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The impact of collaborative organisational models and general practice size on patient safety and quality of care in the English National Health Service: A systematic review

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ABSTRACT

Collaborative primary care has become an increasingly popular strategy to manage existing pressures on general practice. In England, the recent changes taking place in the primary care sector have included the formation of collaborative organisational models and a steady increase in practice size. The aim of this review was to summarise the available evidence on the impact of collaborative models and general practice size on patient safety and quality of care in England. We searched for quantitative and qualitative studies on the topic published between January 2010 and July 2023. The quality of articles was assessed using the Newcastle-Ottawa Scale and the Critical Appraisal Skills Programme checklist. We screened 6533 abstracts, with full-text screening performed on 76 records. A total of 29 articles were included in the review. 19 met the inclusion criteria following full-text screening, with seven identified through reverse citation searching and three through expert consultation. All studies were found to be of moderate or high quality. A predominantly positive impact on service delivery measures and patient-level outcomes was identified. Meanwhile, the evidence on the effect on pay-for-performance outcomes and hospital admissions is mixed, with continuity of care and access identified as a concern. While this review is limited to evidence from England, the findings provide insights for all health systems undergoing a transition towards collaborative primary care.

1. Introduction

Over the last two decades, new organisational models started to emerge in the English National Health Service (NHS) in response to the growing challenges facing general practices. [1] These include an ageing population, a higher prevalence of co-morbidity, problems with staff recruitment and retention, and budgetary pressures. Newly emerged general practice models take the form of formally integrated collaborative models (close collaboration), such as super-partnerships and multi-site practice organisations, but also models promoting varying levels of informal collaboration (loose collaboration) (Fig. 1). [2,4] Amongst these are federations and primary care networks (PCNs). [3]

The key difference between the two models is that closely collaborating practices usually merge their GP contracts and jointly provide core general practice services such as identifying and managing illness, and referrals to secondary care. [1,4] Meanwhile, practices within loose collaborative models usually retain more autonomy over their operations but may choose to collaborate on the provision of out-of-hours services, diagnostics and other enhanced services. [5] Nonetheless, the two types of collaboration often share a number of features, including integration of key functions, [1,6] employment of a wider mix of healthcare professionals (including practice pharmacists and physiotherapists), [1,7–9] and provision of additional training and development opportunities for staff, [2,5,6,10] which all have the potential to improve the safety and quality of care provided.

Despite research showing that the majority of general practices in

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England operated under a collaborative model in 2018, [4] an existing systematic review demonstrates a paucity of research evaluating the impact collaborative models have had on patient care, outcomes, and patient and staff experience. [11] Furthermore, while another systematic review, by Brown et al. (2016), identified evidence of improvement in care delivery resulting from clinical networks, it did not focus on general practice networks specifically. [12] Meanwhile, Pettigrew et al. (2019) reviewed and analysed the literature on a range of inter-organisational collaborations in healthcare in order to identify relevant lessons for large-scale general practice in England, while concluding that their potential impact is not yet clear and requires further evaluation. [13] With the NHS strategy increasingly focusing on integrated care systems, [3] including those between primary and secondary care, it is more important than ever to establish the effect of collaboration and practice size on key outcomes.

A similar shift towards collaborative primary care has been observed in international health systems. Nordic countries, including Finland and Sweden, have primary care organisations jointly providing out-of-hours care, specialist care out of the hospital, joint consultations between general practitioners (GPs) and specialists, as well as enhanced GP training. [14,15] Furthermore, general practices in other European countries, including Italy, have been forming collaborative networks similar to PCNs in England, which enable clinical collaboration and provision of extended out-of-hours and other joint services. [16] In addition to the European experience, patient-centred medical home models have been gaining popularity in the United States, with the goal of comprehensive and coordinated primary care provision. [2,17,18] There are many similarities in the implementation of collaborative primary care across international settings, including the deployment of multidisciplinary teams of doctors, nurses, pharmacists, physiotherapists and other healthcare professionals with the view of providing enhanced services in a primary care setting. [1,2,15,17–19] Therefore, despite the heterogeneity of international large-scale practice models, the findings of this review bear relevance for collaborative primary care across different healthcare systems.

A type of health outcomes that have been historically neglected in primary care research are those focused on patient safety, which has been identified as one of three pillars of quality care in the Darzi review in 2008. [20] However, whilst plenty of evidence exists on patient safety incidents in secondary and acute care research, [21–23] the same is not true for primary care, where the majority of patient contacts with medical services take place. [24,25] The importance of quality primary care, including patient safety, is even higher in countries with a government-funded national health system whereby general practitioners act as "gate-keepers" to secondary care – such as England, Italy and Spain.

