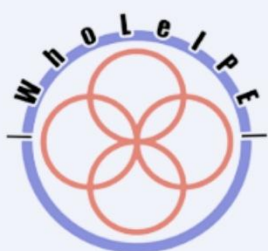




TOWARDS INTEGRATED HEALTHCARE

ORIGINAL HANDBOOK



Co-funded by
the European Union

TOWARDS INTEGRATED HEALTHCARE



Trinity College Dublin

Coláiste na Tríonóide, Baile Átha Cliath

The University of Dublin

Learning and Working Together for Improved Healthcare Outcomes
- Strengthening Interprofessional Education (**WhoLeIPE**)



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List of abbreviations

ACE - Acute Care for Elders
ACO - Accountable Care Organisation
ADHD - Attention Deficit Hyperactivity Disorder
AF - Atrial Fibrillation
AI - Artificial Intelligence
AR - Augmented Reality
BHP - Behavioural Health Provider
BMI - Body Mass Index
CCM - Chronic Care Model
CDSS - Clinical Decision Support Systems
CHAS - Community Health Assist Scheme
CIHC - Canadian Interprofessional Health Collaborative
CIN - Clinically Integrated Network
CIPE - Continuing Interprofessional Education
CKD - Chronic Kidney Disease
CME - Continuous Medical Education
COPD - Chronic Obstructive Pulmonary Disease
CVD - Cardiovascular Disease
CYP - Children and Young People
DHL - Digital Health Literacy
DOT - Delivering on Target
EBM - Evidence-Based Medicine
ECG - Electrocardiogram
eHealth - Electronic Health
EHR - Electronic Health Record
EMR - Electronic Medical Record
EMS - Emergency Medical Services
EU - European Union
FDA - Food and Drug Administration
FHIR - Fast Healthcare Interoperability Resources
FHT - Family Health Team
GDPR - General Data Protection Regulation
GP - General Practitioner
GQLHM - Good Quality Local Healthcare Model
HIC - High-Income Country
HIPAA - Health Insurance Portability and Accountability Act
HIS - Health Information Systems
HL7 - Health Level Seven International
IC - Integrated Care
ICCCF - Innovative Care for Chronic Conditions Framework
ICCM - Integrated Chronic Care Model
ICD - International Classification of Diseases
ICS - Integrated Care Systems

IDM - Integrated Disease Management
IDS - Integrated Delivery System
IGH - Integrated General Hospital
ILO - International Labour Organisation
IMPU - Integrated Medical and Psychiatric Unit
IODM - Integrated Oncological Decision-Making Model
IPA - Independent Practice Association
IPE - Interprofessional Education
IPC - Interprofessional Collaboration
IT - Information Technology
LMIC - Low- and Middle-Income Country
MDT - Multidisciplinary Team
mHealth - mobile health
MI - Motivational Interviewing
MSGP - Multispecialty Group Practice
MSO - Management Services Organisation
NCD - Non-Communicable Disease
NHS - National Health Service
NLP - Natural Language Processing
PCC - Patient-Centred Care
PeCC - Person-Centred Care
PCMH - Patient-Centred Medical Home
PCP - Primary Care Provider
PHC - Primary Healthcare
PHI - Primary Health Institution
PHO - Physician-Hospital Organisation
PIC - Paediatric Integrated Care
PtDA - Patient Decision Aid
RBAC - Role-Based Access Control
RHS - Regional Health Systems
SAMHSA-HRSA - Substance Abuse and Mental Health Services Administration - Health Resources and Services Administration
SBAR - Situation, Background, Assessment, Recommendation
SDM - Shared Decision Making
SMI - Serious Mental Illness
SPICE - Singapore Programme for Integrated Care for the Elderly
SUD - Substance Use Disorder
ToT - Training of Trainers
TPB - Theory of Planned Behaviour
TQM - Total Quality Management
VR - Virtual Reality
WHO - World Health Organization



Dear Reader,

The journey towards integrated healthcare is both timely and necessary. Around the world, patients, healthcare providers, and policymakers face the consequences of fragmented systems that often leave individuals navigating care on their own. This handbook “Towards Integrated Healthcare” was created to provide guidance, share evidence, and spark dialogue on how we can move beyond isolated practices toward truly coordinated and person-centred care.

What you will find in these pages is not only theory but also practical insights, reflections, and examples of how integration can be achieved in real settings. It is my hope that this volume serves as both an inspiration and a tool: to challenge assumptions, encourage collaboration, and shape solutions that are sustainable and equitable.

