HEALTH SYSTEMS AND POLICY ANALYSIS

POLICY BRIEF

Implementing innovative care models in European countries

What are the implications for health and care workforce planning and training?

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DRAFT

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TO BE COMPLETED UPON STAKEHOLDER AGREEMENT

Methods

For this policy brief we selected seven innovative care models that are being implemented in various European countries from our previous and ongoing scientific work on integrated care. To describe these models and their implications for the health and care workforce, we used key publications we were already familiar with and additional publications retrieved through 'snowballing' of references and citations. Where available, we relied on scoping and systematic literature reviews as well as on key publications of renowned international organisations including the World Health Organization (WHO), the Organisation for Economic Cooperation and Development (OECD) and publications from previous and current actions (co-)funded by the European Commission. We did not apply a structured, systematic literature search. For the sections on health and care workforce planning and training, additional sources were used from country informants participating in the Joint Action 'HEROES' (HEalth woRkforce to meet health challEngeS).

Key messages

TO BE COMPLETED UPON STAKEHOLDER AGREEMENT

Executive summary

TO BE COMPLETED UPON STAKEHOLDER AGREEMENT

Foreword

The health and care needs of European populations are changing as a result of ageing and immigration. Particularly population ageing impacts the demand for chronic (curative) care and long-term care, as not only single chronic conditions but also multimorbidity are nowadays common among the majority of older citizens. As many older citizens live independently in the community for as long as possible, in particular primary care and community services are seeing many more people with complex care needs than some decades ago. High expenditures on health and long-term care as well as the shrinking health and care workforce necessitate countries to reconsider how health and long-term care is provided. Innovative care models are being implemented in response to these challenges.

The implementation of these new care models requires countries to make changes in their health and care workforce. The health and care workforce implications of innovative care models are the subject of this policy brief. The question addressed in this policy brief is:

What innovative care models are being developed and implemented in European countries to provide high-quality care to growing populations with an increased complexity of care needs, and what are the implications of these developments for countries' health and care workforce planning and training?

In this policy brief, we use WHO terminology to refer to the health and care workforce, which encompasses all persons primarily engaged in actions with the primary intent of enhancing health (health workers) and all persons who provide direct personal care services in a client's home, in healthcare organisations and in residential settings (care workers) (WHO, 2021). WHO definitions and other terminology in this brief align closely with the International Standard Classification of Occupations (ISCO-08), which is a system for classifying health workers into five broad groups: health professionals (including doctors, nurses, dentists, pharmacists, paramedics and allied health professionals, among others), health associate professionals, personal care workers in health services, health management and support personnel, and other health service providers not elsewhere classified (ILO, n.d.).

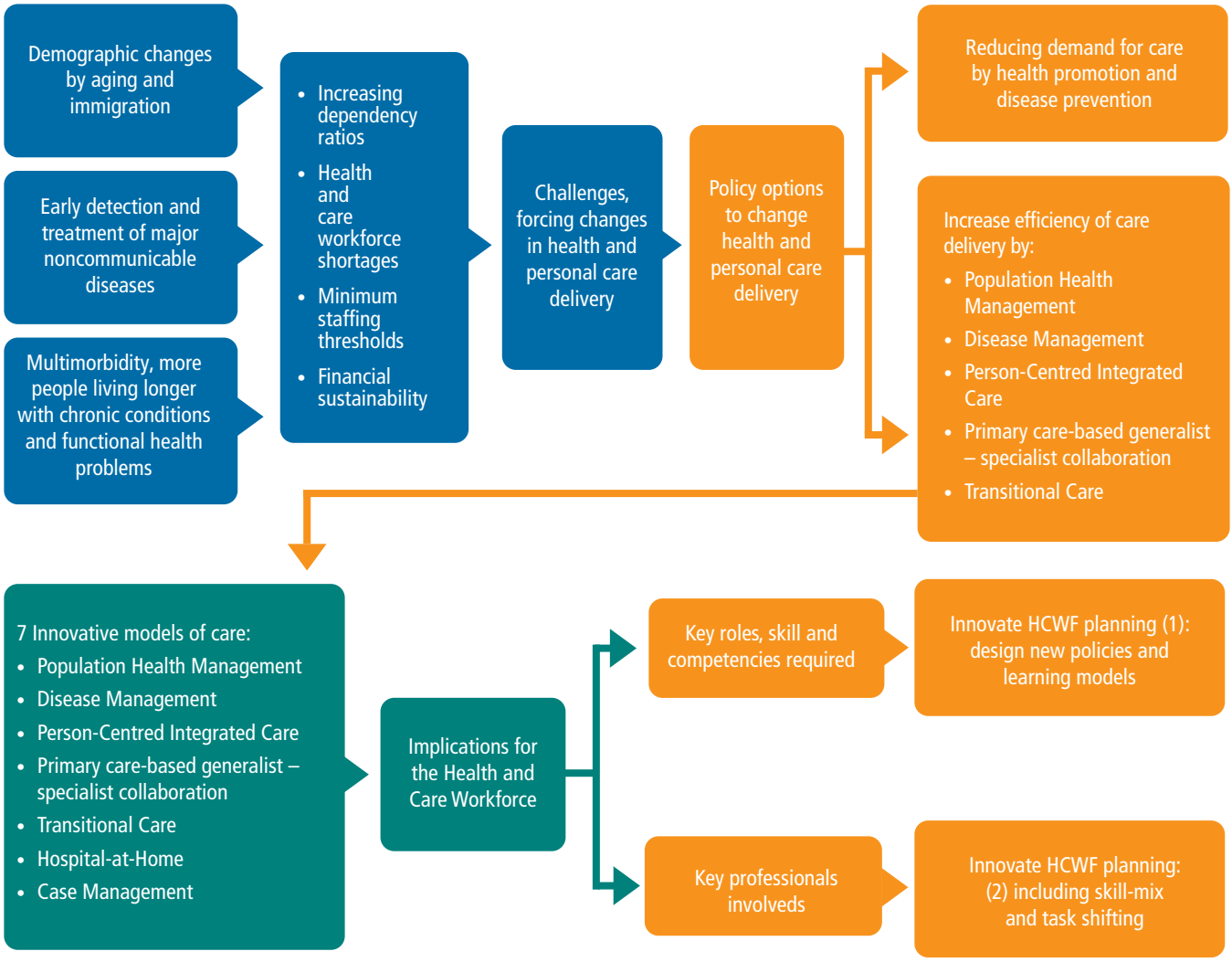
The policy brief is part of the Joint Action HEROES.

Outline and framework of the policy brief

Figure 1 outlines the general framework underlying this policy brief. We start with describing the reasons why the organisation of health and long-term care needs to change (Figure 1, blue boxes). Several policy options have been suggested for this purpose, which could be distinguished in two main directions: 1. reducing the demand for health and personal care (e.g., through prevention), and 2. improving the efficiency of care delivery (e.g., through integration or digitalisation of services) (Figure 1, orange boxes). These options have been translated by care providers, health authorities and stakeholders into innovative care models (Figure 1, green box). Implementing these new models on a large scale will have implications for the health and care workforce (HCWF) that countries need (Figure 1, red boxes). To bring the HCWF implications into practice, policies and strategies for planning and training of the HCWF will need to be designed (Figure 1, blue boxes).

In the next sections we follow the framework, starting with describing the current challenges for countries' health and care systems and services (Section 1), followed by the policy options to intervene on the demand or supply of health and personal care (Section 2). In Section 3 we describe the innovative care models that have been developed based on these policy options. The implications for the HCWF needed to enable large-scale implementation of these models are described in Section 4. Section 5 addresses what this requires from countries' HCWF planning and training, with Section 6 providing some first directions for HCWF planning. The policy brief ends with the main conclusions (Section 6).

Figure 1. General framework of the policy brief



POLICY BRIEF

1. Why health and personal care delivery needs to change

Health and care systems in European countries are under pressure, because of an accelerating growth of the demand for health and personal care, while facing already now substantial challenges to attract and keep enough health and care workers that are sufficiently qualified to meet the current demand for health and personal care. Although population growth is relatively small in Europe [Eurostat, 2025a], the changing composition of European populations due to ageing and immigration highly impacts the demand for health care [The Lancet Healthy Longevity, 2021].

Besides demographic changes, progress made in the early detection and treatment of major noncommunicable diseases (NCDs), such as cancers and cardiovascular diseases, increase the demand for (complex) medical treatment as well as the demand for long-term health and personal care because of more people living longer with chronic conditions and functional health problems. The high prevalence of multimorbidity due to ageing and higher incidence and survival rates of chronic conditions also increase the complexity of (older) people's care needs.[Colombo et al., 2016] And as many very old people nowadays live in their own home for as long as possible, primary and other ambulatory care professionals, including community nursing and home care, see many more patients with complex care needs.[e.g., Turner & Cuttler, 2011]

The rapidly increasing demand for (complex) care goes along with an increasing dependency ratio due to population ageing. For example, the old-age dependency ratio, defined as the number of older people at an age when they are generally economically inactive (i.e. aged 65 and over) compared to the number of people of working age (i.e. 15-64 years old), increased in the European Union (EU) from 25.9% in 2001[Eurostat, 2021] to 33.9% in 2024[Eurostat, 2025b]. The latter ratio means that there are about three persons of working age for every person aged 65 and over in the EU. Future projections estimate a further increase of this EU old-age dependency ratio to 60% by 2100.[Eurostat, 2025b] These developments have very serious implications for countries' financial sustainability as well as for their workforce and productivity. Specifically for the health and care workforce in the EU, shortages have already been reported in the number of doctors (shortages reported by twenty countries in 2022/2023) and nurses (shortages reported by 15 countries in 2022/2023).[OECD, 2024] Moreover, it has been estimated (based on minimum staffing thresholds for universal health coverage) that EU countries together had a total shortage of about 1.2 million doctors, nurses and midwives in 2022. Ageing of primary care doctors exacerbate the shortages, in particular in peripheral areas. These shortages are due to population ageing, but factors specific for the health and care labour market also play a role, such as a declining interest in health careers among young people.[OECD, 2024]

Considering these developments it is clear that reforms in the organisation of care delivery and in the health and care workforce (HCWF) are needed, which have therefore been assigned top priority by policymakers and stakeholders in European countries.

2. How health and personal care delivery can be changed

Policies in response to the described challenges focus either on reducing the demand for care or on increasing the efficiency of care delivery. The first should not go at the cost of accessibility, while the second should not result in loss of quality, and both should ensure equity in access, use and quality of care delivered to target populations.

Policy options to reduce the demand for care

Policy options to reduce the demand for health and personal care may focus on health promotion and disease prevention targeting the general population or high-risk populations or individuals, or on healthy ageing, i.e., maintaining and improving older adults' functioning and wellbeing [Rudnicka et al., 2020]. Although traditionally considered as public health responsibilities, health promotion, disease prevention and healthy ageing call for Health in All Policies, i.e., "an approach to public policies across sectors that systematically takes into account the health implications of decisions, seeks synergies, and avoids harmful health impacts in order to improve population health and health equity".[WHO, 2014] This also means that healthcare professionals should adopt a proactive approach by integrating health promotion and preventive interventions in care delivery; for example, by identifying high-risk individuals for tailored interventions, by programmatic and opportunistic screening, by patient education and counselling, and by structurally collaborating with public health, community and social care workers.

