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# Rapid Review

## Examining international primary healthcare delivery models with high rates of patient attachment

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The North American Observatory on Health Systems and Policies (NAO) is a collaborative partnership of interested researchers, research organizations, governments, and health organizations promoting evidence-informed health system policy decision-making.



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# List of Abbreviations

| | |
|---|---|
| ANP | Advanced Nurse Practitioner |
| ARRS | Additional Roles Reimbursement Scheme |
| BSN | *Burgerservicenummer (Citizen Service Number, Netherlands)* |
| CHI | Community health index |
| CPR | Civil Personal Registration (Denmark) |
| EHR | Electronic health record |
| EMR | Electronic medical record |
| EU | European Union |
| FFS | Fee-for-service |
| FPT | Federal, Provincial, and Territorial |
| FTE | Full-time equivalent |
| GMS | General Medical Services |
| GP | General Practitioner |
| ICB | Integrated Care Board |
| MOU | Memorandum of understanding |
| NHS | National Health Service |
| OOH | Out-of-hours |
| PCN | Primary Care Network |
| QOF | Quality Outcomes Framework |

# Executive Summary

Countries with strong primary care systems tend to be associated with better health outcomes, higher patient satisfaction, and lower overall costs. A key foundation of these systems is patient attachment, which refers to a stable or ongoing relationship between an individual and a primary care clinician or practice. It is important to distinguish between structural attachment to a practice, where all care takes place through the registered practice, and relational continuity, which reflects patients' efforts to see a preferred clinician. Attachment supports continuity, coordinated care, and proactive management of health needs. However, achieving high levels of attachment while ensuring timely access has proven challenging, especially in systems where primary care is delivered through independent practices with limited formal governance.

Although expanding access to primary care is a shared federal, provincial and territorial (FPT) health priority, efforts to introduce new policy levers aimed at improving attachment and timely access often encounter structural, operational, and political barriers. This rapid review explores international cases that have achieved high patient attachment—Denmark, the Netherlands, Scotland, and England—to uncover key lessons and help inform recommendations for the Canadian context.

Experience from these jurisdictions underscores that attachment alone does not guarantee timely access to care and/or a longitudinal relationship with a primary care professional. Workforce shortages and uneven distribution remain pressing barriers, even in systems with near-universal registration. Countries have responded by expanding multidisciplinary teams and advanced nursing roles, but success depends on clear role definitions, sustainable funding, and coordination with social services. Digital platforms amplify the benefits of attachment by enabling record sharing and patient engagement, yet technology cannot compensate for insufficient clinical capacity. Equity remains a persistent challenge. Systems that rely on patient-initiated registration risk leaving vulnerable populations behind unless complemented by outreach and culturally grounded supports. While automatic assignment models may minimize administrative barriers, they still require targeted policies to maintain access to rural, remote and underserved areas. In addition, monitoring and accountability mechanisms are necessary to ensure that attachment translates into meaningful improvements in continuity and access.

Effective patient attachment depends on both thoughtful system design and foundational implementation capacity. Jurisdictions pursuing attachment reforms must make deliberate choices about registration pathways and equity safeguards supported by three foundational building blocks.

1. Strengthen primary care workforce planning and distribution, guided by a coordinated pan-Canadian workforce strategy;
2. Build a population-based primary care system so no person is left behind; and
3. Advance monitoring and reporting of primary care data to empower patients and drive accountability.

# Introduction & Background

Primary care is the cornerstone of a robust health system (1–3). Primary care clinicians, particularly general practitioners (GPs)/family physicians and other professionals (e.g., nurse practitioners [NPs] and interdisciplinary teams) are ideally a patient's first point of contact for responsive, on-going, continuous care (4,5). By serving as the first point of contact for most patients, primary care improves health outcomes, enhances equitable access to care, and may be associated with reduced system cost and reliance on emergency department care (1, 3,6–8).

High patient attachment to GPs and other primary care clinicians is a key component of strong primary care systems (9–12). Attachment refers to the ongoing relationship between an individual (or patient) and primary care clinician or practice (13). This relationship may be formalized through registration or enrollment (14). Formal attachment can support planning at the local care level, strengthen accountability to patients, enable effective and efficient care pathways, and facilitate continuous, longitudinal care (13,15).

Achieving near 100% attachment while ensuring and/or improving timely access to care, however, is a challenge in many jurisdictions. This is particularly the case in health systems where primary care provision is dominated by private, independent clinicians who are not formally managed, and where workforce shortages and geographic or digital inequities exacerbate access gaps and limit the effectiveness of digital health innovation to bridge access to care (16–20). Indeed, strategies to implement patient attachment models must balance patient choice, clinician autonomy, and system accountability, while striving to address structural constraints like workforce shortages and maldistribution, as well as limits in digital infrastructure.

As part of the *Working Together to Improve Health Care for Canadians* plan, expanding access to primary care is a shared federal, provincial, and territorial (FPT) health priority (21). FPT governments are at different stages of primary care reforms and face a range of challenges when seeking to introduce new policy levers with the potential to improve patient attachment and timely access to primary care.

This rapid review explores select international examples that have achieved near-universal attachment to a regular primary care clinician, team, or clinic, and synthesizes actionable recommendations and implementation strategies relevant to the Canadian context.

# Methods

We conducted a rapid jurisdictional review and consulted with experts to explore international cases and their approaches to achieving high rates of attachment in primary care and uncover key policy enablers and challenges. This review was limited to Denmark, the Netherlands, Scotland, and England. These jurisdictions were selected for having well-established primary care systems with a strong emphasis on patient registration or attachment, making them relevant comparators for Canada. Denmark and the Netherlands are recognized for their strong systems of patient-list registration, strong continuity of care, and after-hours systems (22), offering insights into mechanisms that sustain long-term patient-clinician relationships. Scotland and England share structural similarities with Canadia's universally covered, publicly funded, and regionally governed health system; they have also adopted innovative strategies to improve attachment and access (22). Together, these cases offer a diverse mix of policy approaches, organizational structures, and performance outcomes, offering lessons that are transferable and adaptable to the Canadian context.

Academic and grey literature sources (e.g., reports from the Commonwealth Fund, European Observatory on Health Systems and Policies) were reviewed to understand how these systems and initiatives support high attachment and timely access. A data collection template was created to systematically capture key features of the models and approaches, including impacts, barriers, facilitators, and other contextual factors. For this report, the terms "patient attachment" and "patient registration" are used interchangeably to describe the formal or informal relationship between an individual and a primary care clinician or practice. Similarly, "primary care" and "general practice" are used interchangeably, recognizing that while primary care encompasses a broader system inclusive of other providers, general practice is the dominant delivery model in the jurisdictions examined.

Draft findings were shared with local experts (2–3 per jurisdictions), selected for their knowledge of and familiarity with the identified models, including primary care clinicians and researchers. Experts provided written feedback and/or met with the research team virtually to validate findings, clarify contextual nuances, and address evidence gaps. The draft report was also reviewed by the Primary Care Working Group of the federal/provincial/territorial Committee on Health Workforce to help refine and contextualize the results and recommendations most applicable to Canada.

## Limitations

This rapid review provides a high-level synthesis of international approaches to primary care attachment but is subject to some limitations. Evidence across countries is uneven, with few evaluations of how specific reforms affect access, continuity, or equity, making it difficult to assess causal impacts. Cross-jurisdictional comparisons are challenged by differences in terminology, governance structures, financing arrangements, workforce metrics, and population health needs, limiting the ability to draw direct conclusions. Finally, the review's primary reliance on publicly available, English-language sources conducted within a short timeframe may have omitted some local or emerging evidence. Nonetheless, expert consultations helped validate findings, clarify context, and strengthen the relevance of this synthesis for Canadian policy development.

# Analytic Overview

## Primary Care System Overview

All four jurisdictions provide universal health coverage, but the structure, governance, and financing of their primary care systems vary substantially, shaping local planning, funding flows, and accountability mechanisms (**Table 1**). Scotland, England, and Denmark operate primarily single-payer systems funded through public taxation, whereas the Netherlands relies on mandatory statutory health insurance supplemented by voluntary coverage within a managed competition framework (23,24).

Governance arrangements reflect these structural differences. Scotland's National Health Service (NHS) is devolved to the Scottish Government and organized into 14 territorial boards, with policy and funding overseen by the National Health and Social Care Directorate (25). Denmark's system is decentralized across state, regional, and municipal levels, with regions managing hospitals and primary care, while municipalities deliver most social and long-term care services (26). England's 2022 reforms replaced Clinical Commission Groups with 42 Integrated Care Boards (ICBs), which are statutory NHS organizations responsible for allocating NHS resources, coordinating primary, community, and hospital care, and improving population health across local areas (27,28). The Netherlands combines national oversight through its Ministry of Health and the Dutch Health Care Authority with decentralized implementation guided by national standards (24).