Therefore, due to the recent emergence of new models of general practice and the scarcity of research on primary care patient safety, the aim of this systematic review is to update and establish the current level and quality of evidence on the effect of collaborative general practice in the English NHS on patient safety and quality of care. In addition, the review also considers studies investigating general practice size and its relationship with safety and quality outcomes. This is to capture additional findings which may be relevant for increasing collaboration in general practice. While an existing literature review on the topic of practice size and care quality identified some limited evidence on the topic, [26] our review is the first to consider both collaborative general practice models and practice size. This will help inform future integration of health care service provision in England and can provide valuable lessons for international health systems embarking on or considering a similar transition.

2. Methods

This study aims to characterise the impact of collaborative organisational models and general practice size on a variety of patient safety and quality outcomes. A systematic review of published and grey literature was conducted using the PRISMA guidelines. [27] The review protocol was registered on PROSPERO (ID: CRD42021236413). Search terms used to perform the literature search have been based on the PICO framework – outlining the relevant population, intervention, comparison group and outcomes (Table 1). Search terms were selected in consultation with existing literature on the topic of large-scale collaborative models of general practice and patient safety and quality of primary care, with a full listing available in the Supplementary Material. Three databases were searched – MEDLINE, APA PsycINFO and Health Management Information Consortium (HMIC), alongside a separate grey literature search. References of included articles were screened for potential inclusion of additional records. The search was limited to literature published between January 2010 and July 2023, since collaborative general practice models, which are one of the main interventions under study, became significantly more widespread during this time period. Conducting the search up to July 2023 also marks a departure from the protocol which proposed a search up to July 2020. As organisational models within the English NHS are of interest, only English language articles were included.

Whilst collaborative organisational models are being adopted across health systems around the world, evidence on international collaborative models has been excluded from this review due to the lack of standardised taxonomy and definition of what constitutes a collaborative or large-scale model of general practice. Furthermore, the heterogeneity of such models in different financing and delivery settings prevent meaningful analysis and synthesis of evidence. Nonetheless, the findings of this review, and the lessons learned from the English experience, may be of interest to policymakers in other countries undergoing a transition toward primary care integration.

Table 1
PICO components of the systematic review.

Component	Definition
Population	General practices in England
Intervention	Collaborative organisational models present in England (super-partnerships, multi-site practice organisations, federations, primary care networks); Practice size
Comparison Group	Not applicable
Outcomes	Quality and safety outcomes[a]

[a] Quality and safety outcome measures considered are further described in Table 2.

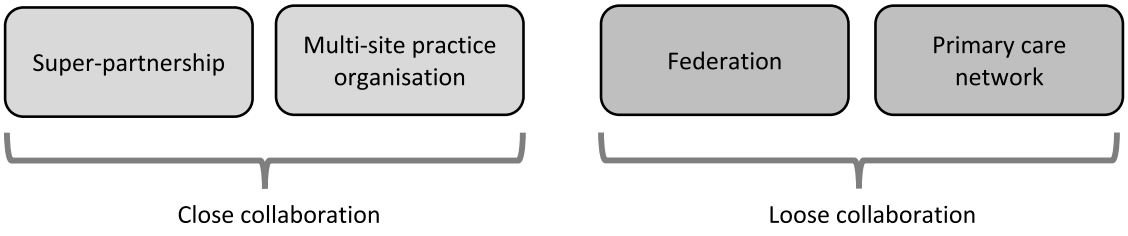

Fig. 1. Collaborative organisational models of general practice.

The goal of the inclusion and exclusion criteria was to include all methodologically sound studies – defined as quantitative and qualitative studies with a comprehensive explanation of used methods, and which clearly describe an organisational model as well as its impact on safety and quality outcomes. The outcomes considered are grouped into four distinct themes for the purposes of qualitative synthesis of results:

1 Service delivery measures
2 Pay-for-performance (P4P) scheme outcome measures
3 Hospital admissions
4 Other outcome measures

Additionally, the inclusion criteria were expanded compared to the original review protocol to also include studies describing differing practice sizes, defined as either registered patient list size or number of GPs within a practice, and their relationship with the same outcomes. This is because practice size is often associated with formal collaborative organisational models. Since the creation of some collaborative organisations such as super-partnerships and multi-site practice organisations requires two or more general practices to formally merge their GP contracts, this effectively creates a single large practice from an operational standpoint. The results from the inclusion criteria have been reported and analysed separately. The detailed inclusion and exclusion criteria are presented in Table 2.