Policy options to improve efficiency of care delivery

Policy options to increase the efficiency of care delivery may focus on delivering the same amount of health and personal care with a lower number of health and care professionals, or delivering more care while keeping the health and care workforce at the same level. To this aim, European countries are promoting digital care, integrated care, patients' self-management of chronic conditions, and collaborations with informal caregivers and volunteers. These policies often also aim to control costs, i.e., reducing the growth of health and care expenditures, and/or improving the quality of care for certain patient populations.

- **Digital care** encompasses a wide range of technologies to support the care delivery process and the tasks of health and care workers as well as the tasks of patients and their family/caregivers in the prevention and management of (chronic) diseases, the maintenance and improvement of functioning, independent living and wellbeing. Many different eHealth technologies exist that enable the delivery of remote care, including telehealth (e.g., self-monitoring of blood glucose values), telemedicine (e.g., video consultations), mHealth (e.g., personalised health check-ups, automatic medication dispensers), telecare (e.g., using environmental sensors in older adults' houses to detect falls), *et cetera*. In addition to eHealth, many other technologies exist that can help (older) adults with function impairments to remain active and live independently, such as Active and Assistant Living (AAL) and robotic technology.[EPTA, 2019] It should be noted that eHealth technologies such as self-monitoring devices and apps may also reduce the demand for care.
- **Integrated care** aims to "improve outcomes for those with (complex) chronic health problems and needs by overcoming issues of fragmentation through linkage or coordination of services of difference providers along the continuum of care" [Nolte & Pitchforth, 2014]. According to the Rainbow Model of Integrated Care[Valentijn et al., 2013], integration can take place at all levels of health and care systems: at the micro-level where health and care workers provide care to individual patients or clients (care coordination and clinical integration), at the meso-level where care professionals develop and implement multidisciplinary guidelines (professional integration) and care organisations merge services or collaborate based on a formal agreement in an integrated care pathway for a defined patient population (organisational integration), and at the macro-level where segregated health and care systems merge their governance, quality regulation and financing to become an integrated health and care system (system integration).[Valentijn et al., 2013] It should be understood that delivering integrated care by health and care workers at the micro-level usually requires organisational adaptations at the meso-level (e.g., multidisciplinary team training and consultations, integrated clinical information system), which may need adaptations at the macro-level (e.g., professional training, financing of integrated care, quality assessment and data sharing legislation). The Rainbow Model therefore distinguishes two additional dimensions: functional integration, which refers to integration of the key support functions and activities (i.e., financial, management and information systems) and normative integration, which refers to the development and maintenance of a common framework of reference (i.e., shared mission, vision, values or culture) between organisations, professional groups and individuals involved.[Valentijn et al., 2013] Fragmentation of health care services is a problem in itself that poses problems for patients in navigating the system and find appropriate care and that makes health care less efficient because of repeated services (such as laboratory services) and requires additional professionals and/or volunteers (such as patient navigators). [Groenewegen et al., 2025]
- **Supporting self-management** has been recognised as a key element of chronic care (e.g., Chronic Care Model[Wagner, 1998; Wagner et al., 2001] and subsequent models). Patients' self-management of their chronic conditions consist of four main tasks: 1. adopting and maintaining a healthy lifestyle; 2. self-monitoring of the chronic condition(s) and self-care (e.g., taking medication); 3. communicating with care professionals, including shared decision-making, navigating the health and care system and coordinating care; and 4. coping with the physical, functioning and psychosocial consequences of living with chronic illness.[van Houtum et al., 2015] Many self-management support

programmes have been developed and implemented in European countries, which often built on the Chronic Disease Self-Management Program (CDSMP), developed by Lorig and colleagues in the USA in the nineties[Lorig et al., 1999; 2001]. These programmes could be in-person or online group-based courses or administered to individuals online. A key element of the original CDSMP was the moderating role of peers. However, to ensure that self-management support is provided in an integrated and continuous way, it is crucial that health and care workers who are directly involved in the care for individual patients support patients' self-management themselves by education and counselling, and encouraging patients to take an active role in their care. Numerous digital support tools are available for patients and care professionals to help with self-management (support), while care organisations may also offer multidisciplinary self-management programmes, in addition to peer support programmes and supportive community activities.

- **Collaborating with family/caregivers, volunteers and community services** has also been promoted to reduce the burden on professional health and care workers. Moreover, informal care is often considered a cost-effective way to prevent institutionalisation.[Zigante, 2018] In general, professional healthcare cannot – and should not – be replaced by informal care, but collaborating with family/caregivers, volunteers and community services can support patients' self-management and improve their wellbeing, and as such reduce the demand for professional healthcare. When it comes to long-term care, particularly family/caregivers already provide a large part of the care that is needed by (older) adults who need help with (instrumental) activities of daily living (ADL/IADL). It has been estimated that about 80% of all long-term care in Europe is provided by informal caregivers[Hoffmann & Rodrigues, 2010], and that 10% to 25% of the total population in Europe is engaged in providing informal care[Zigante, 2018]. The latter also implies that many European citizens who are nowadays urgently needed at the labour market have multiple long-term responsibilities and may experience a high burden of combining informal care and (self-)employment. Therefore, supporting family/caregivers of people with long-term conditions is also an important task of health and care workers.

The policy options described above are typically not stand-alone solutions. Their potential and effectiveness to actually change health and personal care delivery in practice, highly depends on combining and aligning them to the different contexts of the health and care challenges they address. Innovative care models have been, and are being, designed that combine and align these options.

3. Innovative care models

Considering their potential to reduce the burden on health and care workers, often in combination with quality improvement and cost containment, innovative care models have been developed and implemented in many European countries. They usually include several of the elements discussed in Section 2: health promotion and prevention, digital care, integrated care, self-management support, collaborating with family/caregivers, volunteers and community services and supporting informal carers. These new care models are often based in primary care, because of their alignment with the four core functions that primary care fulfils: first contact, comprehensiveness, coordination and continuity[Jimenez et al., 2021]. These core functions of primary care have been associated with better outcomes in all five domains of the Quintuple Aim for healthcare improvement[Nundy, 2022]: better patient experiences, better health outcomes, lower costs, more job satisfaction of care professionals, and more equity [e.g., Bayker & Chandra, 2004; Starfield et al., 2005; Lewin et al., 2008; Stobbe et al., 2021]. Besides the primary care-based models, several models encompass the entire health and care system in a region (for example, population health management) or have been initiated in hospitals (e.g., transitional care) to reduce the use of costly acute care services.

In this section we describe seven innovative care models (Table 1) that have been or are being implemented in European countries or regions at a wider or smaller scale, that incorporate one or more elements to intervene on the demand for care or care delivery as described in the previous section. These models all address the key challenges of current health and care systems as outlined in Section 1. While similar in their general purpose to respond to these challenges, the models differ with respect to the patient target population (referring to the demand-oriented policy direction), which is directly linked to the main sector delivering the care (referring to the supply-oriented policy direction).

Table 1. Overview of selected care models

Care model	Main target population	Main sector of care delivery
Population Health Management	Entire population in a defined region, regardless of age and health condition	Community care
Disease Management	Patients with selected NCDs / chronic diseases	Community and primary care
Person-Centred Integrated Care	(Older) patients with complex care needs	Primary care
Primary care-based generalist – specialist collaboration	(Older) patients with complex care needs who may benefit from medical specialist expertise (consultation model) and patients who would otherwise be followed up in specialist outpatient clinics (substitution model)	Hospital care, long-term care and primary care
Transitional Care	Hospitalised patients who are discharged	Hospital care and primary care
Hospital-at-Home	Patients who need (acute) hospital care but whose condition is stable enough to provide care at home	Hospital care
Case Management	Patients with complex care needs who need care from multiple health (primary, secondary) and social services	Hospital and primary care

Population Health Management

Population Health Management (PHM) has been defined as a "people-centred, data-driven and proactive approach to manage the health and well-being of a defined population, considering the differences within that population and their social determinants of health. Population health management entails data-driven assessment of the health status of a specific population followed by prediction of health outcomes and anticipating the resources needed to proactively address these".[WHO, 2023] PHM consists of five subsequent steps: 1. Defining and identifying the target population; 2. Health assessment and segmentation; 3. Risk stratification and impactibility; 4. Tailored service delivery; and 5. Evaluation and improvement.[WHO, 2023] Box 2 provides an example of PHM implemented in certain regions in Germany.

PHM requires physicians, nurses, allied health professionals and social workers in a defined geographic area or healthcare region to collaborate closely together, and also with public health and community health workers and educators. Depending on the breadth of the PHM model, professionals working in other sectors (e.g. urban planners, transportation workers) may also be involved, in particular when the model builds on Health in All policies.[Frogner et al., 2023]

Box 2. Optimedis integrated care model (Germany)

In Germany the traditional health system has been characterised by institutional fragmentation, with public health services strictly segregated from healthcare, and within healthcare primary and secondary outpatient care being organised and financed largely independent from hospital inpatient care. This strict division provided very few incentives for prevention, quality improvement, efficiency and outcome-oriented care. To overcome these issues, policies were implemented (e.g., Statutory Health Insurance Modernization Act; 2004-2008) to promote integrated care, which resulted in integrated care pathways for specific conditions (e.g., hip/knee surgery), and a few population-based integrated care systems covering all sectors and indications of care for a given population, of which one was the 'Integrierte Versorgung Gesundes Kinzigtal'.[Hilbrandt et al., 2010] Gesundes Kinzigtal has scaled up to the Optimedis integrated care model, which is currently operating in the states of Baden-Württemberg and Hesse.[OECD, 2023] The Optimedis model aims to achieve all Quintuple Aim objectives (improved patient experiences, improved health outcomes, reduced per capita costs, improved work/life balance for healthcare professionals, and equity) by promoting access to prevention and evidence based interventions and coordinating care across all sectors.[OECD, 2023]

The model consists of building a regional integrated network of healthcare providers at all levels of the health system in a region, which are together accountable for the health and healthcare of the region's population. People of all ages living in the region can voluntarily participate in the model (regardless of their condition), which offers them a wide range of preventive (e.g. exercise facilities) and disease management interventions, including health coaching and service navigation support. An important element that contributes to the economic sustainability of the model are the shared savings: through health promotion, disease prevention and supporting people's self-management, substantial health gains are expected, which together with an increased efficiency through coordinated care delivery, are expected to result in substantial savings. These savings are shared between the integrated network and sickness funds.[Hilbrandt et al., 2010; OECD, 2023]

Disease Management

Although not a new care model (the first Disease Management Programmes (DMPs) were already introduced in some European countries at the beginning of the 21st century), Disease Management is still a very relevant model to consider, given its wide implementation in Europe as an approach to proactively manage several major noncommunicable diseases (NCDs), such as cardiovascular diseases (coronary heart disease, heart failure, stroke), chronic respiratory diseases (asthma, COPD), cancer (breast cancer), depression, diabetes type 1 and 2, obesity and many others (e.g., arthritis, chronic back pain, osteoporosis).

Disease Management can be defined as "an individual, proactive, multi-component, patient-centered approach to healthcare delivery that involves all members of a defined population who have a specific disease entity (or a subpopulation with specific risk factors). Care is focused on, and integrated across the entire spectrum of the disease and its complications, the prevention of comorbid conditions, and relevant aspects of the delivery system. Essential components include identification of the population, implementation of clinical practice guidelines or other decision-making tools, implementation of additional patient-, provider- or healthcare system-focused interventions, the use of clinical information systems, and the measurement and management of outcomes"[Norris et al., 2003]. In general, DMPs incorporate multidisciplinary collaborative care based on clinical guidelines with a strong focus on prevention, particularly on early detection and management of complications, and an active role of the patient through self-management. DMPs aim to maximise quality and effectiveness of care, supported by continuous collection and analysis of clinical data. To support care delivery and programme monitoring, DMPs use innovative technology and digital tools (see Box 3). While most DMPs are based in primary care, some are hospital-based; for example, the breast cancer DMP in Germany[Rupprecht, 2005].