Financing and practice organization also vary and further shape primary care delivery. Scotland and England mainly use risk-adjusted capitation for GP remuneration, with England incorporating performance-based incentives through the Quality and Outcomes Framework (QOF). Dutch GPs receive payment through a three-segment model in which capitation and fixed fee-for-service (FFS) payments account for about 77% of total GP compensation, adjusted for patient age and socioeconomic status (24). Denmark relies on a 70/30 FFS/capitation mix (26), thus indicating that it is possible to achieve strong attachment in a predominantly FFS payment model. Across all four jurisdictions, like in Canada, GPs are generally self-employed contractors, though England and Scotland also include some salaried positions (29).

All four comparator countries demonstrate a shift toward group practices and multidisciplinary teams and support from professional associations who play a central role in contract negotiation, training, and advocacy. Quality improvement mechanisms also differ, with a combination of national approaches (e.g., public reporting of performance in England and Denmark, and national benchmarks in the Netherlands) and GP-led initiatives (e.g., GP clusters in Denmark and Scotland [30,31]).

**TABLE 1.** Primary care system features by country

| Feature | Denmark | Netherlands | England | Scotland |
|---|---|---|---|---|
| **Coverage and financing** | Universal coverage; single-payer system funded by public taxation (83% taxation; pooled nationally; ~50% optional private insurance) | Universal coverage; Mandatory statutory insurance with voluntary supplemental coverage in a managed competition framework | Universal coverage; single-payer NHS funded by public taxation (80% taxation; 20% national insurance; 10.5% supplemental coverage) | Universal coverage; single-payer NHS funded by public taxation and UK block grants (~8.5% private insurance) |
| **Governance** | Decentralized across state, regional, and municipal levels; Danish Health Authority; regions and municipalities coordinate care | Ministry of Health; Dutch Health Care Authority; decentralized | Deptartment of Health and Social Care; NHS England; ICBs | Scottish Government; 14 NHS boards plan and fund GP services |
| **GP remuneration** | ~70% FFS/ ~30% capitation mix; extra FFS for OOH | 77% capitation + FFS* (combined); 23% chain care and innovation | 60% capitation; 60% GMS capitation; 22% PMS capitation; 10% QOF; 7% local incentives; <1% enhanced services† | Risk-adjusted capitation (80–90%) with some FFS incentives; salaried positions becoming more common |
| **GP employment** | Self-employed contractors | Self-employed contractors | 59% self-employed contractors; 22% salaried | 72% self-employed contractors; 27% salaried (estimates from 2022) |
| **Regulatory bodies and professional associations** | • Danish Health Authority<br>• Danish Medical Association | • Dutch Health Care Authority<br>• Royal Dutch Medical Association | • Care Quality Commission<br>• NICE<br>• NHS Digital<br>• British Medical Association | • General Medical Council (GMC)<br>• Health Improvement Scotland<br>• British Medical Association Scotland |
| **Quality and performance** | • Danish Healthcare Quality Program<br>• GP quality clusters<br>• Public reporting | • Health Inspectorate national benchmarks; quality circles and regular quality reports from care groups, insurance companies, and pharmacy quality circles | • QOF pay-for-performance<br>• Care Quality Commissions inspections | • GP quality clusters<br>• Healthcare Improvement Scotland |

*Notes:*

** In the Netherlands, the 77% represents combined income from both capitated per-patient payments and fixed consultation fees within Segment 1 of the three-segment payment model. Segments 2 and 3 cover chain care for chronic conditions and innovation projects respectively (24,32).*

*†England's GP payment is a blended model: 60% from GMS capitation (Global Sum), 22% from PMS contracts (also capitation-based), 10% from QOF performance payments, 7% from local incentive schemes, and <1% from enhanced services paid on FFS basis (28,29).*

## Development Pathways for Registration Systems

Across the four countries, patient attachment systems have developed through a combination of national strategies, legislative mandates, contractual reforms, stakeholder engagement, and digital innovation. These systems illustrate that patient registration is not a standalone intervention but part of a broader architecture of governance, financing, and service delivery. Each jurisdiction's model evolved incrementally, often in response to pressures such as rising demand, workforce shortages, and the need for better coordination across sectors. Importantly, a shared feature across these countries is a long-standing professional identity, institutional history of general practice, and organizational structures that predate current attachment systems. For example, in the Netherlands, GP responsibility for 24/7 patient care is rooted in contractual arrangements that date back decades and are reinforced by institutions such as the Dutch College of GPs. This professional foundation and institutional memory are part of why these systems function effectively today (33). While the mechanisms differ, the underlying principle is consistent: attachment serves as a structural foundation for continuity, accountability, and integrated care.

Key enablers of effective attachment systems include strong accountability mechanisms and clearly defined gatekeeping roles for GPs. Denmark combines centralized policy with decentralized delivery, embedding attachment through universal coverage, automated service enrollment (though patients have a choice), and access tied to each person's unique national identification number, known as their Civil Personal Registration number (CPR) (34). The Netherlands leverages managed competition and patient choice, supported by insurer involvement and advisory councils to maintain accountability (23). In both Denmark and the Netherlands, strict GP gatekeeping extends beyond specialist referrals to include emergency departments. For example, Dutch insurers do not reimburse hospital care without a GP referral, and patients without referrals are placed at the bottom of hospital waitlists, creating strong financial incentives for maintaining registration with a GP (23,35). Scotland and England build on the NHS tradition, using contractual reforms and digital platforms to modernize self-initiated registration and expand multidisciplinary teams (28,36,37).

Across all jurisdictions, investment in national digital information technology infrastructure has been critical to operationalizing attachment and supporting continuity. Platforms such as Denmark's sundhed.dk portal (38,39) and England's NHS App (40) enable registration, access to health records, and communication with clinicians. Fully digitized electronic patient records are a foundational element of these attachment systems, facilitating information flow and care continuity across clinicians and strengthening coordination within practices (33).

## Patient Attachment Models, Registration, and Catchment Areas

Patient attachment systems determine how patients are linked to clinicians, how registration and geographic catchment areas are managed, and how transfers and access are facilitated. These systems influence continuity of care, equitable access, administrative processes, and the supports available for people who are unattached or face barriers to accessing care.

Patient attachment models vary between individual GP-based and practice-based systems (**Table 2**). The Netherlands and Denmark use individual GP attachment, where patients register with a named GP (i.e., a specific GP assigned to a patient) (24,34). This model supports team-based care and relational

continuity but can place pressure on practices when GP availability is limited, requiring proactive workforce planning and retention strategies. In contrast, England and Scotland have practice-based attachment systems, where patients register with a clinic rather than a specific GP. While this offers scheduling flexibility, it can challenge relational continuity as patients may see different clinicians within the practice (35,41).

**TABLE 2**. Primary registration systems and attachment by country

| Feature | Denmark | Netherlands | England | Scotland |
|---|---|---|---|---|
| **Attachment level** | Individual GP | Individual GP | Practice | Practice |
| **Registration mechanism** | Default system is automatic assignment via CPR number at birth/residency, though patients routinely choose their own GP; children are linked to mothers' GP | Patient-initiated; insurer assists; BSN number | Patient-initiated; NHS App or online directory; NHS number | Patient-initiated; NHS online or paper form; CHI number |
| **Catchment area** | Defined radius (5–15 km); exceptions allowed | Must be within service area; GPs can refuse if full/outside area | Postal code-based; boundaries loosely defined; refusals allowed | Defined postal code-based boundary; subject to availability |
| **Transfer process** | Allowed after age 15; fee applies (40 DKK; ~CAD$8) | Free switching; 5% lack GP or seeking change | Free switching; encouraged when moving | Online/app transfer within boundary |
| **Supports for unattached patients** | CPR system ensures assignment; financial incentives for rural areas | Insurers assist; digital tools; GP incentives in shortage areas | Walk-in centres; recruitment incentives for underserved areas | NHS 24; Registration teams within National Services Scotland; recruitment schemes for rural areas |
| **Digital infrastructure** | sundhed.dk portal; full EHR access; secure messaging | GP info systems; online booking (58%); record viewing (22%) | Fully computerized; NHS App as front door; mandatory online booking | MyCare.scot portal (2025 rollout); NHS 24 (app and telehealth service); NHS Inform |
| **Equity strategies** | Tax redistribution; rural incentives; care for disadvantaged areas | Community programs for immigrants/elderly; expanded nursing roles | Walk-in centres; targeted recruitment; persistent gaps in underserved areas | Recruitment schemes; rural health centre support; funding adjustments |

*CHI (Community Health Intex); CPR (Civil Personal Registration); NHS (National Health Service); NICE (National Institute for Health and Care Excellence)*

Registration processes and guarantees differ in ways that influence administrative burden, equity, and timeliness of attachment. Scotland, England, and the Netherlands rely on patient-initiated registration, typically through online portals or paper forms. Scotland's NHS system links registration to postal code catchment areas (41) and is developing a digital health and social care portal (MyCare.scot) to improve

navigation, though processes still rely on mailed or emailed registration forms (41,42). England and Scotland link patients to a GP practice through a straightforward process via the NHS App and online directories, supported by a unique community health index (CHI; Scotland) or NHS (England) number system (29,43,44). Scotland and England do not have formal statutory guarantees for registration processing timelines. However, England requires practices to provide explanations for registration refusals within 14 days of denial (28,29). The Netherlands' patient-initiated registration is supported by insurer-supported platforms (e.g., zorgkaartnederland.nl) that is based on the *Burgerservicenummer* (BSN) citizen identification system (24). Health insurers play a crucial role in the registration process, with insurers essentially obligated to help find GP practices for patients seeking attachment, streamlining the registration process and reducing administrative wait times, however interoperability challenges remain across electronic medical record (EMR) systems (24,35).