Title, abstract and full-text screening was performed by two independent reviewers (LK, RN). In cases of disagreement, a third reviewer was consulted (HA). After the screening, data extraction was performed by a single reviewer (LK) and checked for consistency by a second reviewer (RN). The extracted data is presented in Table 5 of the Supplementary Material. The quality appraisal of included studies was independently carried out by two reviewers (LK, RN). Disagreements were resolved through discussion, with arbitration by an additional reviewer (HA), where necessary. The quality of the included studies was assessed using the Newcastle-Ottawa Scale for non-randomised quantitative studies, [28] and the Critical Appraisal Skills Programme (CASP) checklist for the qualitative study. [29]

3. Results

A total of 6934 records were identified through database searching and a grey literature search. Following the exclusion of 401 duplicate records, title and abstract screening was performed on the remaining 6533 records. At the title and abstract screening stage, 6457 records were excluded. Therefore, 76 papers were selected for full-text screening, of which 57 articles were excluded, with 19 articles meeting the inclusion criteria for further qualitative analysis (Fig. 2). The full list of excluded studies including reasons for exclusion can be found within Table 4 of the Supplementary Material. Seven additional articles met the criteria for inclusion following a reverse citation search of the included studies, while three were identified following expert advice. Meta-analysis was not performed due to the heterogeneity of outcomes and interventions studied.

The majority of studies meeting the inclusion criteria are quantitative ($n = 27$), [30–38,40–57] one is qualitative [39] and one takes a mixed-methods approach. [1] Six studies investigated the relationship between organisational models and relevant outcomes, [1,30,32,33,35,39] with four focusing on practice size as the main intervention. [31,34,37,38] One study considered both practice growth and collaboration within specific organisational models. [36] Additionally, 18 identified studies considered a range of practice-level characteristics, including practice size. [40–57] Of those considering organisational models, four are focused on general practice networks in the Tower Hamlets area of London, [30,32,33,35] with one describing a federation in West London. [39] Only one study considered collaborative organisational models within a nationwide setting. [36] Meanwhile, most included studies on the relationship between practice size and relevant outcomes covered practices nationwide, [31,34,36–38,40–48,50,54–57] with the exception of four studies focused on practices in the East Midlands region of England. [49,51–53]

Following the quality assessment using the Newcastle-Ottawa Scale, all included quantitative studies were deemed to be of either moderate or high quality, scoring between 5 and 9 on the scale. Most commonly the studies followed a before-after design, [30,32,33,35] whilst others used observational data in a longitudinal analysis of the changes in outcomes over time for large-scale practices, [1,31,34,36,38] an interrupted time series design, [37] and cross-sectional designs. [40–46,48–53,55–57] Similarly, the qualitative interview study by Ryan et al. was found to be of high quality following assessment using the CASP checklist. [39] However, despite performing well against quality assessment tools, all the included studies are non-comparative and non-randomised. This results in weaker evidence when compared to studies including both intervention and comparator groups, especially those that employ a randomisation design. Their inclusion in this review is still justified, given the difficulty of implementing a randomised design and the dearth of evidence on the impact of large-scale models and practices.

3.1. Service delivery outcome measures

3.1.1. Collaborative organisational models

Five included studies investigated the effect of organisational models on specific service delivery measures, including vaccination uptake, care plan completion, prescribing, referral behaviour and screening uptake. [1,30,32,33,35] Four of these studies refer to eight general practice networks established within the Tower Hamlets Primary Care Trust (PCT) as part of the Department of Health Integrated Care Pilot Programme between 2008 and 2009, and use a before-after design to estimate the change in outcome measures. [30,32,33,35] The newly created networks were made up of four to five collaborating practices, and were provided with financial support for managers and coordinators to implement collaborative working practices, with care packages specifically commissioned to improve quality of care.

Following the implementation, the uptake of MMR vaccinations in participating practices rose from 80% in September 2009 to 94% in March 2011, with improvement observed across all childhood immunisations. [30] Similarly, rates of flu vaccinations for patients with

Table 2
Inclusion and exclusion criteria.