A wide range of health and care workers can be involved in DM, with GPs/family physicians and nurses being almost always involved in the multidisciplinary team delivering the disease management programme (DMP). Certain allied healthcare professionals such as physiotherapists and dieticians are also often involved in a DMP, whereas other care professionals including medical specialists working in secondary care or mental healthcare professionals being involved dependent on the health condition/disease the DMP has been designed for.[Rijken & Bennema, 2011]

Box 3. IT supported Chronic Disease Management (Ireland)

Structured chronic disease management in general practice has received a high priority in Ireland's health policy, which has led the Health Service Executive (HSE) to establish a chronic disease management (CDM) programme for general practice in 2020, under the National Framework for the Integrated Prevention and Management of Chronic Disease (2020-2025). This national CDM programme targets patients with diabetes type 2, asthma, COPD and cardiovascular disease (including heart failure, coronary artery disease, stroke, and atrial fibrillation).[Tandan et al., 2020] The main elements of the programme are opportunistic case finding, structured CDM treatment and annual reviews.[HSE, 2025]

IT support plays a significant role in care delivery and data processing for analysis at national level and payment of reimbursement. Initially the GP Practice Management Systems were enhanced with a CDM module to capture patient review data and send them (via Healthlink) to the CDM Clinical Data Repository (CDR), which analyses the data for programme monitoring and service planning, and to Primary Ccare Reimbursement Service for payment. In recent years additional programmes (for opportunistic casefinding and prevention) and new functionalities and enhancements have been integrated, for the purpose of expanding the prevention programme to new patient target populations and streamlining of the entire CDM programme.[HSE, 2025]

The CDM programme has currently been adopted by over 95% of all GPs, providing structured care to 80% of eligible patients across Ireland. Practice nurses play a key role in programme delivery, besides GPs. Based on a survey among a sample of general practices from a network of practices associated with University College Dublin Academic General Practice, it was found that GPs and nurses were almost always involved in the delivery of the CDM programme. Nearly 80% of the practices had two or more GPs and 66% had two or more nurses involved in the CDM programme. Nevertheless, between 27-30% of the practices reported that they had inadequate numbers of staff to implement the CDM programme, and CDM-related training was reported as inadequate in 42% of the practices (35% had inadequate training related to COPD and asthma, 31% to ischemic heart disease, and 28% to diabetes). Smaller practices, non-training practices and those in rural areas were less likely to be adequately staffed with GPs or practice nurses. Among the barriers to implementing the CDM programme were mentioned recruitment (73% agree) and salary costs (72% agree) for practice nurses and inadequate premises (69% agree).[Tandan et al., 2020]

Person-centred integrated care

The previously described Disease Management model has been criticised for the predominantly single-disease focus and the strictly protocolised integrated care pathway, which does not suit the needs of people with multimorbidity. As nowadays most older adults are multimorbid, person-centred integrated care (PC-IC) models are being developed and implemented that aim to organise care around the comprehensive needs of a person with multimorbidity rather than around the primarily medical needs associated with a single chronic condition. PC-IC is characterised by a person-centred focus, care integration and a proactive approach to identify persons with complex care needs who may benefit from person-centred integrated care.[e.g., Mas et al., 2021; Raaijmakers et al., 2023] Probably the main difference with DM is that the care pathway is more individualised rather than protocolised, and that it is a more holistic approach that starts from patient-defined rather than professional-defined care needs. We refer to this care model as PC-IC, but other names are also in use; for example, PIP (Person-centred, Integrated Proactive) care[Berntsen et al., 2019]. PC-IC programmes are usually based in primary care, considering that comprehensiveness, continuity and coordination of care (core functions of primary care) as well as proximity are particularly important in this approach, and that the patient lists of GPs/family medicine physicians (if available) provide the opportunity to proactively identify patients with complex care needs that are expected to benefit most from this approach. Michielsen and colleagues[2023] reported, based on a scoping review of 21 studies conducted in the USA (9), The Netherlands (5), Australia (2) and five other countries (1), the following health and care professionals to be involved in PC-IC: GPs, nurses, nurse practitioners, primary care internal medicine residents, physiotherapists, behavioural health consultants, pharmacists, occupational therapists, social workers, and speech language therapists. It should be noted that in eleven studies the care professionals involved were not specified.

To identify patients with complex care needs researchers have developed screening tools and software that could be used by primary care physicians and nurses to search the Electronic Health Records of listed patients (see also example in Box 4). Identified patients will subsequently be reviewed by the primary care physician and nurse to determine whether they should be contacted for a broad consultation and comprehensive needs assessment in the primary care centre or the patient's home. Apart from collecting information about patients' physical and mental health and functioning, also their life goals, values, priorities and preferences for care are discussed. As these patients are all multimorbid, deciding on whether or not to start or change a treatment or medication or refer the patient to other care specialists, is generally complex and requires careful decision-making together with patients and their family/caregivers. The person-centred communication and decision-making process will result in an personal care plan agreed upon with the patient and, if necessary, family/caregivers. Subsequently, care will be provided in accordance with the care plan by a multidisciplinary care team in close collaboration with the patient and family/caregivers.

Contrary to DM, PC-IC has not been fully implemented yet in European countries. Recent studies in the Netherlands[1] focus on how PC-IC can be implemented in primary care in a cost-effective way, while also not further increasing the workload for the health and care workers involved.[Bogerd et al., 2024; Heins et al., 2020; Rijken et al., 2019; 2020; Smeets et al., 2020a; 2020b] One of the lessons learnt from these studies is that general practices in the Netherlands do not have the capacity to offer PC-IC to all listed patients with multimorbidity, and therefore need to confine the target population to those patients with the highest needs. Furthermore, several elderly care programmes have been developed based on this model (see Box 4 for an example of The Netherlands). These programmes usually target older patients who are frail or have a high risk of developing frailty.

[1]. Note that Netherlands (Kingdom of the) comprises six overseas countries and territories and the European mainland area. As data for this brief refer only to the European territory, the brief refers to it as the Netherlands throughout.

Box 4. U-CARE, proactive integrated primary care for older people (The Netherlands)

Providing optimal care for the increasing number of older people with complex care needs is a major challenge in primary care. The traditional reactive approach in primary care results in unnecessary loss of daily functioning, suboptimal quality of life and high health care expenditures. To overcome this, a proactive personalised primary care strategy for frail older people was developed in the city of Utrecht, The Netherlands. The strategy consists of a screening intervention (U-PRIM), followed by a personalised nurse-led care intervention (U-CARE). U-PRIM is a software application that identifies potentially frail older patients using available routine care data (ICPC codes of symptoms and diseases, ATC-codes of prescribed medication and contact information) registered in the Electronic Medical Records of the general practice patients. Every three months a U-PRIM report is generated and reported to the practice. Based on this report, GPs could invite patients to the U-CARE programme, which is delivered by trained practice nurses. The programme starts with a self-assessment using the Groningen Frailty Index (GFI) and the Intermed Self-Assessment scale to assess bio-psychosocial care needs, which is then followed by a Comprehensive Geriatric Assessment (CGA) conducted by the nurse in case of potential frailty according to the GFI. Based on the outcome of the CGA and the individual needs of the patients, nurses provide evidence-based tailored care, care coordination, and multiple follow-up home visits.

The programme was evaluated in the Utrecht PROactive Frailty Intervention Trial (U-PROFIT), which demonstrated that screening (U-PRIM) or screening plus nurse-led care (U-PRIM followed by U-CARE) both resulted in less decline of daily functioning after 12 months compared to usual care.[Bleijenberg et al., 2016] The probability of cost-effectiveness at €20,000 per QALY threshold was 87% for screening plus GP care versus usual care, and 91% for screening plus nurse-led care compared to usual care.[Bleijenberg et al., 2017] Practice nurses and GPs reported that it was difficult to deliver the programme due to a lack of time and financial compensation, but most of them indicated that the programme had added value for the coordination of care and allowed them to provide structured care. The program has been scaled up in the region of Utrecht, for which it received an implementation grant of the Netherlands Organisation for Health Research and Development. Further development and upscaling, also to other regions, is currently taking place. More information available in Dutch: *Ouderenzorgproject Midden Utrecht (OM U 3.0) – UMC Utrecht; Home – Om U – Samen werken aan betere zorg en ondersteuning in uw wijk*

Primary care-based generalist – specialist collaboration

Under this heading two types of collaboration models can be distinguished, according to their main purpose and patient target population (though the distinction cannot always be completely made): consultation models and substitution models. Consultation models are usually implemented to provide better care within a primary care setting to (older) people with complex care needs, whereas substitution models are mainly implemented to substitute expensive outpatient specialist care by primary care and could target any patients who would otherwise need to be seen in an outpatient specialist clinic.

Consultation model

A consultation model has been defined as 'an intervention in which medical specialists from outpatient hospital care perform joint consultations with GPs in a primary care setting to discuss medical cases and to agree on an approach of case management'.[van Hoof et al., 2019] The model applies in particular to patients with complex care needs, including older people with multiple chronic conditions and functional impairments, cognitive (e.g., dementia) and/or mental health problems (e.g., depression), or frailty. To avoid the use of acute care services and hospitalisation, but also to maintain or improve these patients' functioning, wellbeing and independent living, primary care physicians collaborate with medical specialists who traditionally provide secondary or tertiary care in a hospital or residential care setting. While GPs have always consulted medical specialists in secondary or tertiary care for individual patients when needed (ad-hoc consultations), structural collaborations for community-dwelling patients with complex care needs are now being set up in European countries based on formal agreements. These collaborations can take various forms, but their commonality is that they aim to support GPs in caring for patients with complex care needs who may otherwise need to be managed within secondary or tertiary care.

Box 5 describes the experience with the Clinic for Multimorbidity, which was established in 2012 at Silkeborg Regional Hospital in Denmark as a consultation service for GPs. In this model GPs can refer patients with complex care needs to a hospital outpatient clinic specialised in multimorbidity. The patient is seen by several medical specialists (during a one-day visit at the clinic), who will advise the GP and the patient on a treatment plan that could be followed up by the GP in the primary care setting.

Box 5. Clinic for Multimorbidity (Denmark)

The Clinic for Multimorbidity was developed in 2012 by clinicians, management, and facilitating officers from the Silkeborg Regional Hospital, together with local general practitioners (GPs). GPs can refer patients who have at least two chronic conditions (including mental health disorders) and who have complex care needs. The purpose of the referral is to get a comprehensive assessment of the patient's care needs and a treatment plan, which could then be followed up and monitored by the GP. After acceptance of the referral, a physician from the clinic who is assigned as personal consultant, collects all relevant patient information and acts as a generalist across all care professionals involved from the clinic. Patients visit the clinic for one day, on which they have diagnostic tests, a medication review by a pharmacist, an assessment by a physiotherapist and an occupational therapist, and a consultation with their personal consultant that focuses on their needs and concerns. After this, and on the same day, patients are discussed in a multidisciplinary conference with the participation of the personal consultant, other relevant medical specialists from the Diagnostic Centre, the pharmacist, therapists, and the pathway coordinator, at which a treatment plan is proposed. GPs can participate by videoconference, if they wish. After this conference, the treatment plan is proposed to the patient, which when agreed upon, will be sent to the GP. The GP will subsequently follow up according to the treatment plan, including specialist suggestions for treatment and monitoring.[Bell et al., 2023]

The Clinic for Multimorbidity has struggled with few referral of patients from GPs. This may be explained by GPs experiencing difficulties in determining the suitable time for referral, and consequently referring few patients. Furthermore, GPs felt it difficult to provide the follow-up care according to the treatment plan, and felt the division of roles and responsibilities was unclear.[Nissen et al., 2020] These aspects need to be carefully addressed in generalist – specialist collaboration models.