Healthcare integration is not a destination, but a continuous journey. I invite you to engage with the ideas presented here, adapt them to your own context, and contribute to a future where healthcare systems truly serve and improve patient health. Each step toward integration brings us closer to care that is not only more efficient, but also more humane and compassionate. The challenges ahead are significant, but so are the opportunities to reshape the way we think about and deliver healthcare. Together, through collaboration and innovation, we can build systems that respond to the real needs of people and communities, ensuring that health remains a central priority in our societies.

Editor-in-Chief
Magdalena Waszyk-Nowaczyk
PUMS WhoLeIPE Coordinator



As long as medicine exists, *primum non nocere* is the *basic principle* in the patient's treatment. The transition from ancient times to modern medicine has resulted in increasingly diverse and multidisciplinary healthcare teams working together in an increasingly complex healthcare environment, with *patient safety remaining the primary concern*, alongside treatment efficacy and effectiveness. However, such healthcare systems are not always as safe and efficient as expected and the need is evident for better organisation and connection between different levels and sectors within the healthcare system, including better linking with other systems (e.g., social care system), as well as for better collaboration between different healthcare and other professionals.

Understanding many challenges and barriers on the way to the effective collaborative practice and integrated healthcare were recognised by the Erasmus+ WhoLeIPE consortium and, accordingly, efforts were undertaken to prepare recommendations for easier overcoming of the envisioned risks. The handbook "Towards Integrated Healthcare" is prepared to help different professionals to better understand actual principles of the modern approaches related to patient and person centred care, different models of collaboration within healthcare teams, as well as models of integrated healthcare. Various tools and technologies that support healthcare integration, as well as the professional and personal competencies required of healthcare professionals to achieve full integration of healthcare systems, are also described. As such, this handbook will serve to the future safer and more effective healthcare of our patients in the WhoLeIPE consortium countries, and wider.

Marina Odalović
WhoLeIPE Coordinator



As the sum of human knowledge increases so healthcare practice becomes more complex. Many disciplines contribute to evidence-based practice each with their own professional perspective and ethos. While individual professionals remain responsible for their decisions, most patient care is provided by teams of professionals. However, frequently these teams are informally constituted and distributed or virtual rather than designated groups working together in a single facility. Consequently, enabling these teams to function effectively and efficiently requires a particular combination of knowledge and skills and a strong commitment.

Fortunately, the framework, the priorities and some examples of best practice have been collated and made available by national bodies such as, the Centre for Advancement of Interprofessional Education and international bodies such as, the Canadian Interprofessional Health Collaborative Competency Framework for Advancing Collaboration.

Nevertheless, each practice setting poses its own set of difficulties, and each profession addresses these issues in their own way. Health service regulators and professional bodies are beginning to incorporate interprofessional practice into their guidance and their requirements. Support for interprofessional practice is needed at every level within health services if it is to flourish not least because organisational culture, workload and resources all need to be taken into account. Consequently, while much has been achieved, there is still more to be done.

Interprofessional education (IPE) will be the foundation for progress and the professional and representative bodies responsible for Continuous Professional Development and Lifelong Learning need to provide opportunities for established practitioners. However, it will be up to the Faculties, Colleges and Schools to prepare students. The WhoLeIPE project group is researching, reviewing, discussing and sharing current ideas and future possibilities to bring IPE to pharmacy curricula. Pharmacy is unusual in that the responsibility for the provision of the principal tools of the profession, medicines, are shared with other professions and with the patients. This makes the importance of IPE even greater for the practice of pharmacy.

This Handbook will, we hope, provide a useful and practical guide for IPE in many different European practice settings.

*Martin Henman
TCD WhoLeIPE Coordinator*

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1. Patient/person-centred care

Olga Sierpniowska

Short insight

Patient-centred care (PCC) and person-centred care (PeCC) are more than buzzwords - they represent a paradigm shift in medicine. The focus has moved from seeing the patient merely as a "clinical case" to recognizing the whole person, their history, values, emotions, and active role in decision-making. Supported by research, policies, and well-established frameworks, this approach consistently demonstrates that partnership, empathy, and clear communication lead not only to greater satisfaction but also to safer, more effective, and more efficient healthcare.

1.1 Basic concepts and definitions

PCC emphasizes the person in their role as a patient, addressing their medical needs and treatment experience. In contrast, PeCC views the individual more broadly - as a whole person with a unique history, values, and life context. Although these terms are often used interchangeably, PCC is more commonly applied in acute and specialized medical settings, while PeCC is prevalent in long-term, palliative, psychiatric, and geriatric care (Mead and Brower, 2002).

Some, however, believe that the fundamental difference is that only in a PeCC approach is the patient an active and equal member of the therapeutic team. The term "patient" has a more limited meaning than "person." While every patient is a person; reducing them solely to their medical condition overlooks important aspects of who they are. Their individuality, life context, strengths, aspirations, preferences, and rights deserve equal consideration in care (Håkansson et al., 2019).