Inclusion criteria	Exclusion criteria
Study clearly describes an organisational model of general practice, general practice size, or a specific feature of collaborative models within the relevant organisational setting	Study is descriptive or lacking clearly described methodology
Study analyses the impact on patient safety and quality outcomes split across four categories:	Study is published in language other than English
• Service delivery measures	Study describes non-NHS models or models in countries other than England
• Pay-for-performance (P4P) scheme outcome measures	Study describes new care models for specific conditions/diseases
• Hospital admission measures	Study describes features of collaborative organisational models (e.g. integrated IT systems) in different contexts
• Other outcome measures	

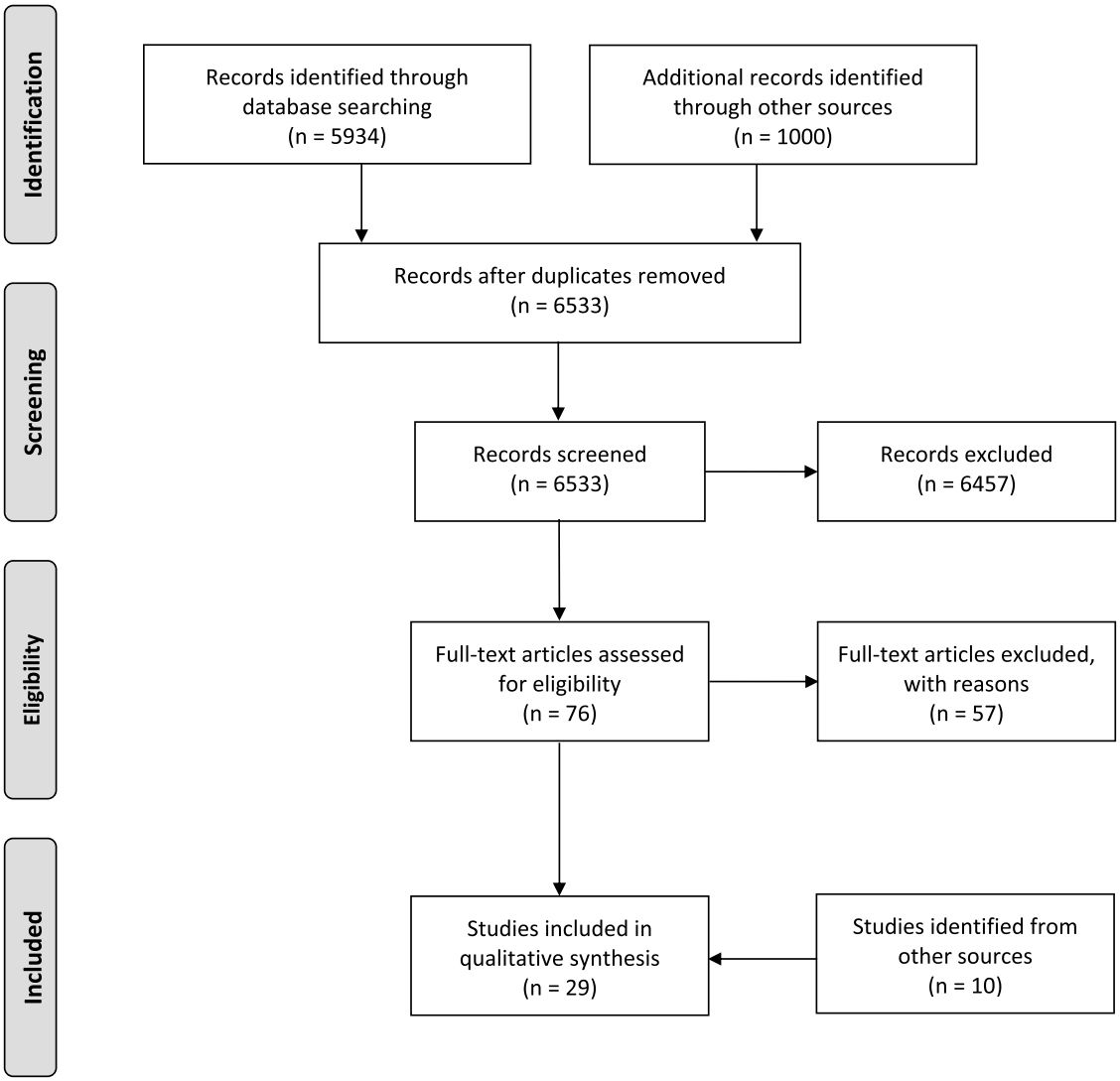

Fig. 2. PRISMA flow chart of the systematic review.

chronic obstructive pulmonary disease (COPD) increased by 2 percentage points between 2010 and 2013. [33] Within three years after their implementation, the networks saw completed care plans type 2 diabetes and COPD patients increased from 10% to 88% and from 53% to 87% respectively. [32,33] In the case of COPD patients, referrals for pulmonary rehabilitation increased from 45% to 70% during the same time. [33] Meanwhile, Robson et al. found a positive change in prescribing behaviours for coronary heart disease patients, achieving better cholesterol levels as a result. [35] Finally, Rosen et al. found that collaborating organisations saw a significant improvement in prescribing indicators. [1]

