from the searches were screened independently by two reviewers against the eligibility criteria. Full texts of potentially relevant articles were then obtained and assessed in duplicate. Disagreements at any stage were resolved by discussion and, where necessary, consultation with a third reviewer. Reasons for exclusion at the full-text stage were documented, and the study selection process was summarized in a PRISMA flow diagram.

### Data extraction and quality assessment

Data were extracted into a standardised form, including review aims, settings, populations, team composition, specific roles of pharmacists, social workers, radiology technologists and specialist nurses, outcomes assessed, number and type of included primary studies, and main findings. Methodological quality of each review was appraised using an established critical appraisal tool for systematic reviews such as AMSTAR 2, focusing on protocol registration, search methods, risk-of-bias assessment and synthesis approach (Page et al. 2021).

### Data synthesis

Because of heterogeneity in populations, settings, team compositions and outcome measures, we did not perform a new quantitative meta-analysis. Instead, we undertook a narrative synthesis, grouping findings by professional role and care setting (pharmacist-centred models, social work in primary care, radiology technologist advanced practice, specialist/advanced nursing roles and mixed interprofessional models), and comparing directions and magnitudes of effects across reviews.

## RESULTS

Six eligible papers met the inclusion criteria: five completed systematic reviews and one scoping review protocol. Together they synthesise evidence on interprofessional collaboration across primary care, inpatient care, radiology services and social work practice. The reviews collectively summarise 21 qualitative studies on teamwork in primary care, 29 reviews of interprofessional collaboration models, 22 inpatient studies focused on patient-reported outcomes, nine evaluations of radiographer advanced practice and 26 studies of social work in general practice.

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The qualitative meta-synthesis by Sangaleti et al. explored experiences of regulated primary-care professionals working in multidisciplinary teams. It identified teamwork as a user-centred daily practice characterised by interdependence of roles, shared decision-making, mutual respect and recognition of each profession's contribution. At the same time, persistent barriers were reported, including dominance of a biomedical logic, ambiguous role boundaries and organisational constraints that limited time and space for collaboration in primary health-care settings.

Rawlinson et al.'s overview of reviews mapped barriers and facilitators of interprofessional collaboration in primary care across six models, including primary-care physician collaboration with nurses, pharmacists, specialists and mental-health providers. Barriers were concentrated at organisational and inter-individual levels, such as workload, inadequate remuneration, fragmented information systems and poor communication. Facilitators included co-location, shared protocols, structured case conferences and leadership that explicitly values collaborative practice, pointing to multiple modifiable levers within care pathways.

Kaiser et al. examined the impact of interprofessional collaboration on patient-reported outcomes in inpatient care. Across 22 studies, interventions such as multidisciplinary ward rounds and coordinated discharge planning tended to show beneficial effects on quality of life, coping, satisfaction and self-management, although heterogeneity and high risk of bias precluded firm conclusions about effectiveness. Hardy et al.'s review of radiographer advanced practice found nine single-centre studies in which extended roles (image reporting, review clinics and contrast studies) were associated with shortened waiting times, high diagnostic agreement with radiologists and maintained or improved patient satisfaction, albeit on a limited evidence base.

Zuchowski and McLennan's review of social work in general practice reported that integrating social workers into primary-care teams supports comprehensive psychosocial assessment, care coordination and crisis intervention, with signals of improved mental-health outcomes and reduced hospital utilisation, alongside persistent funding and role-clarity challenges. The Aggarwal et al. protocol adds a methodological framework for describing and measuring team functioning, effectiveness and collaboration, which will inform outcome selection for future evaluations of interdisciplinary strategies involving pharmacists, social workers, radiology technologists and specialist nurses.

**Table 1: Characteristics of included reviews**

| First author, Year | Review type | Professions, disciplines covered | Setting and population | No. of included studies |
|---|---|---|---|---|
| Sangaleti, 2017 | Qualitative systematic review and meta-synthesis | All regulated primary-care professionals (medicine, nursing, pharmacy, social work, dentistry, allied health, community health workers and assistants) | Primary health-care centres and family health teams in multiple countries | 21 qualitative studies |

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| Rawlinson, 2021 | Overview of reviews | Primary-care physicians collaborating with nurses, pharmacists, specialists, mental-health providers and intersectoral partners | Primary-care and integrated-care services; adults with diverse health needs | 29 systematic reviews |
| Kaiser, 2022 | Systematic review | Multidisciplinary inpatient teams (physicians, nurses, therapists and other allied health professionals) | Inpatient hospital wards; adults receiving multidisciplinary care | 22 studies (16 RCTs, 5 non-randomised studies, 1 controlled before–after study) |
| Hardy, 2016 | Systematic review | Radiographers in advanced practice roles (image reporting, review clinics, barium enema examinations) | Imaging and oncology services, mainly hospital radiology departments in the UK | 9 single-centre evaluations |
| Zuchowski, 2023 | Systematic literature review | Social workers embedded in general practice / family medicine teams | Primary health care and general-practice settings, predominantly in the US and Canada | 26 studies |
| Aggarwal, 2025 | Scoping review protocol | Interprofessional primary-care teams including physicians, nurses, pharmacists, social workers and other disciplines | Primary-care teams in high-income countries | Protocol – no included studies yet |