Research clearly shows that the introduction of PCC improves the quality of treatment - it improves health outcomes, reduces expenses, streamlines the use of available resources and significantly increases patient satisfaction with the care they receive (Jarczewska and Tomasik, 2017).

It is crucial to conduct a collaborative decision-making process in which the healthcare specialist and patient are partners. All healthcare professionals, e.g., physicians, pharmacists, nurses, rehabilitation specialists, psychologists, and dietitians, should participate in PCC. This model also includes the patient's family members (Elwyn et al., 2012).

PCC can be used to improve the quality of healthcare services and has the potential to reduce healthcare costs by using the patient's own resources and their social network (Lewandowski et al., 2023) - **Figure 1.**

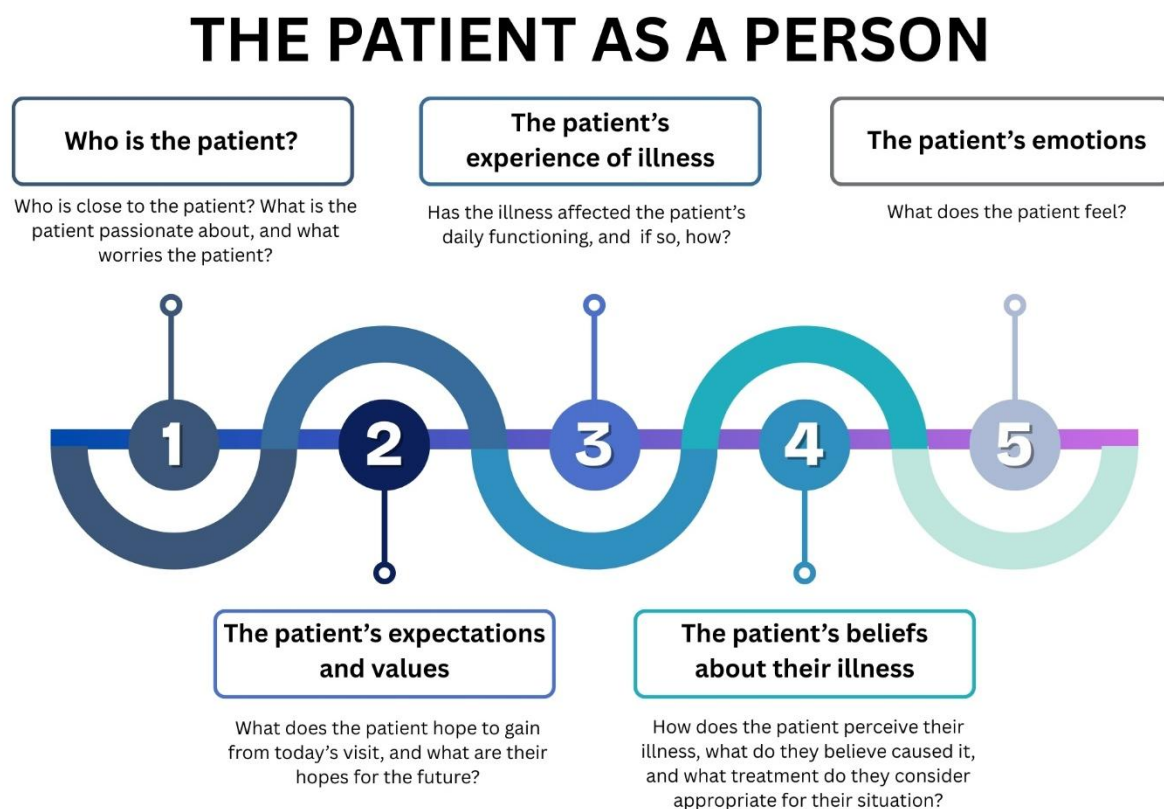


Fig. 1 The patient as a person (Developed by the author based on: Platt et al., 2001)

PCC is an approach to healthcare services that places the patient at the centre of attention, taking into account their individual needs, values, and preferences in planning, coordinating, and delivering care. This model assumes active patient involvement in the treatment process and cooperation with the medical team in making decisions about healthcare. The PCC model is applicable across all age groups and healthcare settings. Its multidimensional nature has led to the development of various definitions:

The care each patient wants, delivered in the way they need it, and at a time that is right for them (Davis et al., 2005).

Care that respects and is responsive to the patient's individual preferences, needs, and values, and, moreover, allows these values to guide all clinical decisions (Barry and Edgman-Levitan, 2012).