The patient-initiated registration in Scotland, England, and the Netherlands requires individuals to take the first step in seeking attachment, though support systems help facilitate this process. Denmark stands apart with its automatic assignment model. Residents receive a CPR number at birth or upon residency, linking them to a GP unless they actively choose otherwise (34). The national digital platform sundhed.dk offers secure communication and supports access to health information (38,39), though variation in EMR systems between Danish regions remains a challenge. Automatic assignment ensures near-universal coverage, eliminates waiting periods for attachment, and reduces administrative burden, but maintaining GP availability in rural and underserved areas still requires financial incentives and redistribution of resources (45).

Catchment rules define how patients are geographically linked to clinicians and shape the organization of primary care systems. In Scotland, strict postal code-based boundaries require patients to register with practices serving their local area (41). This approach reinforces geographic alignment between patient residence and service delivery, but does not directly address clinicians' capacity or distribution. England applies looser geographic rules, allowing patients some flexibility in choosing practices, but practices may refuse out-of-area registrations if their list is full (28,29). Denmark uses defined zones, typically within 5–15 kilometers, paired with planning mechanisms to ensure GP availability (45). The Netherlands maintains free choice of physician in principle, but in practice registration is tied to postal code. GP practices may decline registrations based on distance, as GPs are required to reach patients' homes within set timeframes for emergencies and home visits (24).

Transfer processes differ across systems. In Denmark, patients may change GPs after age 15 for a nominal fee (40 DKK or ~CA$8), with a three-months waiting period between change requests (46,47). England and Scotland permit free switching, which is often encouraged when patients move (29,41). Scotland currently has more patients registered with a GP than its resident population, reflecting administrative challenges in timely de- and re-registration when individuals move within or out of the country (48). In the Netherlands, transfers can be completed online or through mobile apps, provided they remain within geographic boundaries (24).

Supports for unattached patients reflect broader system priorities. Denmark's CPR-based system of automatic assignment ensures universal access, while maintaining patient choice, and financial incentives attract GPs to serve in rural areas to maintain coverage (26,45). Scotland provides additional supports through its urgent health advice telephone line, online app (NHS 24) to identify nearby services (49,50), and registration support teams (51). England relies on walk-in centres and recruitment

schemes to address gaps in underserved areas (29). The Netherlands achieves the highest attachment rates internationally through a system in which health insurers are essentially obligated to ensure patient placement, even in areas with limited capacity (35,52).

## Primary Care Workforce and Practice Organization

Primary care capacity is shaped by workforce size, training pathways, team organization, and workload management. These factors directly influence patient attachment strategies and effectiveness, given that patients can only be meaningfully linked to a clinician when sufficient, well-supported primary care resources are available. These differences are summarized in **Table 3**.

Workforce availability varies markedly across jurisdictions. Per capita estimates of GP supply range from about 60 GPs per 100,000 in Denmark, 67.5 in England, 65.3 in Scotland, and 81 in the Netherlands. The Netherlands achieved this high per capita rate through rapid workforce expansion from 8,600 GPs in 2020 to 14,300 in 2024. This training success is so significant that many Dutch-trained GPs work in other European Union countries, demonstrating the quality and exportability of Dutch GP education (33). The system continues to manage capacity through strong insurer coordination and digital solutions to optimize GP time (24). Denmark maintains a smaller workforce of 3,600 GPs (~60 per 100,000 population) supported by smaller patient panels, a specific group of patients who have an established relationship with a primary care provider, collaborative practice models, and shared community and social care responsibilities with municipalities (45,53).

Patient panel sizes also differ across jurisdictions. Denmark sustains relatively smaller panels (~1,600 patients per GP) among the four countries, which can help preserve patient-clinician relationships (53). England and the Netherlands average over 2,200 patients per GP, with Dutch guidance recommending 2,095 per full-time equivalent (FTE) GP (23,24,28). Scotland averages around 1,735 patients per GP but recent declines in practice numbers have increased strain and wait times (54,55). While the gatekeeping function helps maintain patient access for urgent issues, larger panel sizes across all four systems create pressure on continuity as policy emphasis on same-day and next-day access competes with maintaining ongoing patient-clinician relationships.

Training requirements (typically 9–11 years from medical school entry to GP qualification) limit rapid workforce expansion to meet the needs of the panels. Countries therefore use targeted incentives: Scotland funds rural training through the National Centre for Remote and Rural Health (56,57); England offers fully funded specialty training and recruitment support in shortage areas (58,59). Denmark has region-owned clinics and financial incentives to attract GPs to underserved areas (26); and Dutch insurers support young GPs in stabilizing patient lists (60).

All four systems increasingly rely on group practices and multidisciplinary teams to broaden access and manage workloads. Scotland's 2018 general medical services (GMS) contract expanded teams with pharmacists, nurses, physiotherapists, and allied health professionals (61,62), although reports of geographic disparities persist (63). England organizes Primary Care Networks (PCNs) that serve communities of 30,000–50,000 patients and receive funding for additional clinical and non-clinical roles under the Additional Roles Reimbursement Scheme (ARRS) (23,36). This expansion occurs alongside significant workforce changes, with GP partners in England becoming a minority within the qualified workforce for the first time in 2024, reflecting a sharp decline in partnership numbers and an

81% increase in salaried GPs since 2015 (64). The Netherlands leverages nurses and assistants for chronic disease management, triage, and out-of-hours services (24,26), while Denmark supports collaboration between primary care and municipal services (rehabilitation, home nursing) through robust information systems (26). The shift toward group practices in the Netherlands is driven by increasing numbers of GPs preferring part-time work arrangements (33). Expanded nursing roles are also central to these reforms: advanced nurse practitioners (ANPs) in Scotland prescribe and make referrals (37); England deploys nurse practitioners in PCNs and walk-in centres; and Denmark and the Netherlands have broadened nursing responsibilities to preventive care and chronic disease management (24). Financial incentives support these roles, easing GP workload and improving access for routine care. For example, England's ARRS provides dedicated funding for clinical pharmacists, physician associates, first contact physiotherapists, and care coordinators within PCNs (65), and in Denmark, GPs are paid more than hospital specialists and out-of-hours (OOH) services are attached to FFS payments (47).

Yet, workload is influenced by both routine administrative responsibilities and OOH duties, which together shape pressures on time, continuity, and access to care. Scotland's shift toward salaried GP roles reduces pressures from practice ownership (37,66,67). England addresses reporting demands through team-based administrative support, while Denmark uses medical secretariats and shared group resources, and the Netherlands relies on practice assistants for routine coordination (26,29,68). These approaches help prevent burnout and support retention. In addition, OOH arrangements further shape workload. Danish GPs participate in OOH cooperatives with higher FFS compensation (53); Dutch GPs rotate through GP-led after-hour care cooperatives (23,69). England uses PCNs and NHS 111 (a free, non-emergency medical advice and triage service) to organize extended access (70), and Scotland has largely removed OOH responsibilities from GPs (27,71).

**TABLE 3.** Workforce and organization by country

| Feature | Denmark | Netherlands | England | Scotland |
|---|---|---|---|---|
| **Patient panel size per GP** | ~1,600 patients; optional closure threshold | ~2,300 patients; guidance is 2,095 per FTE GP | ~2,257 patients | ~1,700 patients |
| **GP workforce size** | ~60 per 100,000 (2022) | ~81 per 100,000 (2024) | 67.5 per 100,000 (2025) | 65.3 per 100,000 (2025) |
| **GP medical training and recruitment** | 11 years; region-owned clinics attract GPs to underserved areas | 9 years; insurer support for young GPs | ~10–11 years; fully funded specialty training; recruitment incentives | 10–11 years; rural training via National Centre for Remote & Rural Health |
| **Team organization** | Group practices (2–4 GPs + nurses); municipal services integrated (rehabilitation, home nursing) | Group practices with nurses and assistants; shift from solo to multidisciplinary | PCNs (30k–50k population); ARRS-funded roles (nurses, pharmacists, social workers) | Multidisciplinary teams expanded under 2018 GMS contract (nurses, pharmacists, physiotherapists) |
| **Expanded nursing roles** | Nurses handle chronic care, triage, OOH; ANPs diagnose and prescribe | Nurses manage chronic care, preventive services | NPs in PCNs and walk-in centres prescribe and refer | ANPs prescribe and refer; GPNs = 37% of primary care workforce |
| **Workload management** | Medical secretariats and shared resources reduce admin load | Practice assistants play key role; burden cited since 2006 reforms | Admin support via PCNs; NHS App; QOF burden persists | Salaried GP trend reduces ownership burden; Multidisciplinary teams share admin tasks |
| **Out-of-Hours (OOH)** | GPs required for weekly OOH shifts; higher FFS pay | Mandatory rotation in ~120 GP-led cooperatives | PCNs organize extended access; NHS 111 triage; cooperatives/ private clinicians | OOH largely removed from GP responsibility |

*ANP (advanced nurse practitioner); ARRS (Additional Roles Reimbursement Scheme); FTE (full-time equivalent); GMS (general medical services); GP (general practitioner); GPN (general practice nurse); NP (nurse practitioner); OOH (out-of-hours); PCN (Primary Care Network); QOF (Quality Outcomes Framework)*

## Outcomes and Impacts

Patient attachment systems show varying outcomes as defined by gains in continuity and care, experience and management of patients, and clinician experience. Looking to the future, patient attachment will be further influenced by reforms and transformation in response to successes and lessons learned. **Table 4** summarizes key outcomes across the four jurisdictions, including access and capacity metrics, patient and clinical satisfaction trends, funding patterns, and future reform directions.