Another example of a consultation model comes from the Netherlands, where specialist expertise is being implemented in primary care for frail older people by setting up collaborations with elderly care specialists. Elderly care specialists are physicians who follow a 3-year specialist training program to care for frail older persons.[Koopmans et al., 2017] They used to work in nursing homes (residential care), but because of stricter criteria for admission to nursing homes set in 2015 (Long-term Care Act), they are encouraged to also work with frail older people to support them with living in their own home. Elderly care specialist are nowadays increasingly consulted in Dutch primary care, with various consultation/collaboration models. Vrijmouth and colleagues (2022) identified several collaboration models (Box 6), which differ amongst others in the extent to which GPs and elderly care specialists actually collaborate in joint consultations.

Box 6. Characteristics of collaborations of elderly care specialists in Dutch primary care

Collaboration practice:	
1	Self-employed treatment center for elderly care at the same location as the PCP; elderly care physicians (ECP) mainly deployed as co-practitioner
2	Long-term care organisation with expertise centre and team in primary care that closely collaborates with a regional hospital and the local GP association
3	Long-term care organisation participating in a strong regional collaborative care network, including the regional hospital; ECP deployed solo (with some task delegation to a practice nurse with expertise in older adult care who works in close collaboration with the GPs)
4	Independent care institution that delivers ECPs to long-term care organisations to structurally collaborate with a primary care practice in the primary care setting; ECP deployed solo (with some task delegation to a practice nurse with expertise in older adult care who works in close collaboration with the PCP)
5	ECP as freelancer (member of cooperation of freelancers) with structural and close collaboration with a number of general practices; ECP deployed solo (with some task delegation to a practice nurse with expertise in older adult care who works in close collaboration with the PCP)
6	Long-term care organisation as a network partner of a PCP association that strongly promotes collaboration between PCPs and ECPs; ECP deployed solo (with some task delegation to a practice nurse with expertise in older adult care who works in close collaboration with the PCP)
7	Academic long-term care organisation with an existing academic partnership with PCPs as a foundation for collaboration in primary care, with the possibility for short (diagnostic) admission

Source: Vrijmoeth et al., 2022

Substitution model

A substitution model has been described as 'a shift of hospital-based medical specialists to general practice settings without moving the facilities of the hospital to these settings, in order to prevent unnecessary referrals to outpatient hospital care'.[van Hoof et al., 2019] Substitution models are mainly implemented to substitute expensive (specialist outpatient) care by less expensive (primary) care. These models target any kind of patients who would otherwise be followed up by a medical specialist (e.g. cardiologist, dermatologist, ophthalmologist) in an hospital outpatient clinic. Van Hoof and colleagues[2019] identified several evaluation studies of substitution interventions implemented in (multidisciplinary) GP practices, but apart from one they were all conducted in the United Kingdom. Only one study of a substitution model was found from another country, i.e. the Netherlands (where it was referred to as 'Primary Care Plus').

Transitional Care

Many hospitalised patients, in particular those with complex care needs, experience fragmented care after discharge from hospital, which may lead to safety issues and adverse outcomes, including unplanned hospital re-admissions, emergency department (ED) visits and mortality.[Joo et al., 2023] To improve the quality of care after discharge and prevent adverse outcomes, transitional care models have been implemented, which may include structured follow-up, coordination of care, and patient education and self-management support.[Le Berre et al., 2017] Transitional care (TC) has been defined as "a set of actions designed to ensure the coordination and continuity of health care as patients transfer between different locations or different levels of care within the same location"[Coleman et al., 2003]. Although TC is needed to facilitate any care transition, the focus in this policy brief is hospital-to-home transitional care, given its importance for growing populations of community-dwelling (older) people with complex care needs. Three phases can be identified in this TC model, with different intervention elements: 1. pre-discharge phase, which usually includes a comprehensive needs assessment and the development of a multidisciplinary treatment plan. In this phase interventions may also focus on involving family/caregivers and patient/family education on self-management, or a medication review; 2. bridging phase, which includes case management and often also information exchange between hospital and primary care providers or referral to primary care providers; and post-discharge phase, which usually includes follow-up care through phone calls or home visits, and in-home or outpatient rehabilitation. In this phase also digital care services (e.g., online communication platform for patient-professional communication, and symptom monitoring) could be provided as well as previously mentioned interventions (e.g. patient/family education to self-management, medication review, adaptation of the treatment plan).[Collet et al., 2025]

Based on a systematic review of 49 (cluster) RCTs, Collet and colleagues[2025] distinguish three types of hospital-to-home TC models: 1. interventions that set up a transitional care plan in-hospital and refer patients to relevant community health and care professionals; 2. interventions that are similar to the first type, but comprise a case manager who coordinates the interactions between the hospital, patients and their family/caregivers, and community care settings; and 3. more complex interventions that comprise comprehensive recovery care delivered by a multidisciplinary team from the hospital that takes care of the entire post-discharge rehabilitation process through outpatient rehabilitation, home visits, and phone calls. TC interventions are often coordinated by hospital nurse practitioners or by a hospital multidisciplinary team comprising medical, nursing, and allied healthcare professionals.

In the second type, the case manager was in 60% of the studies a hospital nurse practitioner. Other health and care workers taking this role (all mentioned once) were a hospital physician, primary care physician, primary care nurse practitioner, physiotherapist, occupational therapist, respiratory therapist, and a social worker. Furthermore, other staff (not further specified) taking the role of case manager were a trained patient navigator (mentioned twice) or a care coordinator, discharge coordinator, case manager, care team or hospital allied health professional (all mentioned once). Furthermore, a hospital multidisciplinary team was mentioned (once) to fulfil this role. In the third type of TC model, case management was in 57% of the studies provided by a hospital multidisciplinary team and in 29% by a hospital nurse practitioner. Two studies on this model reported a primary care nurse practitioner or a primary care coordinator (not further specified) as the case manager.[Collet et al., 2025]

Hospital-at-Home

Hospital-at-Home (HaH) is a "service that provides home-based nursing and rehabilitation services, which aim is to prevent admission or to facilitate early discharge from care in an acute hospital"[Cy et al., 2017]. In line with this definition, Leong and colleagues[2021] distinguish admission avoidance (AA) models and early supported discharge (ESD) models. In the AA model a patient could be admitted to HaH based on a referral from a GP or family medicine physician without the physical contact with a hospital. ESD models are meant to reduce the length of hospital stay. HaH services have been set up for various purposes. In Europe, HaH has its origin in France, where they were set up from the premise that inpatient hospital care is more costly and not all inpatients require the range of facilities and services that an acute hospital provides. It has also been argued that the some patients would prefer to be treated in their own home rather than in a hospital.[Cy et al., 2017] HaH are also claimed to reduce adverse events associated with hospitalisation of older patients (e.g., reduction of iatrogenic complications), to improve safety and effectiveness and to reduce the pressure on hospital capacity (beds).[Leong et al., 2021]

Box 6 provides a short description of the 'Hospitalisation à domicile' (HAD) services in France. In the USA HaH is being implemented by Veteran Affairs hospitals, health systems, home care providers, and managed care programmes as a model to cost-effectively treat older adults who need acute care, also aiming to improve patient safety and quality of care. The John Hopkins Model includes (1) the identification of a patient who needs acute care, but is stable enough to be treated at home by ED staff or primary care physician; (2) assessment of the suitability of the patient's home; (3) assigning responsibility for care to a physician; (4) a meeting of a healthcare professional ('greeter') with the patient at the ED or elsewhere to discuss HaH plan, arrange transportation, and deliver the biometric and communication devices at home; (5) a meeting of a care professional with the patient at home and with a physician (either in person or via video) who explains the treatment protocol; (6) delivery of care according to the treatment plan by health and care professionals, who may also conduct diagnostic tests and provide allied healthcare; (7) electronically monitoring of the patient; (9) daily visits of the physician or, in some models, communications with the patient via telemedicine equipment; (8) hand-over to the primary care physician, once the patient is stabilised and well enough to return to activities of daily living. In one model, the HAD physician maintains oversight of the patient for at least 30 days, and provides updates to the patient's primary care physician during this period.[Commonwealth Fund, 2025]

Among the challenges for HaH, medication management and teamwork challenges are most frequently reported.[Nikmanesh et al., 2024] Regarding medication management, the challenges may relate to changes in medication prescriptions and availability of medication when the patient is transferred from hospital to home. In addition, medication interactions, side effects and safety issues have been reported. Teamwork challenges also relate to transferring care from hospital to the home setting, and seem to focus on continuity of care and intra- and extra-team collaboration. Information gaps between the hospital and the home care team were also reported relatively frequently. Frequently described management-related factors that should be addressed in HaH are the communication, coordination and cooperation of healthcare teams, patients, and family/caregivers; patient, family/caregiver and healthcare team education, management of the multidisciplinary team, and the communication between the hospital and home care team.[Nikmanesh et al., 2024]

Box 7. 'Hospitalisation à domicile' (France)

In France, 'Hospitalisation à domicile' (HAD) has been implemented nationwide as a service that provides care at a patient's home for a mited period of time, with the aim of avoiding or shortening hospitalisation. The use of HAD services has increased from 117,000 patients in 2017 to 168,000 in 2023, with a significant increase in 2020 due to the COVID-19 pandemic.[ATIH - Chiffres clés - HAD] GPs can refer patients to a HaD service, which is reimbursed by health insurance under the same conditions as conventional hospital care.

HaD may include health and personal care, and is delivered by a team of healthcare professionals who closely collaborate with social services, GPs and hospital facilities. Care that can be provided by a HAD service include complex dressings, certain chemotherapies, intravenous or intensive nursing treatments, blood transfusions, respiratory assistance, rehabilitation care, pediatric care, antenatal or postpartum care, and palliative care.