**Table 2: Main themes and findings relevant to interdisciplinary patient-care pathways**

| First author, Year | Aim, focus | Key findings on collaboration and outcomes | Relevance to patient-care pathways |
|---|---|---|---|
| Sangaleti 2017 | To synthesise experiences and shared meaning of teamwork and interprofessional collaboration among primary-care professionals. | Teamwork is described as user-centred daily practice based on interdependence of roles, shared decision-making, communication and mutual respect, but constrained by ambiguous roles, biomedical dominance and organisational barriers. | Highlights the need for role clarification, shared leadership and protected time and space so nurses, pharmacists, social workers and other team members can coordinate continuous primary-care pathways. |
| Rawlinson 2021 | To identify barriers and facilitators of interprofessional collaboration in primary care across multiple collaboration models. | Barriers cluster at organisational and inter-individual levels, including workload, funding, fragmented information systems and poor | Provides a map of modifiable system and team factors that can be targeted when designing collaborative pathways involving pharmacists, |

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|---|---|---|---|
| | | communication; facilitators include co-location, shared protocols, joint case conferences and supportive leadership. | social workers, specialist nurses and other primary-care providers. |
| Kaiser 2022 | To examine the effect of interprofessional collaboration on patient-reported outcomes in inpatient care. | Across 22 heterogeneous studies, interprofessional interventions such as multidisciplinary ward rounds and coordinated discharge planning tend to improve quality of life, satisfaction, coping and self-management, although overall certainty of evidence is limited. | Supports the potential of structured inpatient team models, including specialist nurses and pharmacists, to enhance patient experience and outcomes along the hospital segment of the care pathway. |
| Hardy 2016 | To assess whether radiography advanced practice improves patient outcomes and health-service quality. | Nine single-centre studies suggest that extended radiographer roles are associated with shorter waiting times, high diagnostic agreement with radiologists and maintained or improved patient satisfaction, despite mostly low-to-moderate study quality. | Demonstrates how expanding radiology technologist scope can reduce diagnostic bottlenecks, improve throughput and support timely decision-making in patient-care pathways. |
| Zuchowski 2023 | To describe the nature, reported outcomes, benefits, challenges and enablers of social work in general practice. | Twenty-six studies show that social workers contribute to psychosocial assessment, care coordination, counselling and crisis intervention, with signals of better mental-health outcomes, reduced hospital use and improved care experiences, but hindered by funding and role-clarity issues. | Provides direct evidence that embedding social workers in primary care pathways benefits complex patients, while underscoring the importance of sustainable funding and clear role definitions. |
| Aggarwal 2025 | To outline a scoping review protocol on conceptualisation and measurement of team functioning, effectiveness, performance and collaboration in interprofessional primary-care teams. | No empirical results are available yet; the protocol proposes a comprehensive search and extraction of definitions and instruments to describe and measure interprofessional primary-care team functioning. | Offers a methodological framework for selecting robust measures to evaluate interdisciplinary strategies involving pharmacists, social workers, radiology technologists and specialist nurses in future research. |

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## DISCUSSION

The findings of this review show that interprofessional collaboration is associated with broadly positive effects on process and patient-centred outcomes, but that the strength of evidence varies markedly between professions and settings. Overall, the six included reviews demonstrated that collaborative practice improves patient-reported outcomes, service quality and care coordination in primary and inpatient care, while also highlighting persistent organisational and role-related barriers. These patterns are consistent with more recent scoping and systematic reviews that have mapped multidisciplinary team (MDT) compositions and outcomes in primary care. Jokelin et al. found that most primary-care MDT interventions added pharmacists to existing doctor–nurse teams and reported positive clinical effects in 34 of 46 studies, with favourable cost outcomes in five of eight studies, but also noted substantial evidence gaps for other professional groups such as social workers and allied health professionals (Jokelin et al. 2025). Bates et al. similarly reported mixed effects of MDT models on continuity, access and comprehensiveness of care, emphasising that context, team design and implementation strongly influence whether multidisciplinary care strengthens or fragments primary care (Bates et al. 2025).