The patient attachment systems described above have delivered important gains in continuity and care. High registration rates provide a structural foundation for integrated care efforts, supporting systems to

organize services (including prevention and chronic disease management) around defined patient lists and maintain accountability for outcomes. Denmark's list closure threshold of 1,600 patients reportedly helps preserve relational care, while the Netherlands combines patient choice with strong gatekeeping and insurer oversight to sustain continuity (24,53). However, maintaining these benefits requires sustained investment and careful implementation. Despite challenges with maintaining adequate investments in countries like England, local experts emphasize the importance of patient registration/attachment that enables population-based/neighbourhood-based prevention and chronic disease management programs. In Scotland, multidisciplinary teams positioned as separate entities from GP practices have created coordination challenges for patients, including difficulties navigating access pathways and confusion about which providers to contact for specific issues, contributing to service fragments (72).

**TABLE 4.** Summary of outcomes and impacts

| Feature | Denmark | Netherlands | England | Scotland |
|---|---|---|---|---|
| **Access and capacity** | ~1,600 patients per GP; optional closure threshold | ~2,300 patients per GP; guidance: 2,095 per FTE GP | ~2,257 patients per GP (+16.5% since 2015) | ~1,700 patients per GP |
| **Patient satisfaction** | 91% (EU avg 84%); strong digital integration | High continuity; strong satisfaction with access | Declining; 14-point drop since 2017/18 | Declining; widening gap between affluent and underserved areas |
| **Clinician satisfaction** | N/A (reforms in progress) | High GP satisfaction overall; some concerns about administrative burden and OOH participation | 71% very/extremely stressed; 42% unlikely to stay in 5 years | Dissatisfaction in underserved areas; concerns about workload and inequities |
| **Funding trends** | Regional agreements for quality; reforms underway for GP remuneration | Mixed capitation + consultation fees; strong insurer–clinician negotiation | £1.09B funding (2023/24), down 6% in real terms since 2021/22; share fell to 6.5% | Funding grew since 2017/18 but declined in real terms; share fell from 7% to 6.5% |
| **Future directions** | Mosaic reform: regional councils, integrated chronic care, digital focus | 2023 Integrated Care Agreement; urgent workforce expansion | 10-Year Plan: digital + prevention; new GP contracts (2026) | Revised MOU to support GMS contract implementation |

*Note – comparable data on continuity of care were not available*

These systems have also advanced patient experience and engagement. Denmark reports satisfaction levels of 91%, well above the European Union (EU) average (73). The Dutch primary care system demonstrates strong performance on key access by continuity metrics, achieving international recognition for same-day appointment availability (63% able to receive same or next-day appointment vs. 39% Commonwealth Fund average) and maintaining the highest rates of attachment internationally (35,52,68). England and Scotland have invested in digital tools and expanded team-based care, creating new pathways for access and chronic disease management, even as declining satisfaction trends highlight the need for ongoing adaptation (23,28,36,40). Similarly, provider experience reflects both the demands of patient attachment systems and the supports in place to manage them. In Scotland and England, multidisciplinary teams have expanded, yet clinicians report dissatisfaction (particularly in

underserved areas) with high workloads and concerns about inequities (23,54). In the Netherlands, rising administrative burdens and reluctance to provide OOH care contribute to growing clinician dissatisfaction (74,75).

## Enablers of Primary Healthcare Attachment

The comparative experience across countries highlights several factors that determine whether patient registration translates into improved continuity and access.

### Adequate workforce supply and distribution

Stable attachment depends on the total number of clinicians, as well as their distribution and availability across regions where need is greatest. Scotland and England continue to face shortages in rural and underserved areas, despite targeted incentives (28,76). The Netherlands experiences periodic list closures when workforce pressures prevent GPs from accepting new registrations (60). In Denmark, regional authorities are responsible for managing and redistributing GPs to support more even geographic distribution; however, attracting younger physicians to rural or underserved areas remains a challenge. Shortages in some regions have led to private companies or regional authorities to temporarily take over vacant clinics, with employed physicians working on short-term contracts (53).

These patterns underscore that registration systems alone cannot guarantee access. Effective attachment requires sustained investment in workforce planning, strategic recruitment, retention initiatives, and redistribution mechanisms to ensure that patient attachment translates into reliable, continuous, and locally available care.

### Integrated after-hours care with shared digital infrastructure

Models that integrate OOH services with daytime primary care records strengthen continuity of care beyond regular clinic hours. Denmark's OOH system benefits from a regionally coordinated, GP-led model established through collectively negotiated agreements that clearly define GP participation, renumeration, and service obligations (45,53). Access to OOH care is provided through a regional telephone line staffed by rotating GPs and nurses. Patients can share photos or videos to support the triage process, and our expert reviewers shared that the OOH system is extremely effective for keeping non-urgent cases out of hospitals. A substantial proportion of cases are resolved by telephone (48%), and following consultation, a patients' regular GP is notified of OOH encounters to ensure continuity (26,77). Coordination of routine, after-hours, and community-based care is supported by Denmark's mature national digital infrastructure sundhed.dk, which provides a shared, patient-centered platform for accessing and exchanging health information across clinicians and patients (78,79). The platform also links existing registries and administrative datasets that are used for surveillance and planning (80).

The Netherlands integrate OOH services through GP-led cooperatives with mandatory rotations across regional networks, with electronic systems that allow GPs to access after-hours visit summaries, though harmonization challenges exist across multiple EMR systems (23,24,69). The Netherlands' system of about 120 primary care cooperatives also serves as the comprehensive gatekeeper to emergency departments, with standardized telephone triage directing patients to appropriate care

levels (33). In England and Scotland, reliance on NHS 111 and external urgent care clinicians maintains access but can fragment relational continuity (70,81). In Scotland, responsibility for OOH services has been shifted away from individual GPs to reduce workload pressures, with NHS boards organizing services through GP cooperatives (82). Effective OOH integration is therefore essential to protect informational continuity and reduce emergency department demand without weakening patient–provider relationships.

## Team-based care: Role definition and integration

Multidisciplinary teams and the expanded role of nurses can improve access to routine, preventive, and chronic care, while supporting GPs in managing panels. International experience shows that their impact depends on clear role definitions, structured workflows, and consistent implementation. In Denmark, integration and coordination of care across a patient's life course is supported by the complementary roles of regions and municipalities, both of which function as independent, democratically elected authorities that coordinate services within a shared framework of state regulation and funding (26). Municipalities play a crucial role in supporting continuity of care through localized management and prevention of disease, which in turn, reduces pressures on regionally operated hospital and GP services (33).

The Netherlands demonstrates successful task-shifting through highly standardized roles: practice assistants handle telephone triage using sophisticated algorithms and can independently manage approximately 20 types of complaints, while practice support nurses manage chronic disease care, with patients typically having three of their four annual diabetes visits with nurses rather than GPs (32). This standardization, driven by uniform contracts across the country that specify professional roles within primary care practices, enables effective and consistent task distribution (32). In contrast, Scotland has encountered implementation challenges with multidisciplinary teams, including unclear roles and insufficient staffing. Although the policy intention was to reduce GP workload and enable more focused care for patients with complex needs, the introduction of multi-disciplinary teams employed by NHS boards has, in practice, exerted additional demands on GP practices to integrate and build relationships with external providers, creating cultural tensions and coordination challenges (83).

For registration systems to function well, multidisciplinary teams must be adequately staffed, their responsibilities well-defined, and their operations integrated both within the practice and with wider community services.

## Digital infrastructure that supports workforce capacity

Integrated digital systems facilitate continuity of care, coordinated referrals, and accurate record-keeping, while also enabling patients to navigate care pathways more independently. Denmark's CPR-linked infrastructure and England's electronic referral system and NHS App illustrate how digital tools can support coordinated care. When paired with strong gatekeeping, these systems create clear pathways between primary and specialist care. For example, England's mandatory electronic referrals allow GPs to initiate and track specialist consultations through integrated platforms, while the Netherlands' system requires GP referral for hospital care reimbursement, with digital systems facilitating information exchange (23,28).