People-centred care: an approach to care that consciously adopts individuals', carers', families' and communities' perspectives as participants in, and beneficiaries of, trusted health systems that are organized around the comprehensive needs of people rather than individual diseases, and respects social preferences. People-centred care also requires that patients have the education and support they need to make decisions and participate in their own care and that carers are able to attain maximal function within a supportive working environment. People-centred care is broader than patient and person-centred care, encompassing not only clinical encounters, but also including attention to the health of people in their communities and their crucial role in shaping health policy and health services" (WHO, 2016).

The working alliance is a key component of person-centred care, referring to the cooperative, trusting relationship between a healthcare provider and a patient. It is built on three core elements: a shared agreement on treatment goals, a consensus on the tasks needed to achieve those goals, and the development of a personal bond marked by mutual trust and respect. For example, in mental healthcare, a strong working alliance might involve a therapist and patient agreeing to focus on anxiety management, deciding to use cognitive-behavioural strategies, and maintaining an open, empathetic dialogue throughout the process. In primary care, it could mean that a doctor takes time to understand a patient's lifestyle before creating a care plan for diabetes, ensuring the patient feels heard and involved in decision-making. These alliances encourage patients to be more engaged, honest about their concerns, and likely to adhere to treatment. By fostering a strong working alliance, healthcare professionals not only improve clinical outcomes but also honour the personhood of the patient, making care both effective and humane - **Figure 2**.

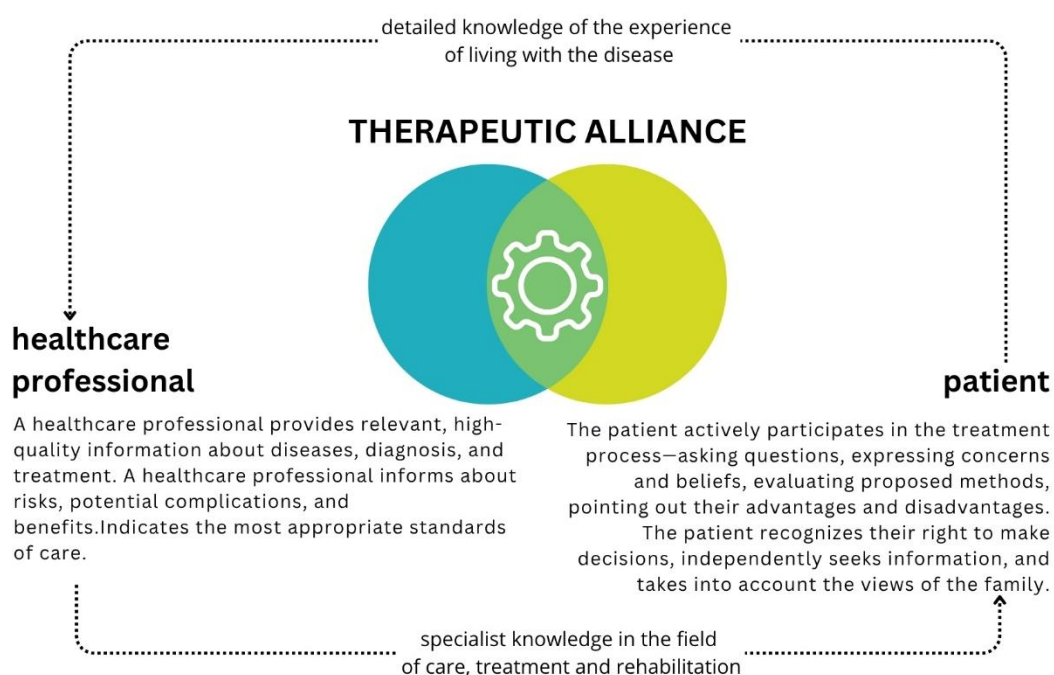


Fig. 2 Therapeutic alliance (Developed by the author, based on: Elwyn et al., 2012)

Evolution of patient- and person-centred care

The concept of PCC and PeCC has evolved from a biomedical approach in the 1980s, where patients were passive recipients of treatment, to a holistic approach recognizing shared decision-making as a core principle. Key milestones include the Picker Institute's (2023) framework defining essential areas of PCC, the Salzburg Statement (2010) emphasizing "No decision about me, without me," and the WHO Framework (2016) promoting integrated, people-centred health services. These developments reflect a global shift toward viewing patients as active partners and unique individuals within healthcare systems - **Figure 3**.