The referral to a HAD is reviewed by a HAD physician, who organises and coordinates the multidisciplinary care, maintains contact with other (hospital and private) physicians involved in the patient's care, and is the first point of contact for the patient and family/caregivers. The HAD service provides the patient and family/caregivers with an alert protocol for emergency situations, which consists of, at a minimum, a nurse hotline available 24/7. All HAD services offer the option of a nurse visiting the patient's home at night. When this is not possible, the nurse can be reached by phone, who will then arrange emergency assistance if necessary. The joint intervention of a HAD facility and a home nursing service (SSIAD) or a multi-purpose home care and assistance service (SPASAD) is possible and will be coordinated by the HAD.[Hospitalisation à domicile]

Case Management

Case management has been defined as "a collaborative approach to ensure, coordinate, and integrate care and services for patients, in which a case manager evaluates, plans, implements, coordinates, and prioritises services on the basis of patients' needs in close collaboration with other health care providers".[National Case Management Network of Canada, 2009] The American Society of Case Management (20240 defines it as "a collaborative process of assessing, planning, implementing, coordinating, monitoring and evaluating the options and services necessary to meet an individual's health needs, articulating the communication and resources available to promote quality and cost-effective outcomes". As with other care models described in this brief, many other definitions exist, but they have in common that case management is targeting patients who need care from multiple services, for example from both primary and secondary health care services as well as social care or community support services. The majority of these patients are elderly who have difficulty managing their health and coordinating the many care services they need. Patients in need of case management may also be younger persons who are vulnerable because of their socio-economic situation, mental health problems or social problems. Family/caregivers may neither be capable of taking the case management role, or simply not be sufficiently available. In those cases, case management should be provided by one or more care professional(s), who could be based in primary care, in a hospital or in a social care organisation. Case management usually includes the development and implementation of a care plan and the involvement of a multidisciplinary care team responsible for care delivery.[Hudon et al., 2019] Some case management models are more intensive than others. Hudon and colleagues[2019] characterised high-intensity case management in primary care as a model including at least three of the following criteria: a caseload of fewer than 60 patients, at least 50% of the time spent face-to-face with the patient, initial assessment in person, and multidisciplinary team meetings or frequent contact with the patient.

The case manager is often a (practice, community, district, hospital) nurse trained in case management, but could also be a social worker or other care professional. Tasks that nurse case managers have in case management are described as case finding, comprehensive needs assessment, care delivery and evaluation of the health outcomes of patients and family, with the scope of action of the nurse case manager being described as very broad; including primary care, specialised care and home care.[Bertuol et al., 2020; Villarreal-Granda et al., 2024] In some countries (e.g., Norway), nurse case managers working in a community setting are exclusively working as case manager, whereas in other countries (e.g., England) nurse case managers are combining their role as case manager with working as practice nurses or district nurses.[Putra et al., 2021] In Spain the role of nurse case managers differ among the regions, with the most established roles of nurse case managers found in Andalucia, Basque country, Catalonia and Valencia. Box 8 provides an example of a two nurse case manager model in the Valencia region.

Box 8. Nurse case management for patients with complex care needs (Valencia region, Spain)

Case management is a key element in the integrated care model for patients with complex care needs, which was initiated as part of the Strategy for Chronic Care in the Valencia region (2014). A 'complex case' has been defined as a patient in need for an intensive level of attention in terms of chronic or palliative care, i.e. among those fitting into the apex of the Kaiser Permanente Pyramid (around 3% of the overall population in the Valencia Region). These patients are usually characterised by an age of 75 and over, multimorbidity, polypharmacy, frequent emergency department visits, frequent hospitalisation for an acute episode, functional dependency, fragile family support, social and economic needs and changes in health status, circumstances of carers or living situation. They may need both vital technologies (e.g., oxygen therapy) or assisted technology (e.g., anti-decubitus mattresses), and treatments that require to be accomplished by care professionals (e.g., placement and use of a catheter). The main purpose of the integrated care model is to improve the quality of care for these patients, enable them to stay in their own home and maintain the best possible quality of life by preventing or delaying clinical, functional and social deterioration and, when appropriate, guaranteeing dying with dignity.

As these patients need both primary/community care services as well as hospital specialist services, these patients are enrolled in case management delivered by two nurse case managers, a community nurse case manager and a hospital nurse case manager (also referred to as hospital liaison nurse). It should be noted that there are various hospital services in Spain; depending on the nature and complexity of patients' health condition, they could be managed in a hospital for acute care and short-term treatments, a Hospital-at-home service, a chronic care hospital for post-acute, rehabilitation and mental health services, or in a palliative care service. In periods of stability, patients with complex care needs can be managed by home and community care services, with health centres acting as 'hubs' of both primary and, to a certain extent, specialised care. Given the multiple care providers and the many transitions a patient may experience, the community nurse case manager and the hospital nurse case managers are jointly responsible for monitoring the patient and interacting with all care providers. They communicate on a continuous basis to ensure high-quality care and continuity and coordination in case of transitions from hospital services to home, and vice versa.[Barbabella et al., 2016; Gallud et al., 2012]

4. Implications for the health and care workforce

In the previous chapter, the seven innovative models of care were described from a health systems and organizational perspective. Here, we specifically address the question what these models mean for the health and care workforce (HCWF). What are the skills, competencies, and roles of health and care professions that are critical in these models? And what are the key professions that are involved, and need to collaborate, in the innovative care models? Below we answer these questions for each model, and then we synthesise the results in an comparative overview.

Population Health Management

Frogner et al [2023] take a general view at the skills and competencies needed for population health management, including the skills to analyse the social and structural determinants of health and to act upon this. They mention the importance of collaboration over different sectors. This requires the competencies to realise Health in All Policies. Population health management requires collaboration between and coordination of different organisations and professionals. In particular they mention public health workers (nurses, physicians) to assure a focus on prevention and skills in data analytics. These belong to the essential public health tasks, implicating the importance of collaboration between public health and health care. [WHO, 2015]

Disease Management

A survey that identified DMPs in ten European countries showed that general practitioners (GPs) or family medicine physicians were involved in all reported DMPs. The involvement of medical specialists depended on the chronic condition(s) the DMP had been designed for; for example cardiologists were involved in DMPs for cardiovascular disease and pulmonologists in DMPs for COPD. Nurse practitioners, specialised nurses or practice nurses were members of the multidisciplinary teams of all reported DMPs. Furthermore, dieticians and physiotherapists were most often mentioned as allied healthcare workers participating in these DMPs, though other allied healthcare workers were also involved, depending on the chronic condition the DMP focused on (e.g. podiatrists in diabetes DMPs). Psychosocial workers such as psychologists, psychotherapists and social workers were only occasionally formally involved, with the exception of DMPs for depression or mental illness, where psychiatrists, psychotherapists and practice nurses working in mental healthcare were usually involved, besides GPs. Furthermore, occupational therapists were involved in some DMPs that included rehabilitation care. Pharmacists were hardly formally involved in DMPs, but this may have changed, given that this information was collected in 2010.[Rijken & Bennema, 2011] In the meantime, medication reviews – that involve pharmacists – have become more important (Jocanovic et al., 2027); consequently, community pharmacist may now be more involved. In terms of competencies, coordination is important in view of the different professions and parts of health care involved. As most of the conditions covered by DM programmes focus on lifestyle-related, chronic conditions, also person-centredness and motivational competencies are required.

Person-Centred Integrated Care

Michielsen and colleagues[2023] identified (based on a scoping review of 21 studies conducted in the USA (9), The Netherlands (5), Australia (2) and five other countries (1) and four clinical guidelines) a range of health and care professions that are involved: GPs, nurses and nurse practitioners; different therapists (physiotherapists, occupational therapists and speech therapists) behavioural health consultants, pharmacists and social workers. They also identified four core competencies that are needed for health and care professionals to deliver PC-IC. First, person-centred communication, which was described in all guidelines and 18 studies as an important competency within PC-IC. Open communication with patients based on equality, relational communication, good listening skills, responding to nonverbal signals and patients' emotions and needs, taking the level of understanding of the patient into consideration and person-centred assessment were mentioned as important features of person-centred communication. Moreover, it was emphasised that care professionals involved in PC-IC need to be able to apply motivational interviewing, as this improves the quality of the professional-patient interaction as well as shared decision-making. The second core competency, described in all guidelines and 12 studies, is collaborative teamwork. The third core competency, described in two guidelines and eight studies, is interprofessional communication. Finally, the fourth core competency, described in two guidelines and four studies, is leadership.

Primary care-based generalist – specialist collaboration

The nature of this type of collaborations is twofold, either to support GPs in providing care to patients with complex care needs by consultation of a medical specialist, or to substitute more expensive outpatient specialist care by primary care. The care providers involved are general practitioners and medical specialists, their specialty depending on the needs of patients (van Hoof et al., 2019). Apart from human resources, this may require physical resources, such specific diagnostic equipment. Collaboration and communication between GPs and the medical specialists involved are key competences. A specific development in primary care-based generalist – specialist collaboration is the collaboration between GPs and elderly care medicine specialists. Apart from the competences needed in the collaboration between GPs and clinical specialties, this collaboration requires competencies to collaborate in broader multidisciplinary teams and clarity about roles and responsibilities (Vrijmoeth et al., 2022).

Transitional Care

The workforce requirements of transitional care are diverse, depending on the type of project and the local and national healthcare setting. In general transitional care requires coordination, often by a case manager, and multidisciplinary cooperation over the boundaries of hospital care and primary care. Nurses in various specialties and roles (specialised nurses, home care nurses, community nurses, nurse assistants, discharge nurses as part of the hospital

team) and GPs are (nearly) always involved. In addition pharmacists, allied health professionals (physiotherapists, occupational therapists, speech therapist) and geriatricians may be involved (Leithaus et al., 2022).

Hospital-at-Home

As in the two previous models, the type of professionals involved depends on the specific care needs of the patients. The recent Cochrane review by Wallis et al. (2024) mentions a number of more general requirements. Both hospital and primary care specialists are involved in Hospital-at-Home programmes and collaboration between primary care and hospital teams are important. They should have the skills to deliver safe and effective patient care at home, person-centred and shared decision making. Hospital-at-Home requires expanded roles of nurses in particular to provide care outside their normal place and scope of practice. The care provision is multidisciplinary.

Case Management

Case Management requires the involvement of several disciplines, including social workers, to develop a care plan, together with patients and their informal carers. Case managers are often nurses. They should have skills with regard to collaboration (including the links to social care) and coordination. The professionals involved in case management and the development of individual care plans require skills in multidisciplinary teamwork and collaboration (Hudon et al., 2029).

Synthesis

The results of the previous analyses of each care model by its key professions, their roles, skills and competencies, are synthesised in Table 2.

Table 2 shows many similar skills, competences and professions across the innovative care models. There are a few professions and skills that are specific to a given care model, while in some models the professions involved depend on the specific chronic condition or care needed. In general, the requirements for the health and care workforce are not so much in the required specific professions (and/or their numbers) as well in different competencies and skills. These can have a slightly different accent depending on the care model, but they are not completely different. This is the first conclusion.

Furthermore, three classes of required competencies can be distinguished in the innovative models of care (c.f. Kuhlmann et al., 2025):

- *Specific competencies and skills*. Some of the innovative care models require specific competencies and skills. Examples are the competencies/skills in the area of data analytics, needed in Population Health Management, and the competencies/skills that nurses need to be able to provide hospital treatment at home, including integrative care planning and shared decisions making.
- *Generic (or transversal) competencies*, relating to communication, coordination, collaboration, organisation and management of services, teamwork. These are the most important competencies needed for professionals to function in all of the innovative care models as most of them are multidisciplinary and patient-centered.
- *Leadership competencies*, needed to implement and sustain innovative care models, and ensure coordination of care between profession, healthcare organizations and informal carers.

Our overview shows that the innovative care models all emphasise the competencies and skills of professionals to provide person-centred and/or integrated care. These competencies and skills include person-centred communication and shared decision-making, interprofessional collaboration and sensitivity to socio-cultural differences (Maeda et al., 2021). Busetto et al. (2017), in a review article on workforce changes in projects implementing integrated care for people with chronic conditions, stress the involvement of nurses in chronic care, sometimes in more autonomous roles (such as in nurse-led care), the importance of multidisciplinary work and working in teams.