3.1.2. Practice size

Two studies on general practice size as the main intervention considered service delivery outcomes. Further supporting the finding of improving referral rates as a result of large-scale working is identified in a study by Kelly et al., investigating the effect of practice size and care quality. [34] The study found that larger practices are more likely to refer their patients for secondary care, including for treatment provided by the independent sector. Additionally, one study considered prescribing outcomes, with results reported by Gravelle et al. suggesting better quality for antibiotics prescribing, but worse quality for generic prescribing measures, amongst larger practices. [38]

Additionally, four studies focusing on practice size as one of considered practice characteristics also used service delivery outcomes. Walker et al. considered a variety of practice-level factors associated with variations in dementia diagnosis in English general practices and found that larger practices have higher diagnosis rates compared to smallest practices. [40] On the other hand, Levene et al. found that larger list size was associated with a lower detected prevalence of hypertension. [44] Two studies investigated outcomes related to urgent referrals, with one identifying a lack of statistically significant relationship between list size and urgent referrals and one finding an association between larger practice size and cancer detection through the use of two-week wait referrals. [45,50]

3.2. P4P scheme outcome measures

3.2.1. Collaborative organisational models

Another commonly investigated outcome of interest in the identified studies are P4P outcome measures relating to the Quality and Outcomes Framework (QOF) scheme in England – a nationwide P4P scheme introduced in 2004. [58] Under the scheme, practices can obtain additional funding for meeting specific targets, allowing them to invest part of the practice profits into quality improvement. In the case of collaborative organisational models, Rosen et al. were unable to determine a persistent difference in quality outcomes, including QOF indicators, between collaborating practices and the national average. [1]

3.2.2. Practice size

Several studies focusing on practice size considered P4P outcomes. The longitudinal analysis of 7502 general practices in England by Doran et al. found that the smallest-sized practices had the lowest achievement rates to start with, but improved the fastest over time following the QOF introduction. [31] Similarly, a study by Kelly et al. on practice size and QOF achievements found that there is a size gradient in QOF scores, with larger practices (>6 FTE GPs) performing better after controlling for patient and practice characteristics. [34] However, both studies suggest that there is a greater variation in performance amongst smaller practices across indicators – with many also providing good quality care. [31,34] Conversely, a retrospective open-cohort study of 422 general practices by Vamos et al. found no significant difference in achievement of national diabetes targets following QOF introduction between small and large practices. [37] Moreover, the panel data analysis by Gravelle et al. found mixed results, with larger practices being associated with higher QOF scores, but lower population achievement rates of QOF indicators. [38],[1],

These mixed findings are corroborated by additional studies considering the association of practice characteristics with QOF related outcomes. One such study found that larger practices have worse performance as measured by reported achievement, but better scoring on QOF points. [47] Similarly, the findings of Ashworth et al. suggest that general practices in the lowest decile for total QOF scores are more likely to be single-handed practices and have smaller list sizes. [54]

3.3. Hospital admissions

3.3.1. Collaborative organisational models

The effect of collaborative organisational models on hospital admissions was investigated in two included studies. [1,33] A before-after analysis by Hull et al. found that between 2010 and 2013, after the introduction of general practice networks, the number of hospital admissions for COPD patients decreased, despite remaining above the London average. [33] On the contrary, the results by Rosen et al. suggest that the collaborative organisations studied broadly followed national trends in hospital activity indicators. [1]

3.3.2. Practice size

In addition to the above, two studies focused on practice size as their main intervention considered its relationship with hospital admissions. The study by Kelly et al. used a multivariate regression analysis to estimate the impact of practice size and found that large practices had lower average emergency hospital admission rates for ambulatory care sensitive conditions (ACSC) and age- and sex-standardised ACSC admissions ratios. [34] This finding is corroborated by the results of Gravelle et al., which also found a lower rate of ACSC admissions as the practice size increases. [38] The latter study also found an improvement in emergency department attendance associated with a larger practice size.