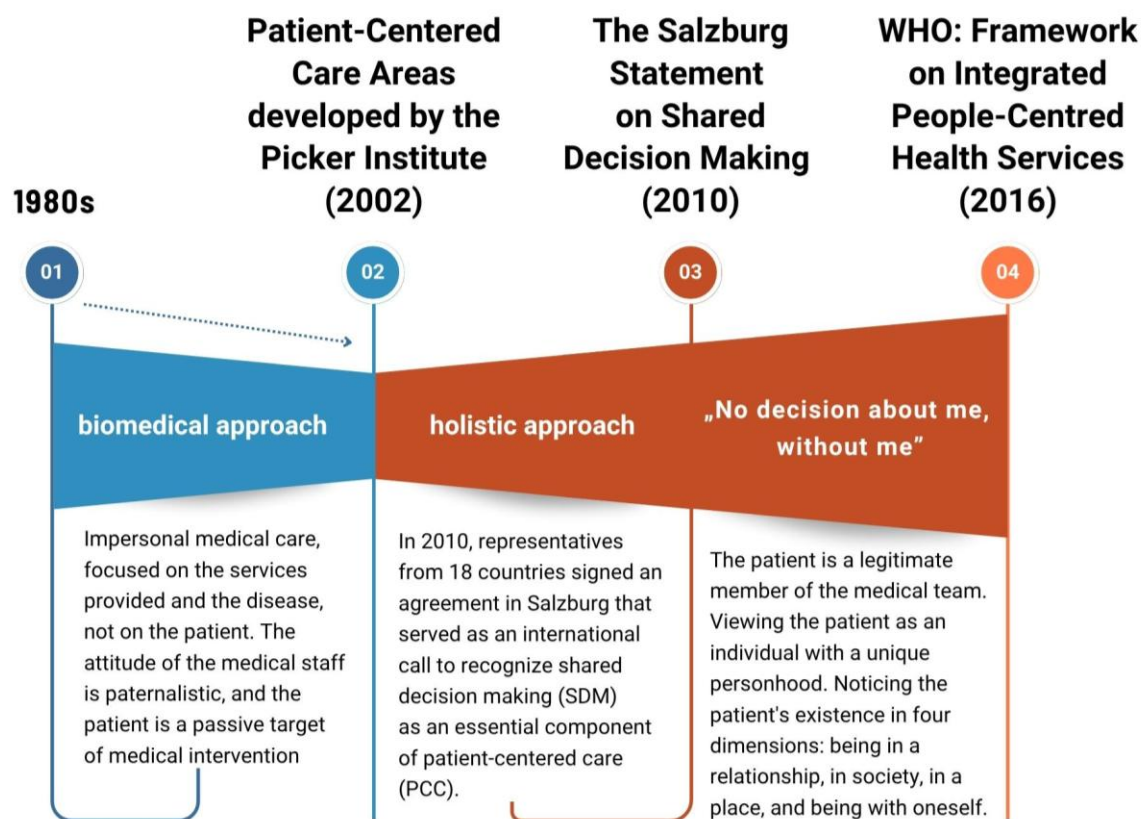


Fig. 3 Key milestones in evolution of PCC (Developed by the author, based on: Buetow, 2016; Elwyn et al., 2012; North, 2020; World Health Organization, 2016)

1.2 Theoretical models

There are numerous conceptual models of PeCC, each offering a unique perspective on how to place individuals at the heart of healthcare delivery. While they share common values-such as respect, dignity, and partnership-their structures, areas of focus, and practical applications vary. Among the many frameworks developed internationally, two have been particularly influential in shaping both policy and practice: McCormack and McCance's Person-Centred Practice Framework and the Picker Institute's Eight Principles. These models will be discussed in greater detail below, outlining their core components and relevance to contemporary healthcare (McCance and McCormack, 2025).

McCormack and McCance's person-centred practice framework

McCormack and McCance's Person-Centred Practice Framework is a widely recognised model that provides a comprehensive structure for understanding and implementing PeCC in healthcare. Developed through research and practice in nursing, it highlights that PeCC emerges from the interaction between the qualities of healthcare professionals, the care environment, and the processes of care delivery, leading to improved outcomes for patients, families, and staff. The framework highlights the importance of culture, relationships, and shared decision-making as essential foundations for high-quality, compassionate care (McCance and McCormack, 2025; Cable et al., 2024; Tyagi et al., 2025).



Fig. 4 McCormack and McCance's person-centred practice framework - prerequisites (Developed by the author, based on: McCance and McCormack, 2025; Cable et al., 2024; Tyagi et al., 2025)

Prerequisites are essential because they represent the foundational attributes of the healthcare professional that must be in place before PeCC can be effectively delivered - **Figure 4**. The care environment either enables or constrains person-centred practice. Even highly skilled and motivated professionals cannot deliver optimal PCC if the environment is unsafe, under-resourced, or culturally resistant to patient involvement. Conversely, a supportive environment amplifies staff capabilities and fosters sustained cultural change - **Figure 5**. Care processes are the core of person-centred practice - they are the point where trust, respect, and collaboration translate into personalised care experiences and, ultimately, better patient outcomes - **Figure 6**. Outcomes are both a measure of success and a feedback loop - they inform continuous improvement in prerequisites, care environment, and processes, ensuring the model evolves with patient and staff needs - **Figure 7**.