Finally, from our overview of the seven innovative modes of care it stands out that the nursing profession (together with GPs or primary care) is most frequently mentioned. This implies a key role for the nursing profession and its broadening scope of practice, responsibility and role in health care provision and innovation (Wit et al., 2024). This fits with a general trend in the role of nurses that is sometimes summarized as a change 'from supporting doctors to supporting patients'. Nurses play a key role in the (re)distribution of responsibilities. Responsibilities need to be clair to other professionals and to patients/the public. In the Case Management model for instance, nurses are explicitly assigned to new roles as in nurse-led care.

Missing from the literature on innovative care models and their implementation is the importance of supportive personnel. In some countries, primary care is still in single-handed practices with no secretarial support. It is unthinkable that innovative care models, with their emphasis on, e.g., coordination of care, is possible without good support.

Table 2. Key roles, skills and competencies required and key professionals involved in care delivery

Care model	Key roles, skill and competencies required	Key professionals involved
Population Health Management	• Collaboration over different sectors • Coordination of different organisations and professionals • Focus on prevention and skills in data analytics • Collaboration between public health and health care	• public health workers • nurses • physicians
Disease Management	• Coordination of different organisations and professionals • Motivational competencies	• general practitioners (GPs) • medical specialists depended on the chronic condition(s) • Nurse practitioners, specialised nurses or practice nurses • Allied healthcare workers depending on the chronic condition (physiotherapists, dietitians) • Psychosocial workers in the case of depression or mental illness
Person-Centred Integrated Care	• Person-centred communication • Collaborative teamwork • Interprofessional communication • Leadership	• GPs • nurses, nurse practitioners • physiotherapists, occupational therapists, speech therapists • behavioural health consultants • pharmacists • social workers
Primary care-based generalist – specialist collaboration	• Provide care at the right time and place • Collaboration and communication between GPs and the medical specialists • Collaborate in broader multidisciplinary teams • Clarity about roles and responsibilities	• Type of professionals involved depends on the specific care needs of the patients • general practitioners • medical specialists • elderly care medicine specialists
Transitional Care	• Coordination • Multidisciplinary cooperation	• Case manager • Type of professionals involved depends on the specific care needs of the patients • Nurses in various specialties and roles • GPs • Pharmacists, allied health professionals • Geriatricians
Hospital-at-Home	• Collaboration between primary care and hospital teams • Skills to deliver safe and effective patient care at home • Providing care outside their normal place and scope of practice • Person-centred care • Shared decision making • Multidisciplinary	• the type of professionals involved depends on the specific care needs of the patients • Hospital and primary care specialists • Nurses
Case Management	• Develop individual care plans together with patients and their informal carers • Skills with regard to collaboration (including the links to social care) and coordination • Skills in multidisciplinary teamwork and collaboration • Patient-centred communication • Shared decision making • Interprofessional collaboration • Sensitivity to socio-cultural differences • Multidisciplinary work and working in teams • nurse-led care	• Social workers • Case managers • Nurses, nurses in chronic care

5. From innovative care delivery to new models for HCWF planning, forecasting and training

The HCWF implications of implementing new care models, as described in Section 3, have a number of implications for HCWF planning, forecasting and training. The main implication is that the 'common' or standard systems and models for HCWF planning and forecasting need to be extended or innovated as well – similar to how the innovative models of care aim to change the provision of health and personal care delivery. While in Europe and globally HCWF planning is (being) adopted and implemented, the mainstream approach is to embed it in the existing context of the health care workforce and system. This context is characterised by shortages and regional disparities in the workforce. Analysing these shortages and disparities is often done by profession and/or sector; to take their specificities into account and to prioritize where planning and labour market regulation is needed most. Likewise, recruitment, retention and wellbeing of health and care workers is a key driver for profession-specific HCWF policy and planning. While it is understandable that HCWF planning and forecasting is primarily profession-oriented, the innovative models of care show that actually the collaboration, integration and coordination *between* professions is a critical to adapt to the new needs of health care systems.

This notion is not new and can be found back in a number of overview studies on HCWF planning.

In their OECD Working Paper, Ono, Lafortune and Schoenstein (2013) reviewed 26 health workforce projection models from 18 OECD countries. One of their results addressed "(…) a gap in high-level, integrated multiprofessional models (…)". According to the authors (at that time) some countries have integrated multiprofessional models, but none have reached the 'highest level of integration' – which fully accounts for demand and supply *across all professions* under alternative scenarios. Likewise our argumentation above, they particularly found this to be a challenge for organizational and technical innovations, i.e. changes in how services (as in innovative care models) are delivered and new technologies impact workforce needs. As a conclusion, Ono et al. recommend a focus on Multiprofessional Models to meet the trend towards more integrated models that consider task-sharing and substitution between different health professions. They also recommend policymakers to improve their HCWF planning by comparing with countries that have similar health systems and labour markets.

This last recommendation matches the main conclusion derived by Batenburg (2015) in his paper on HCWF plannng in Europe. He observed a large variety of data infrastructures, models and governance structure for health workforce planning (HWFP) in Europe. By scoring each country on their level of HWFP on the three dimensions, he concluded that Sweden and Norway were (in 2012) the frontrunners, and higher-scoring countries had countries larger health labour markets, more often a National Healthcare Service (NHS), dealt with cross-border mobility, and had strong primary health care. Most of the HWFP models implemented in countries were demand or supply driven and profession-specific. It was also concluded that large opportunities existed for countries to make progress in HWFP, and this was highly needed to optimize its added value in fighting the fast growing shortages and maldistribution problems. It was advocated to foster mutual and contextual learning, by clustering countries with similar relevant conditions for HWFP (which was actually applied in the Joint Action HEROES project by clustering the 19 participating countries in three clusters).

Last and more recently, the above notions are recalled and followed-up by a systematic review of 40 studies describing/analysing health workforce projection models conducted by Lee et al. (2024). His first conclusion is that the more recent studies tend to embrace "a complex systems approach in health workforce modelling, incorporating demand, supply, and demand–supply gap analyses". Still, he also concludes that most HCWF planning models are primarily needs-based and/or stock-and-flow based. Skill-mix oriented projection models – that fit the cross-professional requirements of innovative care models we described in the previous section – are a minority. Lee's paper also "(…) underscores the significance of dynamic, multi-professional, team-based, refined demand, supply, and budget impact analyses supported by robust health workforce data intelligence", which strongly resonates with the key requirements of the new models of care. Lee concludes that in most HCWF models the differentiated medical workforce is privileged, while social workers, assistants and unregistered workers are poorly represented and planned for. Illustrative for our brief are two statements in the paper:

- *"Effective strategic workforce planning for integrated and co-ordinated health and social care is essential if future services are to be resourced such that skill mix, clinical practice and productivity meet population health and social care needs in timely, safe and accessible ways globally." And*
- *"To advocate for whole-system needs-based approaches that consider the ecology of a co-produced health and social care workforce."*

In line with our previous analysis, Lee also concludes that in most HCWF models nursing and midwifery are characterised as "undifferentiated labour", requiring urgent growth to meet demand.

This implies that innovation in HCWF planning should explicitly go beyond and across professional borders as well, aiming to solve quantitative and qualitative imbalances *within* the existing workforce. This concerns imbalances within the medical workforce between generalist and specialist physicians, between physicians and nurses (Kyriopoulos et al., 2025), but with regard to the capacity and position of allied health professionals and healthcare assistants as well.

6. First directions to innovate HCWS planning

We distinguish two directions to adapt the existing systems of HCWF planning, building upon the two conclusions we derived from analysing the key professions, skills and competences that came forward in the comparative analysis of the innovative care models. The first direction aims at how *policies* can support the conditions for professionals to collaborate, coordinate and integrate their roles, by cross-professional and cross-sectoral learning. This is the more qualitative aspect of HCWF planning to realize innovative models of care. Secondly, we sketch a direction where HCWF *planning and models* support interprofessional collaboration and role adaptation, by focusing on skill-mixes and changing occupational structures. This is the more quantitative aspect of HCWF planning to realize innovative models of care.

Direction 1: Design new policies and learning models

Applying HCWF planning to change the distribution of tasks and roles in the health and care workforce is difficult to implement. Reallocating training budgets and changing privileges and labour market investments will affect the standing position (identity, income etc.) of HCWF professions. Still, the previous chapters showed that the system and organisational changes associated with innovative care models, explicitly *require* a new and clear (re-)distribution of responsibilities. This goes beyond planning as an instrumental or 'top down' policy. Changes in the distribution of capacities and responsibilities are only possible when there is mutual trust, and willingness to change to improve the (collective) delivery of health and care services (Barbazza et al., 2015). Trust is an intangible but critical and multi-facetted condition. It includes trust in the intentions of policy makers and stakeholders that introduce new models of care, but also trust in the skills and competences among the different professions that might lose or receive new responsibilities, and among patients. And trust is dynamic, it can come and go in the confidence of stakeholders that problems during the change processes will be solved.

When exploring how policies can (better) support the trust-sensitive changes in HCWF planning, we recognize that the educational structure provides more options for change than the occupational structure. As shown above, occupational structures deal more with 'inert' developments while the educational structure also initiated innovations (Groenewegen et al., 2012). To this end, the case study box xx illustrates how in Sweden trust between professions and a systems (or: integrative) approach on HCWF planning is aimed for by a 'national learning system'.

Box xx A national learning system to reduce fragmentation and better address the complexity of the health and medical care system in Sweden

Background

In Sweden, the National Board of Health and Welfare initiated in 2025 a new needs-based policy programme on human resources in health and medical care from a national perspective. The programme is based on a national learning system aiming to reduce fragmentation and better address the complexity of the health and medical care system in Sweden. The learning system is developed from an exploratory approach, with interaction across organizational boundaries and based on continuous feedback and interaction. It involves cooperation between the National Board of Health and Welfare and other actors, such as regions and municipalities.

The innovation was driven by the need for a system-wide approach to how human resources in health are planned. Workforce planning was based on historical data rather than on locally anchored needs analyses that are forward-looking. At the same time, the need for care in Sweden is increasing, including an aging population and increased mental illness among children and young people. New medical and technological opportunities also create expectations and increased demands on the healthcare system. Against this background, there was a need for a more efficient use of resources that contributes to sufficient human resources, both in health and medical care and for other publicly funded services and services that contribute to the health of the population. This requires 'a shift in the centre of gravity':

- From control to learning
- From siloed thinking to a systemic approach
- from standardization to responsiveness to the experiences and needs of citizens and patients.

The introduction of a national programme for learning systems and the development towards a more efficient and needs-based use of resources is based on a relational approach. This means that interaction between citizens, employees, patients and decision-makers at different levels is seen as a basic prerequisite for change. It is about interaction and trust between individuals, but also about legal, economic and personal relationships, as well as investments in infrastructure and technology.

Pilots of the national learning system

One of the pilots within the programme is the Leading healthcare's (LHC) project to develop new methods and models for skills supply. The approach of the project is to gather several interest groups for joint conversations on issues that are often dealt with professionally, providing the LHC as an arena that guarantees the system perspective. The project has been based on the think tank as a method and facilitator of social development. In focus groups participants worked on the theme of the future of skills supply together with representatives from the Swedish Association of Occupational Therapists, Midwives, Physiotherapists, Natural Scientists, Psychologists, Health Professionals, Pharmacists, and Dentists. A prerequisite has been that the participants have not committed to agreeing with the other participants or formulating common conclusions, but the purpose of the groups has been to generate new insights and questions and to break different perspectives against each other.