However, even the most advanced digital systems cannot compensate for workforce shortages. In England, continuity of care declined from 66.4% to 56.7% between 2012 and 2017, despite digital investment, reflecting the combined impact of workforce gaps and sustained fiscal constraints within the NHS (23,84). In Scotland, GP practices have increasingly adopted hybrid care models that combine in-person and remote consultations, supported by the NHS Near Me platform for secure video visits (85). While these and other digital tools may improve flexibility, they do not resolve underlying capacity constraints or certain persistent inequities. Patients in deprived areas continue to face longer wait times for basic services and bear poorer health outcomes, despite expanded digital access and having higher levels of need and clinical complexity (86,87).

## Implementation Considerations

Achieving and sustaining high attachment rates requires adequate workforce capacity, effective mechanisms for transitioning patients, attention to inequities in access, and careful policy design. International experience from these four countries highlights both successful, promising strategies and ongoing implementation challenges that offer valuable lessons for policy development.

### Recruiting and retaining GPs

Adequate workforce supply is a foundational prerequisite for high attachment rates, as even well-designed systems struggle when clinician capacity is insufficient.

Denmark demonstrates how compensation and professional status can support recruitment. The annual income of a GP exceeds that of senior hospital consultants, which Pedersen et al. (47) suggests is intended to attract and retain GPs, providing financial recognition of their central role as the first point of contact in the health system. Expert reviewers emphasize that this income structure enables GPs to practice full-time within their specialty without the need to pursue sub-specializations to supplement their income.

The Netherlands demonstrates how sustained investment in training helps maintain GP supply. Moreover, the Dutch system supports retention through standardized national contracts with clear compensation structures set through independent cost-pricing investigations, creating predictable income expectations and reducing administrative burden (24,32). However, rising workload and administrative demands continue to challenge retention, even in well-resourced systems (74,75).

England's experience illustrates how workforce pressures can undermine attachment despite policy efforts. The government pursued targeted financial incentives for GP trainees in shortage areas but subsequently eliminated key programs, including a Targeted Enhanced Recruitment Scheme (28). Despite promises to add 5,000 GPs by 2021, England's workforce declined by 1,570 FTE GPs (5.5%) since 2015 (28,76). Clinician burnout further undermines retention, with 71% of GPs reporting extreme stress and 42% unlikely to remain in practice within five years (76). To address these workforce challenges, England is expanding GP training places, streamlining processes for foreign-trained graduates, and leveraging the ARRS to fund multidisciplinary team members, including clinical pharmacists, physician associates, and physiotherapists to ease GP workload (22,28).

Similarly, in Scotland, workforce shortages persist due to unsustainable workloads, challenges addressing complex needs in underserved areas, and limited resources (63). Although the introduction of multidisciplinary teams was intended to address workforce gaps and reduce pressures on GPs, their potential has not been fully realized due to implementation challenges and poor evidence-based planning (54).

These contrasting experiences highlight that recruitment requires sustained and predictable funding commitment, while retention depends on manageable workloads, sustainable working conditions, and system designs that protect clinicians from burnout.

## Interim measures for unattached patients

Even systems with near-universal attachment require mechanisms to ensure access for patients who lack established registration, are transitioning between clinicians, or face barriers to formal attachment. An exception is Denmark where the default of automatic registration minimizes periods without any access to primary care (26,45). In the other countries, these interim measures serve as safety nets that maintain care continuity during transitions while supporting broader attachment goals.

The Netherlands integrates interim access within its attachment-focused system through complementary mechanisms. A “visitor” status allows unregistered patients to receive care at any GP practice, functioning similarly to temporary coverage during travel, though practices retain discretionary authority during high-demand periods (33). Health insurers play an active coordinating role, essentially obligated to help patients find GP practices when seeking attachment. This insurer-supported system demonstrated its resilience during 2025’s Co-Med practice network bankruptcy affecting 38,000 patients, with insurers rapidly coordinating placement through online systems and ultimately securing permanent registration for 33,100 affected patients (35,60).

England provides multiple parallel access pathways serving patients outside established attachment relationships. NHS 111 operates as a free telephone and online service providing urgent health advice, while walk-in centres offer immediate access for urgent non-emergency conditions without requiring registration (28,29,88). PCNs provide extended access through evening and weekend appointments, though patients may not see their regular GP (28). However, these alternative routes can create tension with attachment objectives by providing care outside registered practice relationships, potentially weakening continuity (22). The contrast between the Netherlands’ insurer-mediated placement and England’s parallel pathways suggests that integrating interim measures within the attachment system may better support long-term continuity goals.

Scotland provides support for unattached patients through dedicated registration services within NHS Scotland (89). Starting in 2026, a new national telephone system is planned to support patient registration, CHI number allocation, and medical record enquiries (89). NHS Inform, Scotland’s health information platform, also provides an online directory of GP practices, helping patients to identify available nearby services (85).

The international experience suggests that interim measures work best when they function as bridges to attachment, rather than alternatives to it. Systems that maintain connection to the attachment framework during transitions, whether through automatic registration (Denmark) or active coordination

(Netherlands) better support long-term continuity goals than parallel access pathways that operate outside registered relationships.

## Inequities in access to primary care

Despite high overall attachment rates, health systems still face equity challenges in reaching vulnerable populations. England's registration process requires proof of address, creating barriers for unhoused populations, though most cities have established access points to facilitate registration. Both England and Scotland experience significant geographic barriers, with the most deprived areas having the fewest GPs per patient and reporting worse satisfaction with services (76). GPs in Scotland experience persistent barriers to patient engagement, limited support for managing complex needs, and quality improvement clusters that lack the capacity to address health inequities, all of which remain significant challenges (63). These issues, alongside ongoing gaps in workforce planning and difficulties recruiting sufficient staff, continue to hinder progress (63).

The Netherlands addresses equity through community-based programming targeting immigrant and elderly populations, leveraging expanded nursing roles for preventive care interventions (24). However, geographic restrictions on GP registration, while necessary for emergencies and home visit feasibility, can limit patient choice and create access barriers when local practices reach capacity. Denmark also experiences challenges in ensuring equitable access to health services in rural areas, with many rural patients exceeding national waiting time guarantees (90). Strategies to address these gaps include expanding nurses' scopes of practice, establishing branch GP facilities, recruiting foreign health workers, and expanding the use of telehealth to link rural patients with clinicians (45).

These challenges underscore that achieving high attachment rates system-wide requires consistent attention to monitoring and supporting communities facing structural disadvantages to ensure attachment contributes to equitable access across the population.

## Careful policy design

England's Named GP policy (2014) illustrates how attachment reforms can falter when implementation does not align with practice realities. Although the policy mandated that every patient be assigned an accountable GP to improve continuity and accountability (28,29,91), it "exist[ed] largely on paper rather than in practice," with patients frequently seeing multiple GPs despite formal assignment (22). Research found no measurable improvement in continuity and, in some cases, a decline (84). The policy's failure stemmed from several implementation gaps: patients were not obligated to see their named GP, appointment systems were not redesigned to support continuity with their assigned GP, and practices received minimal operational guidance on how to implement the policy into daily workflow (84,91). The policy also lacked patient consultation and did not reflect patients' preferences for which GP they wished to see (13,84).

This experience demonstrates a broader lesson for policy design, in that formal assignment alone does not create continuity. Effective attachment systems require operational, implementation support, alignment between policy intent and actual care delivery patterns, and meaningful engagement with interest-holders (e.g., patients and clinicians) to ensure reforms are feasible and trusted.

# Recommendations for the Canadian Context

As Canadian jurisdictions consider strategies to strengthen patient attachment in primary care, international experience shows that success depends on more than registration design alone. Implementation capacity, governance structures, and system priorities are all enabling factors. While this rapid review does not prescribe whether jurisdictions should implement formal patient attachment systems, as that decision must reflect local context and feasibility, it does identify the key design choices and foundational building blocks that jurisdictions pursuing such reforms will need to address.

## Key Design Policy Choices

Jurisdictions pursuing or strengthening patient attachment systems will need to make deliberate choices across six interrelated dimensions informed by international evidence:

- Is primary care attachment a core organizing principle of the health system or a technical registration process add-on? Does attachment underpin gatekeeping, care coordination, financing, and access rules, or is it layered onto existing systems?
- How strong and enforceable is the primary care clinicians' gatekeeping and accountability role? Does it rely on hard levers such as financial or administrative consequences for bypassing primary care or softer contractual and cultural expectations?
- Does the system automatically attach patients by default or require individuals to initiate registration? How does the system balance choice with equity and administrative considerations when designing registration pathways, and what supports ensure equitable access regardless of model?
- Are patients attached to a named GP and/or is attachment practice-based? How does this decision shape continuity, accountability, and workforce sustainability?
- Are geographic boundaries used to ensure service alignment, patient choice, or system planning? Strict catchments promote geographic equity but do not solve capacity shortages. Flexible boundaries may improve choice but could also carry a risk of list closures and refusals and exacerbating inequities. How do boundaries interact with capacity planning and distribution?
- Who is responsible for managing attachment and transitions? Is it actively managed by the system or left to patients and practices?