Eight further studies, considering practice size as one of potentially relevant practice characteristics, investigated its association with hospital admissions of varying types. Busby et al. identified an association between larger practice size and a lower rate of ACSC referrals, corroborating the findings of Kelly et al. [57] Further supporting this finding are a number of studies identifying small practice size as a predictor of higher hospital admissions, including those for asthma, and higher emergency department attendance rates. [41,52,53] However, hospital admissions for COPD and coronary heart disease were not found to be associated with practice list size. [41,42] Two further studies found that a smaller practice list size was associated with a larger proportion of admissions being unplanned. [49,55] Meanwhile, Chauhan et al. found that larger practices were associated with higher elective hospital admissions. [51]

3.4. Other outcome measures

3.4.1. Collaborative organisational models

When it comes to patient-level health outcomes, included studies found that practice networks in Tower Hamlets achieved an increase in the number of diabetic patients with well-controlled blood pressure and cholesterol, a reduction in mean glycated haemoglobin, and an improvement in key cardiovascular disease indicators, whilst reducing chronic heart disease mortality. [32,35] Finally, a qualitative interview study of stakeholders' experiences of a general practice federation in Ealing (West London) explored the attitudes of key stakeholders on the provision of pharmacy services in general practice. [39] The resulting thematic analysis identified a positive experience including improved patient safety alongside better patient relationships and reduced costs. This is of significance as many collaborative organisational models, such as PCNs, rely heavily on additional healthcare staff within practices. [9] However, Forbes et al. findings point towards a slightly lower continuity of care and the same access amongst collaborating practices when compared to non-collaborating practices. [36] Similarly, Rosen et al. identified a deterioration in the GP Patient Survey indicators for practices within collaborative models, although these followed national trends. [1]

3.4.2. Practice size

From a patient's perspective, Forbes et al. also considered access to and continuity of care for growing practices. [36] The study found practices that increased in size had a greater loss of continuity of care and access to care compared to those that did not experience growth. Partly supporting the more negative patient-reported quality are findings of Gravelle et al., which suggest that larger practice size is associated with a reduction in relevant indicators. [38] Similarly, Kelly et al. found that larger practices performed worse in the patient experience domain of QOF. [34]

These findings are further supported by two studies estimating the association between practice size and patient satisfaction indicators, which found that smaller list size is associated with more positive responses to the General Practice Patient Survey and GP Access Survey indicators. [46,48] Despite this, Nagraj et al. found that smaller practices have higher disenrollment rates, with patients more likely to move from such practices. [43] Finally, when it comes to patient-level outcomes, smaller practices were associated with a higher rate of uncontrolled hypertension, but the identified effect level was small. [56]

4. Discussion

4.1. Limited evidence base

Despite an increasing uptake of collaborative organisational models in English primary care, the evidence of their impact on patient safety and quality outcomes remains scarce. This is especially the case when considering high-quality and methodologically robust studies. This systematic literature review included four studies [30,32,33,35] from an earlier review by Pettigrew et al. [11] and excluded another one due to not meeting the inclusion criteria. [59] Furthermore, our review identified three additional studies explicitly focusing on organisational models. [1,36,39] However, the key contribution of the present study is that it builds on the previous systematic review by expanding the search criteria to also include studies on practice size, which identified 22 additional studies not included in the previous review. [31,34,37,38,40–57] This is an important addition given the average patient list size in English general practice increased by 37% between April 2013 and June 2022, [60] and the potential lessons from large practices could be applied to other types of large-scale general practice including collaborative organisations. This consideration is especially important given the more readily available evidence on the impact of practice size, when compared to the evidence on specific collaborative organisational

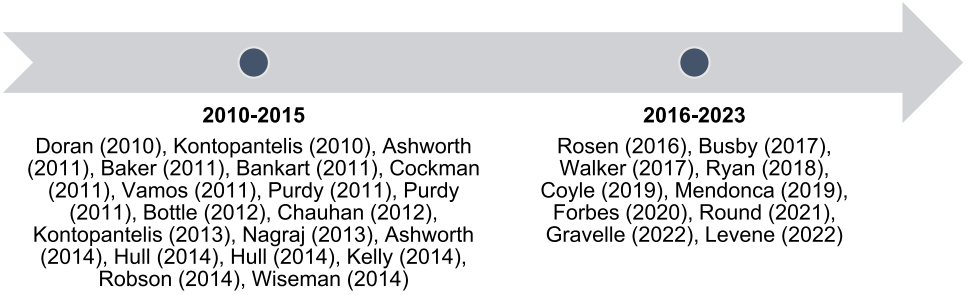

Fig. 3. Timeline of included studies.

models of general practice.