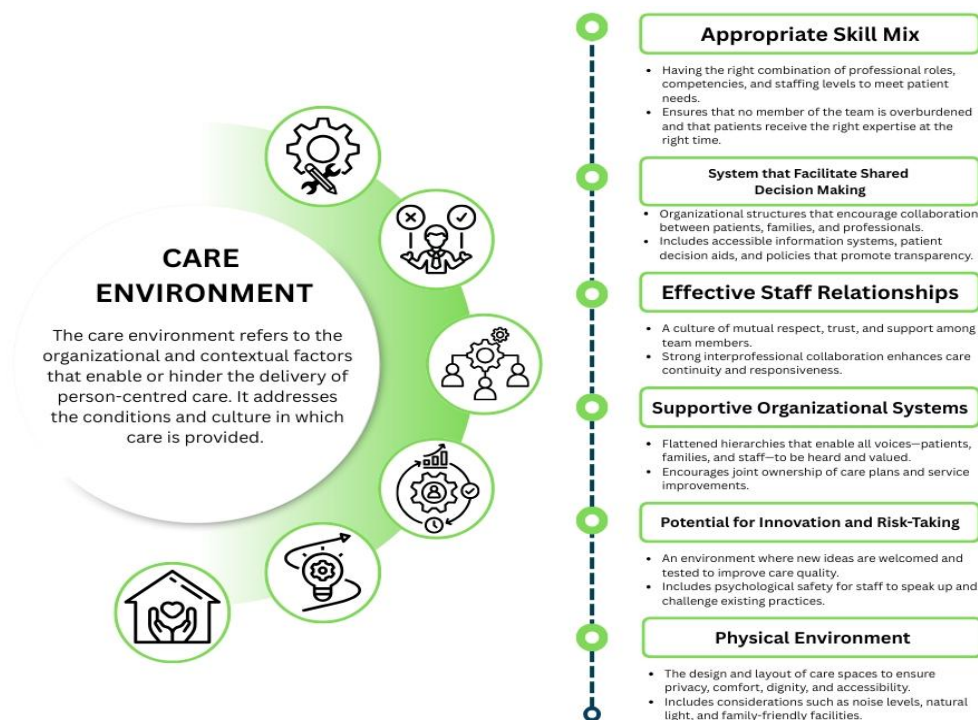


Fig. 5 McCormack and McCance's person-centred practice framework - care environment (Developed by the author, based on: McCance and McCormack, 2025; Cable et al., 2024; Tyagi et al., 2025)



Fig. 6 McCormack and McCance's person-centred practice framework - care processes (Developed by the author, based on: McCance and McCormack, 2025; Cable et al., 2024; Tyagi et al., 2025)