These design choices are deeply interdependent and should be made through meaningful engagement with patients, clinicians, and communities, with explicit consideration of trade-offs between continuity, choice, access, and administrative efficiency. Importantly, primary care improvement takes time. The effectiveness of patient attachment strategies depends on sustained investment, operational support, and deliberate system-level mechanisms that allow reforms to mature and deliver long-term impact.

## Foundational Recommendations

Regardless of which design path jurisdictions pursue, three foundational building blocks are essential for strengthening and sustaining equitable patient attachment in Canada:

### 1. Strengthen primary care workforce planning and distribution guided by a coordinated pan-Canadian workforce strategy

International experience showed that these high-attachment systems require sufficient workforce supply, regardless of how well registration is designed. Canadian health systems could benefit from a coordinated pan-Canadian primary care workforce strategy to provide a shared roadmap for workforce planning, education, recruitment, and distribution, which would help to address both overall supply constraints and persistent geographic disparities in primary care access. Such a strategy should be grounded and informed by robust, pan-Canadian workforce data and forecasting to identify current capacities and gaps, anticipate future needs, and align training and funding accordingly. This requires a comprehensive primary care registry that provides up-to-date information on GPs and nurse practitioners across PTs, including whether they are accepting new patients, available after-hours options, and how to access programs and services tailored to a community (e.g., telehealth and virtual care programs for rural and remote communities).

A pan-Canadian strategy should also articulate a clear and contextually relevant vision for strengthening primary care that reflects Canada's diverse context. This includes workforce diversification, expanding and optimizing scopes of practice, advancing interprofessional primary care teams, and integrating or expanding the appropriate use of virtual care or other innovations to improve access and equity that meets the unique needs of communities across Canada. International evidence points to the importance of sustained financial incentives, standardized role definitions, and digital infrastructure integration to maximize the impact of efforts underway in Canada, such as rural rotations and return-of-service agreements. Workforce planning can also consider supportive roles at the community level or by having a strategy and identifying capacities and gaps to identify where additional supportive roles would be needed or most beneficial (i.e., in rural and remote areas or for patients with complex health and social needs).

### 2. Build a population-based primary care system so that no person is left behind

Interoperable and coordinated primary care data infrastructure is needed in Canada to support effective population-based primary care systems centered on strong patient attachment. This infrastructure includes laying a foundation for interoperable EMRs, expanding virtual care for rural and remote areas, implementing mechanisms for standardized data collection, and ideally enabling up-to-date reporting systems that tracks patient attachment, access, continuity, and outcomes.

These systems would benefit both local and regional planning, while also providing a Canada-wide picture of primary care performance. Federal standards or shared procurement approaches could be explored to accelerate development, reduce system fragmentation, and ensure that digital tools meaningfully support attachment, continuity, and equitable access across Canadian PTs.

### 3. Advance monitoring and reporting of primary care data to empower patients and drive accountability

Insights from the four international jurisdictions reviewed shows that robust and coordinated health information and digital infrastructure for primary care empower both patients and the public, and help strengthen accountability mechanisms for high-quality primary care. When implemented at scale, robust monitoring and reporting can enable timely performance measurement, help identify gaps in attachment, access, quality, and care delivery, and facilitate transparent public reporting at the clinician, organizational, community, and system levels. Strengthening the availability and access to high-quality primary care data underpins accountability by ensuring clear expectations, facilitating benchmarking or indicators for success, supporting the creation of feedback loops for primary care teams, health systems, patients and the public, and embedding continuous quality improvement in the primary care system.

# References


1. Kringos DS, Boerma W, van der Zee J, Groenewegen P. Europe's strong primary care systems are linked to better population health but also to higher health spending. Health Aff Proj Hope. 2013 Apr;32(4):686–94.
2. Barkley S, Marten R, Reynolds T, Kelley E, Dalil S, Swaminathan S, et al. Primary health care: realizing the vision. Bull World Health Organ [Internet]. 2020 Nov 1 [cited 2025 Nov 18];98(11):727-727A. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC7607456/
3. Rajan D, Rouleau K, Wickelmann J, Jakub M, Kringos D, Khalid F. Implementing the primary health care approach: A primer. Geneva: World Health Organization; 2024.
4. Kringos DS, Boerma WG, Hutchinson A, van der Zee J, Groenewegen PP. The breadth of primary care: a systematic literature review of its core dimensions. BMC Health Serv Res [Internet]. 2010 Mar 13 [cited 2025 Nov 18];10(1):65. Available from: https://doi.org/10.1186/1472-6963-10-65
5. National Academies of Sciences, Engineering, and Medicine; Health and Medicine Division; Board on Health Care Services; Committee on Implementing High-Quality Primary Care. Implementing High-Quality Primary Care: Rebuilding the Foundation of Health Care [Internet]. Robinson SK, Meisnere M, Phillips RL, McCauley L, editors. Washington (DC): National Academies Press (US); 2021 [cited 2025 Nov 18]. Available from: http://www.ncbi.nlm.nih.gov/books/NBK571810/
6. Bilazarian A, Hovsepian V, Kueakomoldej S, Poghosyan L. A Systematic Review of Primary Care and Payment Models on Emergency Department Use in Patients Classified as High Need, High Cost. J Emerg Nurs [Internet]. 2021 Sept 1 [cited 2025 Nov 19];47(5):761-777.e3. Available from: https://www.jenonline.org/article/S0099-1767(21)00014-3/abstract
7. Stange KC, Miller WL, Etz RS. The Role of Primary Care in Improving Population Health. Milbank Q [Internet]. 2023 Apr [cited 2025 Nov 19];101(Suppl 1):795–840. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC10126984/
8. van den Berg MJ, van Loenen T, Westert GP. Accessible and continuous primary care may help reduce rates of emergency department use. An international survey in 34 countries. Fam Pract. 2016 Feb;33(1):42–50.
9. Bates SM, Lin J, Allen L, Wright M, Kidd M. The impact of patient enrolment in primary care on continuity and quality of care around the world, 2014–2024, and lessons for Australia: a scoping review. Med J Aust [Internet]. 2025 May 19 [cited 2025 Nov 19];222(9):462–71. Available from: https://doi.org/10.5694/mja2.52648
10. Bodenheimer T, Ghorob A, Willard-Grace R, Grumbach K. The 10 Building Blocks of High-Performing Primary Care. Ann Fam Med [Internet]. 2014 Mar [cited 2025 Nov 18];12(2):166–71. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC3948764/
11. Marchildon GP, Brammli-Greenberg S, Dayan M, De Belvis AG, Gandré C, Isaksson D, et al. Achieving higher performing primary care through patient registration: a review of twelve high-income countries. Health Policy. 2021;125(12):1507–16.

12. Roy A, Breton M, Loslier J. Providing continuity of care to a specific population. Can Fam Physician [Internet]. 2016 May [cited 2025 Nov 18];62(5):e256–62. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC4865354/

13. Godfrey L, St-Amant A, Premji K, Fitzsimon J. Impact of changes in primary care attachment: a scoping review. Fam Med Community Health [Internet]. 2025 Jan 28 [cited 2025 Aug 25];13(1):e003115. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC11781123/

14. Bates SM, Wright M, Brown P, Chomik R, Lin J, Kiran T, et al. Characteristics of patient enrolment policies in primary care: a qualitative analysis of 15 schemes from 12 high-income countries. Lancet Prim Care [Internet]. 2025 Aug 1 [cited 2025 Nov 19];1(2). Available from: https://doi.org/10.1016/j.lanprc.2025.100023

15. Smithman MA, Haggerty J, Gaboury I, Breton M. Improved access to and continuity of primary care after attachment to a family physician: longitudinal cohort study on centralized waiting lists for unattached patients in Quebec, Canada. BMC Prim Care. 2022;23(1):238.

16. Khatri RB, Wolka E, Nigatu F, Zewdie A, Erku D, Endalamaw A, et al. People-centred primary health care: a scoping review. BMC Prim Care [Internet]. 2023 Nov 9 [cited 2025 Nov 19];24(1):236. Available from: https://doi.org/10.1186/s12875-023-02194-3

17. Matenge S, Sturgiss E, Desborough J, Hall Dykgraaf S, Dut G, Kidd M. Ensuring the continuation of routine primary care during the COVID-19 pandemic: a review of the international literature. Fam Pract. 2022 July 19;39(4):747–61.