The focus group discussions of this project resulted in the following notions:

- A more efficient use of available resources should be the starting point for workforce planning. While access to training places continues to be an important goal, the solutions proposed cannot be based on an assumption that the number of employees in the wellbeing services area will increase in relation to future needs.

- Workforce planning needs to include a development perspective that takes into account new opportunities for division of labour and developed working methods. Not least, the strategic transition to good and close care needs to be reflected in the dimensioning, allocation and coordination of resources.
- Skills supply needs to be seen in a longitudinal perspective over the entire process from education and clinical placements, onboarding at the workplace, working conditions and work environment that promotes a sustainable and long-term working life.
- Solutions to improve skills planning and supply should be developed with a system perspective in mind, i.e. that the questions need to be asked so that the answers do not automatically end up in positioning between the professional groups, for example in terms of resource allocation or knowledge requirements. Rather, many of the proposals discussed in this group are based on improving the conditions for cooperation between different professional categories in order to jointly meet patient needs in a more effective way.
- Skills supply issues can also include working proactively with the needs side of healthcare. It is inevitable that the need for care will increase in the future, but there are also ways to work towards a decrease, for example through a health-promoting approach, preventive measures and/or redistribution of work efforts towards a higher degree of self-care.

Source: https://www.socialstyrelsen.se/publikationer/metoder-for-att-arbeta-med-larande-for-ett-effektivt-nyttjande-av-personalresurser-uti fran-ett-nationellt-perspektiv—ett-nationellt-larandesystem-for-att-infora-en-patient—och-personalcentrerad-planering—2025-5-9590/

The next case study example from Norway illustrates how policies can contribute to educational systems, and their need to adapt to realize interprofessional training – one of the key skills that came forward from the innovative models of care. Like in the case of Sweden, the approach is to set up governance structures to achieve collective goals that cannot be reached by the individual education and training institutes.

Box xx RETHOS: four Norwegian Ministries shaping a new governance system on the content of the education of both health care and social students

Background

In Norway and for many years, it was possible to increase the number of health care workers more than the corresponding population growth, both as a response to the very decentralized health care system, and as a way of delivering a higher standard of care. However, Norway is now facing growing pressure like most other European neighbours, due to the combination of an ageing population and a number of people of working age which is no longer increasing.

Interprofessional collaboration

Due to the challenges there is a new impetus towards organizing work in new ways in the healthcare sector. One of the promising ways forward is to foster more interprofessional collaboration. Such collaboration can both enhance the quality of care, by ensuring that each profession brings their expertise to the table, and allow for more flexibility in the way work is carried out (by different groups). This flexibility is seen as crucial in a future where health care workers will have to adopt a broad set of skills in order to assess a varied patient population, especially in primary health care. Preparing the health care staff for new models of care ought to start already when they are (first) educated.

Collaboration between four ministries/new governance system

In a groundbreaking project (called RETHOS), four Norwegian Ministries started collaborating on the content of the education of both health care and social students in 2017. The Ministry of Health and Care; Ministry of Education of Research; Ministry of Labour and Social Inclusions; and Ministry of Children and Families are all members of the Steering Committee of the new governance system.

The main aim of the collaboration is to ensure that the education content is aligned with future developments, with the needs of the healthcare and social services, and with the needs of patients and users of the services. Both the services and the patients and users have an increased influence on the content of the education via this new governance model. The new system was initially met with some resistance, especially as the healthcare and social service sectors get a more direct say in the content of the curricula. Getting the four ministries to collaborate has been a key success factor in setting up the new system. So far, 35 different educations, mostly on bachelor level but also some on master level, are included in the new system.

Expected results

The expected result of this new governance system is to produce qualified candidates who have some common core knowledge and know more about the competence of other professions; have to some extent trained together during their education; and therefore can collaborate more easily and draw on each other's strengths in the health care and social services.

The content of this case description was gratefully provided by Christin Marsh Ormhaug, Department of Competence Development. Norwegian Directorate of Health. Useful links for more information is on the 'RETHOS web page' (in Norwegian): https://hkdir.no/hoyere-utdanning-og-forskning/nasjonale-retningslinjer-for-helse-og-sosialfagutdanningene-rethos/om-rethos#Om%20styringssystemet and the link to the 35 educations currently included (also in Norwegian) is: https://hkdir.no/hoyere-utdanning-og-forskning/nasjonale-retningslinjer-for-helse-og-sosialfagutdanningene-rethos/programgrupper-i-rethos

Direction 2: Including skill-mix and task shifting

Innovating HCWF planning and forecasting interferes with occupational structures that are in place and inherently stable. Occupation structures are expression of hierarchies of health and care professions. Hierarchies emerge and sustain by educational levels, specialisation, professionals boundaries and scope of practices, coined as 'systems of profession' through 'jurisdiction' by Andrew Abbott (1988). Still relevant today, Abbott argues that professions define their role by the expert knowledge they exclusively achieve and hold, resulting in a power position and a jurisdiction between an occupation and its work. Abbott also claims that a profession can pre-empt another's work, implying that the histories of professions are inevitably interdependent. Different internal and external cultural and social forces determine the division of expert labour, coined as the concept of the professional "arena", to describe the domains where different professions compete for jurisdiction over a particular set of expert tasks.

A similar tension can be seen in the educational structure of the professions. The way the educational system is organised, and the relation between health educational of occupational norms, is also inherently formed by discipline. For innovative care models there is a need for interprofessional education, broader, generalist education, and a focus on competencies. A Lancet committee, led by Julio Frenk, already voiced this required changes in the health educational and occupational structure – already 15 years ago (Frenk et al., 2010). In 2010 they concluded, based on a world-wide analysis of health education and occupational systems, that health labour markets are integrative nor pro-active systems. They fail to solve the quantitative labour market mismatches, i.e.:

- Shortages, waiting list, stress and burnout
- Oversupply, supply induced demand
- Recruitment and retention problems
- Mismatch between student interests and required capacities and workers

As well as the qualitative labour market mismatches, i.e.:

- Lack of competencies to meet patient and population needs,
- Poor integrative and patient centred care organizations and limited teamwork,
- No focus on skill-mix optimization (e.g. hospital/clinical orientation at the expense of public health and primary care).

It is the latter mismatch mentioned by the Frenk committee, skill-mix optimization, that is still present and pressing. As became clear from our analyses before, innovative care models specifically require that hierarchies and specialisation need to be reduced to increase flexibility and adaptation. Therefore, processes as task shifting and redefinition of roles as parts of Skillmix optimization are an essential part of innovative care models (cf. Maier et al, 2022; Semmelweis University, 2023). As most HCWF models are *single-occupational* based however, factors as task shifting and substitution are not or only indirectly taken into account when projecting and monitoring the supply, demand and work process of the specific profession. Next to this limitation, the traditional HCWF planning model also tend to overestimate the required capacity of professions and even inefficiencies (Birch et al., 2017).

Still there are a number of cases that successfully incorporated shifting and substitution in HCWF planning. The box below firstly shows how task shifting or substitution was actually incorporated is the single-occupational planning model of the Netherlands. While this might not be a case to show the optimal alignment of integrative and skill-mix requirements of the new models of care, it does shows how the potential effects of task shifting or substitution between the three main health professions in oral care (dentists, oral hygienists and prevention assistants) can be evaluated by HCWF planning.

Box xx Evaluating the feasibility of reshaping the Skillmix in dental health care in The Netherlands using the national health workforce planning model

Background

In 2006, the so-called Linschoten committee on 'Innovation in Dental Healthcare' in the Netherlands presented a number of (by then) groundbreaking recommendations on how to restructure task divisions in oral health. This can be considered as an innovative model of care, suited to research the feasibility of the staff-mix scenarios in dental healthcare as proposed by the committee. The Dutch model for HCWF planning was applied for an ex-ante evaluation study to simulate the potential effects of structural task reallocation between three dental health professions (dentists, oral hygienists and preventive assistants) and explore the feasibility of future staff-mixes in Dutch dental healthcare.

Methods

For his study, a specific task reallocation software tool was developed and connected with the existing Dutch model for HCWF planning. This planning model is in place since 1999 (see) and developed to provide annual training inflow advices to the Dutch ministries of health and education, aiming to achieve or maintain balance between the future demand and supply of medical professions. In 2010 when this study was executed the advised and targeted annual intake in dentist training was 240, in oral hygienist training 300 and the intake in preventive assistant training was assumed to be optimal if 200 training places would be fulfilled. Derived from the committee's report, is was assumed that the amount of task reallocation from dentists to oral hygienists and preventive assistants is 50%; i.e., half of the current total dentist capacity in FTE can be structurally reallocated to oral hygienists and preventive assistants.

It was also assumed that this halving of the total FTE of dentists could be achieved over a period of 20 years. It was estimated by the model and tool that in the committee's scenario the dentist capacity would be reduced by 1.25% per year (assuming that both dental hygienists and oral preventive assistants each take over half of the shifted tasks.

Evaluation of several staff-mix scenarios

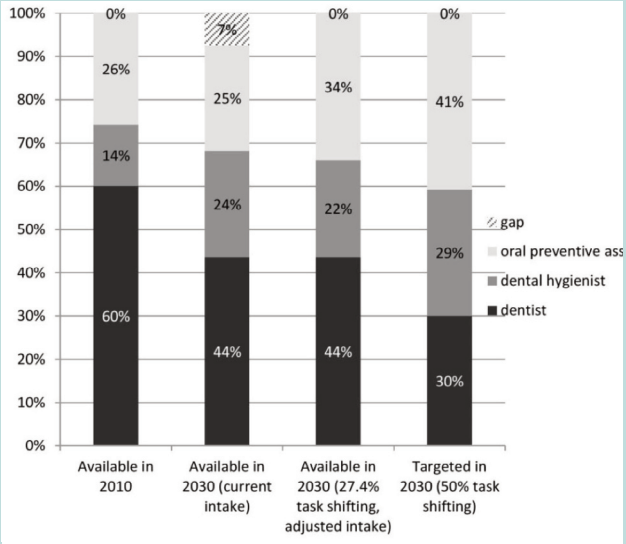
Based on the assumptions and tools presented above, several staff-mix scenarios were projected and evaluated. First, it was evaluated if the recommended oral health staff-mix could be met in 20 years if student intakes will remain constant, or if it will take more years to meet this target. This was done by comparing the available FTEs of dentists, oral hygienists and preventive assistants in 2010 with the targeted required FTEs in 2030. Second the model was used by trial-and-error to explore the feasible 'amount' of task reallocation in 2030, assuming that the annual student intake will remain constant over time. And finally, the available dental staff-mix in 2010 was compared with the targeted (or recommended) staff-mix in 2030, given the current student intakes and the feasible amount of task reallocation between dentists, oral hygienists and preventive assistants as explored in step two.

Results

The workforce projections from the study/model showed that it is possible to half the total FTE of dentists and to double the total FTE of oral hygienists, maintaining the current annual student intake – as proposed by the recommendations of the committee. The analyses also showed, however, that it will last more than 20 years to achieve this new skill-mix or dental staff ratio. In particular, it was demonstrated that the total FTE of preventive assistants could never be realised if their current student intake is not increased.