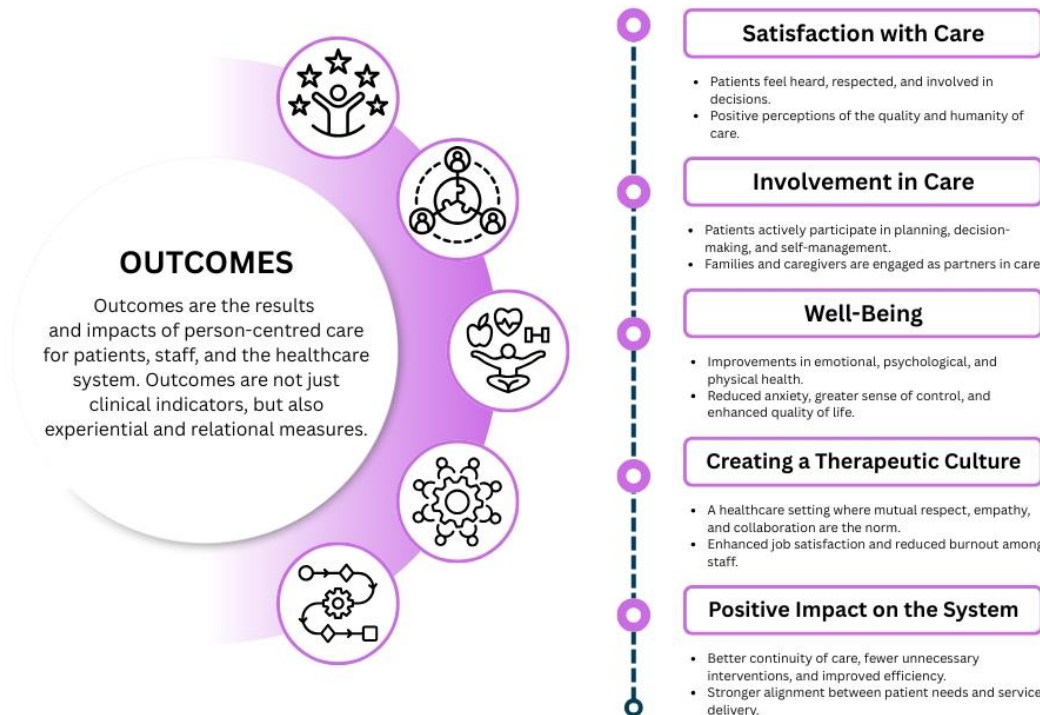


Fig. 7 McCormack and McCance's person-centred practice framework - outcomes (Developed by the author, based on: McCance and McCormack, 2025; Cable et al., 2024; Tyagi et al., 2025)

Picker's eight principles of patient centred care

The Picker Institute model of PCC is one of the most well-known and practically applied frameworks in this field. It originated in the USA in the 1980s and 1990s and was later developed further in Europe (Picker Institute Europe). It is based on patient experience research, which identified the key elements of high-quality care from the recipient's perspective (Kuipers et al., 2021).

The eight dimensions of PCC according to Picker are (Picker Institute Europe, 2023):

1. **Respect for patients' values, preferences, and expressed needs.** Care reflects the individual's values, culture, beliefs, and expectations; the patient is an active partner in clinical decision-making.
2. **Coordination and integration of care.** All elements of the care process are coherent, with information and actions well-coordinated between different professionals and facilities. Most important is ensuring consistency of actions between different members of the medical team and between different stages of treatment. For the patient, it means support and guidance from staff in a difficult care system, which helps reduce the feeling of being lost and helpless in the disease.
3. **Information, communication, and education.** Patients and their families receive clear, understandable, and complete information about their condition, treatment, risks,

and prognosis, and are encouraged to ask questions. Clear and understandable information allows informed decision-making about health. It is particularly important to provide information about health status, prognosis and the care process, as well as prevention and opportunities for psychological and financial support.

4. **Environment conducive to healing and physical comfort.** Includes effective pain management, assistance with daily activities, and ensuring privacy and dignified conditions.
5. **Emotional support and alleviation of fear and anxiety.** Recognizing and responding to the patient's emotional needs, building relationships based on trust and understanding. Illness is often accompanied by severe stress, anxiety, and uncertainty-which is why it's so important for patients to receive help in understanding and managing these feelings. This aspect of care involves both conversation and support from staff, as well as-if necessary-incorporating specialized psychological support or pharmacotherapy to improve well-being.
6. **Involvement of family and friends.** Loved ones are treated as partners in care, have access to information (with the patient's consent), and can support the treatment process. The inclusion of family and significant others in care must be based on the patient's expectations and consent.
7. **Continuity and smooth transitions between care settings.** Ensuring safe and well-prepared transitions between hospital, outpatient care, rehabilitation, or home care. Providing appropriate information upon discharge or completion of treatment reduces patient anxiety and strengthens self-care skills. Patients should receive comprehensive guidance regarding pharmacotherapy, lifestyle, and the specific needs arising from their current health condition.
8. **Access to care.** Easy contact with the healthcare facility, short waiting times, and availability of specialists and appropriate resources. It also means ensuring easy access to medical services that considers patient's preferences (e.g., conveniently located transportation, appropriate admission times, access to referrals, and specialized services) and continuity of care at different stages of treatment.

The Picker model emphasises that the quality of care should be measured by how the patient experiences it, not only by clinical indicators. It is often used as the basis for patient satisfaction surveys and for designing quality improvement processes (Picker Institute Europe, 2023).

1.3 Medical communication

Medical communication is one of the key pillars of the PCC approach, which emphasizes not only the treatment of disease but also the consideration of the patient's individual needs, values, and preferences (King and Hoppe, 2013). Effective exchange of information based on empathy, listening and understanding supports not only better diagnosis and treatment but also the development of trust and shared responsibility for health (Naughton, 2018).