Furthermore, whilst the identified studies are skewed towards the early 2010s (Fig. 3), there has been a slow advancement of evidence on the topic since the late 2010s. Nonetheless, the evidence base supporting the consolidation of the primary care sector in England remains underdeveloped and largely mixed. The evidence of the impact of large-scale general practice on service delivery measures was predominantly positive amongst studies investigating collaborative general practice models, with more varied findings amongst those focusing on practice size. Meanwhile, no consistent findings on the relationship between collaborative models and practice size, and P4P outcomes and hospitalisation outcomes, were identified across the included studies. Finally, patient satisfaction was identified as a key concern in research investigating both collaborative models and practice size as interventions of interest. As a result, whilst key arguments in support of collaborative models of general practice are their ability to increase patient access to care, improve quality, reduce costs and provide additional training for staff, [61,62] further methodologically robust assessments of these claims are required. This is especially the case for most recently introduced collaborative models in the form of PCNs, which were incepted in 2019 as a result of a nationwide policy promoting general practice collaboration. While there are many factors which may have prevented robust retrospective evaluations of PCNs, including the COVID-19 pandemic shifting the broader health system priorities in recent years, more research on the topic is needed to further refine existing models of general practice collaboration.

4.2. Findings and comparison with existing literature

While the existing evidence is mixed, it points towards a positive impact of large-scale general practice on some outcomes. As demonstrated by the results of this systematic review, collaborative organisational models and larger practice size have a predominantly positive effect on service delivery measures and patient-level outcomes. [1,30,32–35,38,39] Similarly, whilst the evidence on the effect on P4P achievement targets and hospital admissions is more mixed, it is still positive in the majority of studies. [1,31,33–35,37,38,49,52–55,57] Patient perspectives and concerns surrounding access to and continuity of care remain important considerations for policymakers, regardless of the many suggested benefits of large-scale practice. [1,34,36,38,46,48]

Despite the positive effect of collaborative organisational models and practice size on some measures, four of the studies are focused on general practice networks in the London borough of Tower Hamlets. [30,32,33,35] As mentioned previously, these practice networks also enjoyed significant financial support with the view of improving care, which could be a factor for their success in improving outcomes of interest. In addition, another study examined a large practice federation located in London. [39] Therefore, many of the findings on the impact of collaborative organisational models are limited to a limited geographical area covering the London population which is younger, more ethnically diverse and more deprived compared to the England average. [63]

Furthermore, practices in London have historically underperformed in a range of outcome measures studied prior to the introduction of networks. For example, the uptake of childhood vaccinations was lower in London compared to the England average in 2007, shortly before the practice networks were formed. [30,64] Similarly, the region had higher rates of heart disease, stroke and emergency COPD hospital admissions, premature cardiovascular death and some of the lowest QOF scores for diabetes compared to other regions of the country. [32,33,35] Whilst all these metrics support the need for investigating collaborative care delivery as a potential solution, it is possible that the demonstrated improvement in outcome measures was facilitated by comparatively poor performance at the onset of the intervention.

In the case of collaborative organisational models, the focus on such models operating within London requires caution when interpreting the findings, as they may be less generalisable to the wider population of practices in England. Moreover, this potentially limits the applicability of findings and subsequent lessons learned to the international context of such models. However, identified findings from studies on practice size are more transferrable as they study a nationally dispersed sample of general practices across England. Still, some caution is needed to apply these findings internationally, which requires careful consideration of the specific health system in question, including features of primary care organisation, funding and provision.

Furthermore, some of the positive findings of this review are corroborated by additional literature which did not meet the inclusion criteria. An interview study of clinicians within the Tower Hamlets general practice networks suggested that networks improved care and reduced variation in practice performance. [65] Similarly, the results of McDonald et al. study on GP federations found that, while they have potential benefits, their success depends on the approach of the central authority. [66] Furthermore, a case study by Baker et al., focusing on a large privately owned company providing primary care in over 50 general practices in England, found that this model of care provided benefits surrounding standardising policies and facilitating system implementation while removing administrative pressures on clinical staff. [59] Additionally, a rapid evaluation of PCNs' implementation suggests that GPs' decision to join PCNs was often motivated by the desire to improve care delivery for patients. [67]

However, the qualitative analysis of Parkinson et al. also points towards the motivations of GPs being based on the almost "mandatory" feel of PCNs, given the strong financial incentives to join such networks. [67] The excluded literature also highlighted areas of concern, including a high GP turnover, putting at risk the continuity of care. [59] In addition, several similar considerations have been highlighted following the introduction of PCNs in 2019. These include heterogeneity of IT systems used amongst collaborating practices, increased administrative workload, training and supervision burden of hiring new staff, and space constraints given the workforce expansion. [68] Coupled with the findings of Forbes et al., [36] this suggests that, while large-scale collaborative models have a potential for improving safety and quality of care, it is important to mitigate the challenges arising from primary care consolidation.