18. Nabieva K, McCutcheon T, Liddy C. Connecting unattached patients to comprehensive primary care: a rapid review. Prim Health Care Res Dev [Internet]. 2023 Mar 15 [cited 2025 Nov 19];24:e19. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC10050950/

19. Rush KL, Seaton CL, Burton L, Smith MA, Li EPH. The healthcare experiences of rural-living Canadians with and without a primary care provider: a qualitative analysis of open-ended cross-sectional survey responses. Prim Health Care Res Dev [Internet]. 2025 Jan 6 [cited 2025 Nov 19];26:e1. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC11735112/

20. Toal-Sullivan D, Dahrouge S, Tesfaselassie J, Olejnik L. Access to primary health care: perspectives of primary care physicians and community stakeholders. BMC Prim Care [Internet]. 2024 May 6 [cited 2025 Nov 19];25(1):152. Available from: https://doi.org/10.1186/s12875-024-02312-9

21. Health Canada. Working together to improve health care for Canadians. [Internet]. 2023 [cited 2025 Nov 19]. Available from: https://www.canada.ca/en/health-canada/news/2023/02/working-together-to-improve-health-care-for-canadians.html

22. Shahaed H, Glazier RH, Anderson M, Barbazza E, Bos VLLC, Saunes IS, et al. Primary care for all: lessons for Canada from peer countries with high primary care attachment. CMAJ [Internet]. 2023 Dec 4 [cited 2025 Aug 22];195(47):E1628–36. Available from: https://www.cmaj.ca/content/195/47/E1628

23. Emanuel EJ. Which Country Has the World's Best Health Care? Public Affairs; 2020.

24. Kroneman M, de Jong J, Polin K, Webb E. The Netherlands: Health system summary 2024 [Internet]. Coppenhagen: European Observatory on Health Systems and Policies, WHO Regional Office for Europe; 2024 [cited 2025 Aug 18]. Available from: https://iris.who.int/bitstream/handle/10665/381432/9789289014472-eng.pdf?sequence=1

25. HFMA. Chapter 23: The NHS in Scotland. In HFMA introductory guide to NHS finance [Internet]. 2023. Available from: https://www.hfma.org.uk/system/files/chapter-23_hfma-introductory-guide_jan23.pdf

26. Vrangbaek K. The Danish health care system. In: International profiles of health care systems. The Commonwealth Fund; 2020. p. 47–57.

27. British Medical Association. 2021 update to 2018 Scottish GMS contract [Internet]. 2024 [cited 2025 Nov 18]. Available from: https://www.bma.org.uk/pay-and-contracts/contracts/gp-contract/2021-update-to-2018-scottish-gms-contract

28. Thorlby R. Health System Overview: England [Internet]. The Commonwealth Fund; 2020 Dec [cited 2025 Sept 28]. Available from: https://www.commonwealthfund.org/sites/default/files/2020-12/2020_IntlOverview_ENG.pdf

29. Anderson M, Alderwick H, Pitchforth E, McGuire A, Edwards N, Mossialos E. United Kingdom: Health System Review. Health Syst Transit [Internet]. 2022 [cited 2025 Oct 16];24(1):220. Available from: https://eurohealthobservatory.who.int/publications/i/united-kingdom-health-system-review-2022

30. Public Health Scotland. GP clusters [Internet]. 2024 [cited 2025 Oct 15]. Available from: https://publichealthscotland.scot/healthcare-system/primary-care/general-practice/gp-clusters/

31. Bundgaard M, Pedersen LB, Søndergaard J, Kousgaard MB, Wehberg S, Jarbøl DE. Experiences of quality cluster meetings in general practice – Findings from a national survey two years after initiation of quality clusters in Denmark. BMC Prim Care [Internet]. 2025 Mar 3 [cited 2026 Jan 17];26:63. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC11874380/

32. Primary Focus [Internet]. 2025 [cited 2025 Nov 30]. Available from: https://primaryfocus.substack.com/p/catch-up-our-4-part-series-in-the

33. Local Expert(s)/Reviewer(s). Virtual; 2025.

34. Mainz J, Hess MH, Johnsen SP. The Danish unique personal identifier and the Danish Civil Registration System as a tool for research and quality improvement. Int J Qual Health Care. 2019;31(9):717–20.

35. Local Expert(s)/Reviewer(s). 2025.

36. Mossialos E, Djordjevic A, Wharton G. 2020 International Profiles of Health Care Systems: Australia, Canada, China, Denmark, England, France, Germany, India, Israel, Italy, Japan, the Netherlands, New Zealand, Norway, Singapore, Sweden, Switzerland, Taiwan, and the United States [Internet]. 2020 Dec [cited 2025 Sept 28] p. 59–71. Available from: https://www.commonwealthfund.org/sites/default/files/2020-12/International_Profiles_of_Health_Care_Systems_Dec2020.pdf

37. Scottish Government. National health and social care workforce plan [Internet]. 2018 [cited 2025 Oct 7]. Available from: https://www.gov.scot/publications/national-health-social-care-workforce-plan-part-3-improving-workforce/pages/6/

38. Petersen ME. ACHIEVING BETTER HEALTH AND WELL- BEING VIA THE DANISH E-HEALTH PORTAL SUNDHED.DK [Internet]. 2019 [cited 2025 Nov 18]. Available from: https://eurohealthobservatory.who.int/publications/i/danish-e-health-portal

39. Sundhed.dk. Background [Internet]. 2025 [cited 2025 Nov 18]. Available from: https://www.sundhed.dk/borger/service/om-sundheddk/om-organisationen/ehealth-in-denmark/background/

40. Reidy C, Papoutsi C, KC S, Gudgin B, Laverty AA, Greaves F, et al. Qualitative evaluation of the implementation and national roll-out of the NHS App in England. BMC Med [Internet]. 2025 Jan 21 [cited 2025 Nov 19];23(1):20. Available from: https://doi.org/10.1186/s12916-024-03842-w

41. NHS Inform. Registering with a GP practice [Internet]. 2024. Available from: https://www.nhsinform.scot/care-support-and-rights/nhs-services/doctors/registering-with-a-gp-practice/

42. Scottish Government. Health and social care app - MyCare.scot: national rollout - high-level summary [Internet]. 2025 [cited 2025 Oct 15]. Available from: https://www.gov.scot/publications/health-social-care-app-mycare-scot-national-rollout-high-level-summary/

43. England NHS. NHS England » The NHS number [Internet]. [cited 2025 Nov 17]. Available from: https://www.england.nhs.uk/long-read/the-nhs-number/

44. RCGP. Patients in deprived areas face even harder struggle to see a GP in the future, warns College [Internet]. [cited 2025 Nov 17]. Available from: https://www.rcgp.org.uk/news/harder-struggle-to-see-gp

45. Birk HO, Vrangbæk K, Rudkjøbing A, Krasnik A, Eriksen A, Richardson E, et al. Denmark: Health System Review. Health Syst Transit. 2024;26(1):1–186.

46. City of Copenhagen. Change your health insurance group [Internet]. [cited 2025 Aug 31]. Available from: https://international.kk.dk/live/healthcare/health-insurance/change-your-health-insurance-group

47. Pedersen KM, Andersen JS, Søndergaard J. General practice and primary health care in Denmark. J Am Board Fam Med. 2012;25(Suppl 1):S34–8.

48. Public Health Scotland. General practice - demographics data visualisation [Internet]. 2025 [cited 2025 Nov 27]. Available from: https://publichealthscotland.scot/publications/general-practice-demographics-data-visualisation/general-practice-demographics-data-visualisation-up-to-30-june-2025/#

49. Elliott AM, McAteer A, Heaney D, Ritchie LD, Hannaford PC. Examining the role of Scotland's telephone advice service (NHS 24) for managing health in the community: analysis of routinely collected NHS 24 data. BMJ Open [Internet]. 2015 Aug 26 [cited 2025 Nov 19];5(8):e007293. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC4554912/

50. NHS Inform. NHS inform. 2025 [cited 2025 Nov 19]. NHS 24 Online. Available from: https://www.nhsinform.scot/care-support-and-rights/tools-and-apps/nhs-24-online/
51. NHS Scotland. National Services Scotland. 2024 [cited 2025 Nov 19]. Get in touch with our registration teams. Available from: https://www.nss.nhs.scot/medical-services/patient-registration-and-medical-records/get-in-touch-with-our-registration-teams/
52. CIHI. Survey shows how health care experiences of older adults in Canada compare internationally [Internet]. 2025 [cited 2025 Sept 23]. Available from: https://www.cihi.ca/en/survey-shows-how-health-care-experiences-of-older-adults-in-canada-compare-internationally
53. Haastrup P, Møller A, Kristensen JK, Huibers L. Danish primary care: a focus on general practice in the Danish healthcare system. Scand J Prim Health Care. 2025;1–7.
54. Audit Scotland. General practice: Progress since the 2018 General Medical Services contract. 2025.
55. Public Health Scotland. General practice - GP practice list sizes [Internet]. 2023 [cited 2025 Oct 1]. Available from: https://www.publichealthscotland.scot/publications/general-practice-gp-practice-list-sizes/general-practice-gp-practice-list-sizes-2013-to-2023/
56. Cleland J, Johnston PW, Walker L, Needham G. Attracting healthcare professionals to remote and rural medicine: learning from doctors in training in the north of Scotland. Med Teach. 2012;34(7):e476–82.
57. NHS Education for Scotland. The National Centre for Remote and Rural Health and Care Programme [Internet]. 2024 [cited 2025 Oct 15]. Available from: https://www.nes.scot.nhs.uk/our-work/the-national-centre-for-remote-and-rural-health-and-care-programme/#
58. NHS England. Addressing Health Inequalities: Distribution of Medical Specialty Training Programme [Internet]. 2021 [cited 2025 Nov 17]. Available from: https://www.hee.nhs.uk/our-work/doctors-training/addressing-health-inequalities-distribution-medical-specialty-training-programme
59. NHS England. NHS England » Widening Access to Specialty Training (WAST) international recruitment scheme 2019-2020 expansion pilot [Internet]. 2019 [cited 2025 Nov 17]. Available from: https://www.england.nhs.uk/looking-after-our-people/the-programme-and-resources/we-are-always-learning/widening-access-to-specialty-training-wast-international-recruitment-scheme-2019-2020-expansion-pilot/
60. Netherlands Court of Audit. Focus on shortage of general practitioners (EN) [Internet]. 2025 Apr [cited 2025 Aug 25] p. 45. Available from: https://english.rekenkamer.nl/publications/reports/2025/04/02/focus-on-shortage-of-general-practitioners
61. Dewar M. Making practices more sustainable in Scotland. Pract Manag. 2020;30(7):26–7.
62. Smith GI, Mercer SW, Gillies JC, McDevitt A. Improving together: a new quality framework for GP clusters in Scotland. Br J Gen Pract. 2017;67(660):294.