The Figure below depicts, from left to right, the staff-mix ratios of (1) the dental health workforce in 2010 as the 'base year', (2) the oral health workforce in 2030 without adjusting student intakes, (3) the staff-mix after the most feasible amount/level of 27.4% task reallocation has been achieved in 2030, and (4) if the committee's scenario of 50% task reallocation would have been implemented

during the period 2010-2030. According to the aim of the simulations, the targeted total dental workforce in 2030 should be the same as in 2010. But from Figure 3 it can be seen that total available dental workforce in 2030 will actually be smaller assuming that all student intakes will remain constant. To meet the most feasible level of 27.4% task reallocation from dentists to dental hygienists and oral preventive assistants, as well to maintain the total dental workforce, the model estimated that annual student intakes of oral hygienist training and preventive assistant training have to be adjusted (252 for dental hygienist training and 337 for oral preventive assistant training).



Conclusion

The conclusion from this explorative simulation study was, first of all, that the recommendations of the Dutch committee on Innovative in dental healthcare were only feasible by large adjustments of the annual training inflow of dentists, oral hygienists and oral preventive assistants. Not only the required increase in oral hygienist and preventive assistant training implies major investments, also the required decrease of the annual intake in dentist training would have large (adverse) consequences such as closing the academic dental schools. To restructure the total dentist workforce and skill-mix, supporting policies such as stimulating dentists to work part time or retire at an earlier age should be implemented. The simulations/workforce projections also shows that the advisory committees' recommendations has large consequences and requires additional policies to oversee its long-term effects. This specifically regards the recommended amount of task reallocation by 50% between dentists, oral hygienists and preventive assistants – which appears to be not feasible in 20 years based on the assumptions of the training inflows in the selected base year.

The analyses therefore address important questions about the feasibility of task reallocation, taking into account the characteristics of the dental health workforce and the inflow and outflow of its dental professions. Already at the time of this study, several studies found that task reallocation in Dutch oral health care is not yet developing according to the expectations/targets. It was even predicted that task reallocation from dentists to oral hygienists is stagnating, and that tasks are mostly shifted to preventive assistants, because their training and hiring costs are lower for the latter. Task reallocation in dental health care is therefore not only a matter of changing skill-mix or staff ratios – as a redesign exercise 'on paper'.

Source: Chapter 4 in: Greuningen, M. van. Health workforce planning in the Netherlands: how a projection model informs policy regarding the general practitioner and oral health care workforces. PhD Tilburg University, 2016.

In a similar vein, the next case study from the United Kingdom (UK) demonstrates how skill-mix innovation in the dental workforce was pre-evaluated using a health workforce planning model as well. While the Dutch case study focused on task shifting from dentists to oral hygienists and oral preventive assistants, in the UK case the potential task shifting from dentists to dental therapists is explored. The approach of the study by Gallagher et al (2013) in the UK is of particular interest because it explores the 'optimal' type of skill-mix for dental team, by simulating the cost effectiveness and feasibility of different skill-mix scenarios. This goes beyond the case from the Netherlands, where the committee Innovation in Oral Healthcare *pre-defined* what would be the optimal skill-mix of dental teams – which was then calculated and projected in terms of the required capacity of the dental professions. Another relevant element of the UK study is that the type or 'level' of task shifting is taken into account, by differentiating dental tasks as examination, diagnosis, prevention, routine and complex treatments.

Box xx Exploring the feasibility of an optimal make-up of dental teams in the South Central region of the UK, by introducing the new role of dental therapists

Background

In their paper, Gallagher et al. (2013) explored or pre-evaluated a number of future scenarios on the optimal skill mix within dental teams for the South Central Strategic Health Authority (SHA) in the United Kingdom. The study was driven by the important changes in the need for oral health care, caused by improvements in the oral health of children and adults, together with demographic changes (i.e. older people living longer as well as retaining their natural teeth) and increasing patient expectations from a basic public heath service.

Methods

The authors developed a demand/needs-informed and supply model for workforce planning, labelled as 'Model DeSiDE' (Dental Skillmix Decision Environment). The model included population demography, oral health needs and demands, the current dental workforce, activity and dental utilisation as the main factors, that fed into a Linear programming module to obtain 'the optimal make-up of the dental team'.

The demand side of the DeSiDE model was developed with key parameters assuming the changes in the future demands such as population, attendance, oral health trends and the proportion of treatments in three 'bands of care' received by different age groups (0–19, 20–64, 65+):

- Band 1: examination, diagnosis, preventive care
- Band 2: examination, diagnosis, preventive care and routine treatment including fillings and extractions.
- Band 3: examination, diagnosis, preventive care and all treatment including complex work such as dentures, crowns and bridges

The model projects the future dental demands in the three age and care band groups, for South Central SHA and its subregional communities ('Primary Care Trust level').

The supply side of the DeSiDE model was subsequently developed to give insight into the dental workforce needed for the projected dental demands. Assumptions were developed for several scenarios using linear programming and a method to adopt a dentist to therapist ratio to optimize the dental workforce in the south central SHA and its Primary Care Trusts. A specific scenario was developed to estimate the potential of the dental therapist, as a (relatively) new

role or occupation adding to the dental workforce. In the UK, dental therapists provide clinical dentistry under the direction of a dentist and have a extended similar role compared to dental hygienists by carrying out direct restorations on permanent and primary teeth (including pulpotomies, extract and place preformed crowns on primary teeth). Dental therapists work in dental teams, employed by independent general dental practitioners or dental services and.

The key challenge of the DeSiDE model and its scenario to add the dental therapists to the dental workforce, was to encounter (1) an 'accurate' dental therapist staff level and (2) the 'optimal' dentist to therapist ratio. Empirically, the ratio was of 16.7 to 1 in the south central SHA region, which was close to the ratio suggested by the General Dental Council for the national dental workforce (19 to 1).

In a first exploratory scenario, the skill mix within the dental teams was varied by dental therapists working (a) part-time or full-time, and (b) working within current guidelines (where dental therapists work under the direction of dentists) or working at the front end providing dental examinations. On all scenarios dental therapists were assumed to be excluded from performing Band 3 treatments (see above) because of the complexity of this care and its treatments. In addition, it was assumed that dental therapists are only being able to handle 70% of the 'estimated maximum current proportion of care that they are able to provide'. It was also assumed that the complications of 20% of patients would be too complex for dental therapists to handle, and that 10% of the single-handed dental practices in the south central SHA region cannot hire dental therapist.

Results

The simulation and linear programming results of the DeSiDE model showed that the largest number of dental therapists would be required to obtain the optimal workforce where dental therapists only work part-time. In the optimal scenario, dental therapists work full-time within the current system of delegated care. This 'optimal' situation was indicated by the estimated cost-effectiveness of the scenario and feasibility in terms of the numbers of dental therapists currently in training nationally and those working in the region.

Other, 'future' scenarios involved dental therapists undertaking their current scope of practice and working full-time. The results suggested that the current staffing level of dental therapists provides between 10% and 20% of the current job competency level based on current levels of care. It was shown by the simulations that that upon increasing the level of job competency (i.e. taking over tasks within their scope of practice) there is potential for much greater development of skill mix with the use of dental therapists in primary dental care, including costs. Overall, it was observed that greater benefits can be achieved if a dental therapist is able to provide a full-time commitment to NHS services rather than part-time. The optimal exploratory scenario in terms of costs and volume of staff was based on dental therapists working full time and providing 70% of routine care (that is within their current job competency). This scenario required 483 therapists by 2013, a figure that appeared achievable.

The most promising result was that increasing the level of job competency provided by therapists revealed potentially higher benefits in terms of reduced cost and requiring fewer dentists. The findings by Gallagher et al, suggest that (1) dental therapists can play a more significant role in the provision of primary dental care, both currently and in future, and (2) there is a need for health services to routinely collect data that can inform workforce analysis and planning.

Source: Gallagher (2013)

While the two case study examples selected for this chapter are limited to a specific type of (dental) healthcare, they demonstrate the potential of HCWF planning models to actually put innovative care models in practice. Implementation of innovative care models cannot be achieved without human resources for health that are fit to the new ways of working. Both case studies show that, first of all, a strategic vision is needed on the accountable goals and aims of dental healthcare provision – in terms of their health outcomes, costs and benefits). From this, the second strategic question that needs to be addressed is 'who does what and why' – in terms of the 'optimal' (dental) organization and team, composed of the optimal structure and composition of the required tasks, skills and competences of the (dental) workforce/profession.

The two case studies show how both questions were addressed from a need to change dental care provision to meet changing population demands (e.g. by aging), but likewise to meet the changing dental workforce (e.g. by new dental occupations). Next, both cases show how specific committees, policies and stakeholder perspectives were needed to jointly re-design the existing dental organization and team composition. By defining the 'optimal' staff mix or skill-mix, as well by (re)defining task and patient allocation over the dental professions. The examples learn that this is the hardest and critical element of the innovation. It is complex and sensitive to define in a 'top-down' manner what tasks require what generic and role-specific competences by whom. E.g., the repetitive key question is what tasks can and should be shifted from dentists to oral hygienists or prevention assistants (in the Dutch case) or dental therapists (in the UK case) and, to what extend, to what level, under what conditions? The task-shifting or conversion factor that were defined (or assumed) in the case studies (50%, 70% etc) were predominantly uncertain in terms of their feasibility, effects and requirements. For this reason, they were formulated and analysed as scenarios, anticipating for adjustments to the (expected) reality or practice. The outcomes hence mainly supported a critical (ex-ante) evaluation of the intended innovation of dental healthcare models, rather then to provide a normative or prescriptive staffing method to realize them.

While dental healthcare seem to be 'limited' in terms of health services and relevant professions (compared to for instance the broader fields of primary care, hospital care or mental care) exactly this makes it a suitable field to think through innovative models or care and its HCWF implications. Ater all, the underlying strategic policy questions as described above, will be similar in other health and care areas.

7. Conclusions

The innovative care models discussed in this policy brief have in common that they focus on older people with often multiple health and care needs. Even if this focus is not explicit, it is often an indirect consequence of the fact that in ageing populations the prevalence of multiple health and care needs is high. In most of the innovative care models primary care plays an important role, with the possible exception of the Hospital-at-Home, although this also requires coordination and continuity with primary care.

Innovative care models require structural and urgent changes in the current health and care workforce, to be achieved by adapting their educational and occupational systems. While capacities and 'numbers' are critical given the current shortages and exceeding workload of all health and care professionals, qualitative imbalances or skill mismatches are probably of equal or even more importance. We note that only few professions are specific to innovative care models nor are the required skills or competencies profession specific. Rather, innovative care models require the HCWF to possess generic skills and competences to enable collaboration, coordination and communication.

As a consequence, strategic changes in the education of the HCWF gain more importance than ever. Actually, the potential for innovation is more prominent in the structure of health education than in the occupational structure of health professions themselves. This makes provides radical challenges for HCWF planning. Current models of HCWF planning are mostly developed to project the supply and demands of single professions, and likewise to forecast and identify gaps, shortages and capacity mismatches by region or sector. While of great importance for policy makers and planners, innovative models of care show that this type of models is not sufficient. HCWF planning models need to be extended to address the required and optimal staff mix or skill-mix to address the interprofessional challenges that are inherent of innovative care models. In practice, this implies innovation of HCWF planning by investing in (1) its political and stakeholder context and (2) the models for HCWF planning.

Limitations: no structured scoping review or systematic review

Literature is often about specific field projects; need for more attention to generalizability and conditions for implementation, related to the health system design.

We have left the patient side out of this Policy Brief. However, integrated care models often also suppose competencies of patients and their informal carers, such as the ability to manage their own care. Lack of core abilities and resources of patients may lead to inequalities in access to and benefits from integrated care models. Apart from informal carers, other volunteers are important in innovative care models.

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