Our findings on pharmacists align with a large body of high-quality evidence. The overview of reviews in primary care highlighted models in which clinical pharmacists collaborate with general practitioners and nurses to manage cardiovascular risk and multimorbidity, often through medication reviews and structured case conferences. This is reinforced by Chisholm-Burns et al., who synthesised 298 studies and showed that pharmacist-provided direct patient care significantly improved haemoglobin A1c, low-density lipoprotein cholesterol, blood pressure, adverse drug events, adherence, knowledge and general health-related quality of life compared with usual care (Chisholm-Burns et al. 2010). Jokelin et al. also concluded that the most convincing evidence for MDTs relates to adding pharmacists to teams caring for patients with cardiovascular disease, polypharmacy and multimorbidity, with signals of both clinical benefit and potential cost savings (Jokelin et al. 2025). Taken together, these data support the central role of pharmacists in interdisciplinary strategies to optimise therapeutic management along the care pathway.

For specialist nursing roles, the inpatient review of patient-reported outcomes suggested that interprofessional interventions such as multidisciplinary ward rounds and coordinated discharge planning can improve coping, satisfaction and self-management, albeit with heterogeneous designs and risk of bias. This is complemented by disease-specific evidence for advanced practice nurses. Ordóñez-Piedra et al. found that advanced practice nursing interventions for heart failure reduced hospital readmissions by up to 33 %, lowered mortality (7.8 % vs. 17.7 %), improved quality of life and were cost-effective, with an estimated cost reduction of 1.9 million euros compared with usual care (Ordóñez-Piedra et al. 2021). Rodríguez-García et al. reported that advanced practice nursing interventions for patients with diabetes—predominantly educational programmes delivered in primary care, clinics and hospitals—were associated with reductions in HbA1c, better self-knowledge and self-efficacy, and reduced readmissions and mortality

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(Rodríguez-García et al. 2025). These findings reinforce our interpretation that specialist nurses are key contributors to effective chronic-disease pathways, particularly when they lead structured education, follow-up and case-management activities within multidisciplinary teams.

Our review also points to the important, but under-evaluated, role of social workers and radiology technologists. Zuchowski's review suggested that social workers embedded in general practice contribute to psychosocial assessment, care coordination, counselling and crisis intervention, with signals of improved mental-health outcomes and reduced hospital utilisation, although funding and role-clarity issues remain limiting factors. This is further elaborated by Ashcroft et al., who identified a wide range of professional roles undertaken by social workers in primary care, including addressing social determinants of health, supporting behavioural health integration and facilitating team-based care (Ashcroft et al. 2024). However, both reviews emphasise the paucity of robust comparative studies quantifying impacts on clinical outcomes and costs, echoing Jokelin et al.'s observation of a research gap for non-pharmacist additions to MDTs (Jokelin et al. 2025).

Radiology technologists were represented mainly through evidence on advanced radiographer practice. Hardy's review indicated that extended radiographer roles in image reporting, review clinics and contrast studies can shorten waiting times, achieve high diagnostic agreement with radiologists and maintain patient satisfaction, but the evidence base is small, often single-centre and methodologically limited. This contrasts with the much larger and more rigorous literature on pharmacists and specialist nurses, underlining the need for better-designed evaluations of radiology professionals' contributions to interdisciplinary pathways.

The broader interprofessional literature contextualises our findings. Bouton et al. showed that interprofessional collaboration in primary care is particularly effective for patients at cardiovascular risk, with 23 of 28 trials reporting positive effects on patient-centred outcomes, while evidence in older, polypathological and mental-health populations remains limited and heterogeneous (Bouton et al. 2023). Bates et al. similarly documented that MDT care can strengthen chronic-disease management but may also fragment continuity if poorly implemented (Bates et al. 2025). Across these sources, a consistent message emerges: multidisciplinary and inter-professional strategies involving pharmacists, social workers, radiology technologists and specialist nurses can enhance patient care pathways when roles are clearly defined, collaboration is actively supported and interventions are tailored to context, but gaps remain in understanding optimal team composition, long-term outcomes and cost-effectiveness for all four professional groups together.

## CONCLUSION

Interdisciplinary models that explicitly integrate pharmacists, social workers, radiology technologists and specialist nurses appear to strengthen patient care pathways across primary, inpatient and diagnostic settings. Evidence is strongest for pharmacist-led and

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advanced practice nursing interventions, which consistently improve key clinical outcomes, self-management and, in some contexts, costs. Social work and radiology technologist contributions show clear conceptual value and early positive signals but remain under-evaluated using robust comparative designs. Our findings highlight the importance of clear role definition, supportive organisational structures and shared protocols to realise the benefits of collaboration. Future research should test integrated models that include all four professions and report long-term clinical, economic and patient-reported outcomes.

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