63. Aitken L, Donaghy E, Mercer SW. Has the new GP contract in Scotland reduced health inequalities? Qualitative evaluation of the views of general practitioners working in deprived areas. Int J Equity Health. 2025;24(1):233.

64. Bostock N. GP Online. 2024 [cited 2025 Nov 19]. Partners in minority for first time in history of general practice. Available from: https://www.gponline.com/article/1878848

65. NHS England Digital. NHS England Digital. 2025 [cited 2025 Nov 28]. Primary Care Workforce recruited through the Additional Roles Reimbursement Scheme (ARRS) [MI]. Available from: https://digital.nhs.uk/data-and-information/publications/statistical/mi-primary-care-workforce-recruited-through-the-additional-roles-reimbursement-scheme-arrs

66. British Medical Association. Memorandum of evidence to the Review Body on Doctors' and Dentists' Remuneration [Internet]. 2023 Jan. Available from: https://www.bma.org.uk/media/7269/bma-memorandum-of-evidence-to-the-review-body-on-doctors-and-dentists-renumeration.pdf

67. Ng L, Lunan CJ, Mercer SW. Has the new Scottish GP contract improved GPs' working lives in deprived areas? A secondary analysis of two cross-sectional national surveys of GPs' views in 2018 and 2023. BJGP Open. 2025;

68. Wammes J, Stadhouders N, Westert G. The Dutch Health Care System. In: 2020 International Profiles of Health Care Systems [Internet]. Commonwealth Fund; 2020 [cited 2025 Aug 18]. Available from: https://www.commonwealthfund.org/international-health-policy-center/countries/netherlands

69. Smits M, Colliers A, Jansen T, Remmen R, Bartholomeeusen S, Verheij R. Examining differences in out-of-hours primary care use in Belgium and the Netherlands: a cross-sectional study. Eur J Public Health [Internet]. 2019 Dec 1 [cited 2025 Aug 22];29(6):1018–24. Available from: https://doi.org/10.1093/eurpub/ckz083

70. Simpson RM, Jacques RM, Nicholl J, Stone T, Turner J. Measuring the impact introducing NHS 111 online had on the NHS 111 telephone service and the wider NHS urgent care system: an observational study. BMJ Open [Internet]. 2022 July [cited 2025 Nov 17];12(7):e058964. Available from: https://bmjopen.bmj.com/lookup/doi/10.1136/bmjopen-2021-058964

71. Scottish Statutory Instruments. The National Health Service (Primary Medical Services Section 17C Agreements) (Scotland) Regulations 2018 [Internet]. Statute Law Database; 2018 [cited 2025 Nov 18]. Available from: https://www.legislation.gov.uk/ssi/2018/67/contents

72. Donaghy E, Sweeney K, Henderson D, Angus C, Cullen M, Hemphill M, et al. Primary care transformation in Scotland: qualitative evaluation of the views of patients. Br J Gen Pract. 2024;

73. OECD. Primary care in Denmark [Internet]. Paris: OECD Publishing; 2017. (OECD Reviews of Health Systems). Available from: http://dx.doi.org/10.1787/9789264269453-en

74. de Vries H, Vahl J, Muris J, Evers S, van der Horst H, Cheung KL. Effects of the reform of the Dutch healthcare into managed competition: Results of a Delphi study among experts. Health Policy [Internet]. 2021 Jan 1 [cited 2025 Sept 1];125(1):27–33. Available from: https://www.sciencedirect.com/science/article/pii/S0168851020302657

75. Schäfer W, van den Berg M, Groenewegen P. De werkbelasting van huisartsen in internationaal perspectief. Huisarts En Wet [Internet]. 2016 Mar 1 [cited 2025 Aug 25];59(3):94–101. Available from: https://doi.org/10.1007/s12445-016-0065-5

76. British Medical Association. The Value of a GP [Internet]. 2025 [cited 2025 Sept 15]. Available from: https://cdn.intelligencebank.com/eu/share/qMbw14/eRaXW/09oZM/original/The+Value+of+a+GP

77. Prior A, Rasmussen LA, Virgilsen LF, Vedsted P, Vestergaard M. Continuity of care in general practice and patient outcomes in Denmark: a population-based cohort study. Lancet Prim Care. 2025;

78. Council of Europe. Guide to health literacy: Contributing to trust building and equitable access to healthcare [Internet]. Strasbourg: Council of Europe; 2023. Report No.: INF(2022)17. Available from: https://rm.coe.int/inf-2022-17-guide-health-literacy/1680a9cb75

79. Optimity Advisors. Health System Performance Assessment – Integrated Care Assessment (Health system fiche: Denmark) [Internet]. European Commission; 2018. Available from: https://health.ec.europa.eu/document/download/49bc7123-1873-4fc5-a6d6-f1e3b7c17545_en?filename=2018_integratedcareassessment_denmark_en.pdf

80. Jensen TB, Thorseng AA. Building national healthcare infrastructure: the case of the Danish e-health portal. Inf Infrastruct Eur Health Care Work Install Base. 2017;209–24.

81. Pope C, Turnbull J, Jones J, Prichard J, Rowsell A, Halford S. Has the NHS 111 urgent care telephone service been a success? Case study and secondary data analysis in England. BMJ Open [Internet]. 2017 May [cited 2025 Nov 17];7(5):e014815. Available from: https://bmjopen.bmj.com/lookup/doi/10.1136/bmjopen-2016-014815

82. Sweeney C. Primary care out of hours services. 2007

83. Donaghy E, Huang H, Henderson D, Wang HH, Guthrie B, Thompson A, et al. Primary care transformation in Scotland: qualitative evaluation of the views of national senior stakeholders and cluster quality leads. Br J Gen Pract. 2022;

84. Tammes P, Morris RW, Murphy M, Salisbury C. Is continuity of primary care declining in England? Practice-level longitudinal study from 2012 to 2017. Br J Gen Pract [Internet]. 2021 June [cited 2025 Oct 4];71(707):e432–40. Available from: https://bjgp.org/lookup/doi/10.3399/BJGP.2020.0935

85. NHS Inform. General practice services [Internet]. NHS inform. 2023 [cited 2025 Oct 15]. Available from: https://www.nhsinform.scot/care-support-and-rights/nhs-services/doctors/general-practice-services/

86. Mercer SW, Blane D, Donaghy E, Henderson D, Lunan C, Sweeney K. Health inequalities, multimorbidity and primary care in Scotland. Future Healthc J. 2023;10(3):219–25.

87. Mercer SW, Watt GC. The inverse care law: clinical primary care encounters in deprived and affluent areas of Scotland. Ann Fam Med. 2007;5(6):503–10.

88. nhs.uk [Internet]. 2020 [cited 2025 Nov 29]. When to use NHS 111 online or call 111. Available from: https://nhsuk-cms-fde-prod-uks-dybwftgwcqgsdmfh.a03.azurefd.net/nhs-services/urgent-and-emergency-care-services/when-to-use-111/

89. NHS Scotland. National Services Scotland. 2025 [cited 2025 Dec 31]. Get in touch with our registration teams. Available from: https://www.nss.nhs.scot/medical-services/patient-registration-and-medical-records/get-in-touch-with-our-registration-teams/

90. Sundhedsstrukturkommissionen. Sundhedsstrukturkommissionens baggrundsrapport. Indenr Og Sundhedsministeriet. 2024

91. Finance and NHS. Equality Analysis for the GP contract changes 2014/15 [Internet]. 2014. Available from: https://assets.publishing.service.gov.uk/media/5a7ee98840f0b62305b83f67/Equality_analysis_GP_contract.pdf

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