Moreover, existing literature, dating as far back as the early 2000s,

suggests that several other drivers other than primary organisation size influence their performance. These include the wider environment within which the organisations operate and additional organisational features. [69] A 2013 systematic review by Ng et al. established that the existing evidence on the effect of practice size on a variety of patient-reported and clinical outcomes is mixed, [26] suggesting there may be other factors determining the quality of care provided. Despite Ng et al. studying a wider range of outcomes, their conclusion supports the findings of our review, which finds that practice size has a mixed effect on studied outcomes.

Lastly, international literature demonstrates the potential of clinical networks focusing on the management and treatment of specific conditions. [12] Whilst the aim of this review was to describe models not limited to a single condition, the findings on condition-specific models of care are useful in determining the potential of well-organised collaborative networks to improve quality of care. As in the case of practice size, the effectiveness of clinical discipline-specific networks was found to depend on factors such as resource availability, strong leadership, professional education for clinical staff and clear design of care pathways. [12] As a result, it is evident that consolidation of practices into collaborative organisational models may not be sufficient to improve care quality in absence of other key factors.

4.3. Strengths and limitations

One of the strengths of this systematic review is the comprehensiveness of the search strategy, which includes a broad range of relevant search terms and expanded inclusion criteria compared to a previous review on the topic. [11] Furthermore, this is the most up-to-date systematic literature review on the topic of organisational models and general practice size and their effects on patient care. Due to the increased uptake and promotion of collaborative models, including the introduction of PCNs in 2019, it is important to evaluate the progress that has been made in the literature on their impact on patient safety and quality of care since the latest systematic review on the topic was conducted. [11] As such, this review provides a summary of the current level and quality of evidence on the topic.

However, the exclusion of international evidence is a limitation. This is because potential learning points on the impact of collaborative models and practice size could be identified from international literature, despite the difficulty in interpreting and synthesising such evidence given the difference organisational context of primary care in international settings. Nonetheless, the primary findings from this review – a mixed impact of collaborative models and practice size, and the need for further evidence generation – are useful to consider within the international setting, especially for health systems currently undergoing a transition to collaborative primary care. They suggest that the commonly touted benefits of collaboration may not always translate to the practical experience of their implementation, highlighting the need for evidence-based policies promoting this type of working. A further limitation in interpreting the results is that the included studies are non-randomised, potentially introducing bias. This was partly mitigated through performing a thorough quality assessment, although consistent application of quality appraisal tools was challenging due to the heterogeneity of included studies.

4.4. Implications for further research and policy

Several areas related to new organisational models of general practice remain unexplored. In the first instance, international evidence should be considered to support further integration of primary care in the English NHS. Furthermore, developing a more robust evidence base on the impact of collaborative care models currently operating within the sector should be a focal point for primary care organisation research. While the latest iteration of collaborative organisational models in general practice, PCNs, have already been implemented as part of the NHS Long Term Plan, [3] it is not too late to establish their benefits and drawbacks. In addition, future implementation of different collaboration types between health care organisations, such as Integrated Care Systems, [70] would benefit from up-to-date evaluations of prior collaborative models.

Future research should focus on the effect of existing and future proposed models on effectiveness outcomes, including quality of care and patient safety. Additionally, developing evidence on their impact on the management of acute and chronic conditions would be useful, especially given the increase in the number of people living with multimorbidity, [71] but also increasingly multidisciplinary approach to care taken by many collaborative general practice models. [1,2] Furthermore, the cost-effectiveness of large-scale models needs to be established, especially the context of an over-stretched publicly funded health system such as the English NHS. Further developing this evidence base will enable the refinement of collaborative models and facilitate their integration as key building blocks of Integrated Care Systems. [3] In addition, this evidence can serve to inform future developments in the primary care sector across the NHS. This, however, requires more research taking a wider geographical approach, instead of focusing on limited areas such as London.

Conclusion

Based on the identified studies on the impact of collaborative organisational models and practice size on patient safety and quality outcomes, there is evidence supporting collaboration and large-scale working in the form of large practices with the view of improving patient care. However, the evidence base is limited and has remained largely inconclusive despite the increase in average practice list size as well as nationwide initiatives to promote collaborative general practice organisations in the English NHS, such as the introduction of PCNs in 2019. Additionally, continuity and access to care, as well as patients' perception of quality remain a concern. As a result, more high-quality evidence is needed to inform strategic directions and the implementation of future collaborative models.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.healthpol.2023.104940.

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