Thinking about the goals of the conversation and asking the questions can facilitate achieving PCC:

- Understanding the patient's perspective: *What does a typical day with the disease look like for you?*
- Considering the patient's social and emotional situation: *Does anyone in your environment help you cope with treatment?*
- Developing a shared understanding of the health situation and treatment goals: *What treatment outcomes would be truly satisfying for you?*
- Building a partnership and involving the patient in decision-making: *What are your thoughts on the treatment options presented?*

Communication barriers

In the PCC model, the quality of communication plays a crucial role. Unfortunately, in practice, numerous barriers arise (Moore et al., 2016):

- **Psychological barriers** - such as fatigue, stress, prejudice, or lack of empathy may lead to ignoring or distorting the patient's statements.
- **Lack of interpersonal skills** - some healthcare staff are not sufficiently trained in active listening and in conveying information in an understandable way.
- **Complexity of medical language** - the use of technical terminology without explanation can cause confusion for patients.
- **Lack of time for conversation** - workload overload limits the ability to conduct open, empathetic dialogue.
- **Inconsistent communication standards** - differences in how information is conveyed among team members can lead to confusion and disorganisation.

It's important to avoid overwhelming the patient with excessive information. A more effective approach is to share details in manageable segments, using repeated cycles of asking a question, offering information, and then asking again-such as inquiring about the patient's response to what was just shared (Hashim, 2017).

Motivational interviewing

Motivational interviewing (MI) is a method of clinical communication that fits perfectly into the philosophy of PCC. Both concepts assume respect for the patient's autonomy, a therapeutic partnership, and support for their internal motivation to change (Miller and Rollnick, 2025). MI is not about providing ready-made solutions, but about skilfully accompanying the patient in the process of reflecting on their behaviours and health decisions.

An example would be a conversation with a patient who smokes cigarettes: instead of saying, "You have to quit smoking," the specialist asks, "What do you think about the impact of smoking on your health?", giving space for reflection.

MI together with PCC can significantly improve adherence, meaning the extent to which patients follow medical recommendations. This approach takes into account each person's individual needs, values, and circumstances, making the patient an active partner in the treatment process rather than a passive recipient of instructions. When patients feel heard and involved, they are more motivated to follow both medical and lifestyle-related recommendations (Stewart et al., 2000; Arora, 2003).

This is particularly important after acute health events, such as a heart attack. Although modern medicine has greatly reduced mortality in such cases, the benefits are often undermined by low participation in follow-up rehabilitation. PCC helps increase engagement in activities like cardiac rehab, dietary changes, smoking cessation, and cholesterol management (Thompson et al., 2011).

Plain language in written materials

Plain language is a way of organizing text that provides the average reader with quick access to the information it contains, better understanding it, and, if necessary, effective action on it. It is a language for quick reading, but above all - "a language of clear thoughts, sincere intentions and simple form" (Piekot et al., 2019; Plain Language Action and Information Network, 2025).

Plain language plays a key role in medical communication within the PCC model because it can (Riganti and McKinnon, 2023):

- **Facilitates understanding** - patients better comprehend diagnoses, procedures, and recommendations, which increases their sense of safety and control over treatment.
- **Strengthens the therapeutic relationship** - clear communication builds trust between the patient and healthcare providers, which is a cornerstone of this model of care.
- **Increases patient engagement** - a patient who understands what is happening is more likely to participate in therapeutic decisions and collaborate with the medical team.
- **Minimizes the risk of misunderstandings** - avoiding specialized jargon reduces the likelihood of errors caused by miscommunication.

Plain language is not about oversimplifying content, but about conveying it clearly and empathetically, in line with the spirit of care focused on the patient's needs (Warde et al., 2018). Plain medical language emphasizes short sentences and familiar words, and promotes the avoidance of jargon, difficult terms, and complex syntax - **Figure 8**.



short sentences,
simple words,
friendly
grammar



key
information
comes first



well-organized
content



phrases
addressed
to the reader



verbs
and active voice

Fig. 8 Key rules of plain language (Developed by the author, based on: Piekot et al., 2019; Piekot and Maziarz, 2014)

1.4 Teaching

Training in PCC and PeCC should be based on learning communication skills, critical thinking, strengthening reflectiveness, self-awareness, empathy, and self-efficacy (Serafin and Sak-Dankosky, 2024).

Design thinking

Design thinking can play a valuable role in teaching PCC and PeCC due to a shared core philosophy: starting from the person's needs, values, and context, and co-creating solutions with them rather than for them (Cuddihy et al., 2021).

Here's how design thinking supports PCC and PeCC education (Park et al., 2022; Feuerwerker et al., 2019):

1. **Empathy as the starting point.** The first stage of design thinking is to deeply understand the person's perspective, which mirrors the PeCC principle of seeing the patient as a unique individual. In teaching PeCC, students can use empathy interviews, shadowing, or patient narratives to identify unspoken needs.
2. **Co-creation and collaboration.** Design thinking promotes working *with* stakeholders (patients, families, healthcare teams) to generate ideas. This models the shared decision-making process central to PCC.
3. **Iterative problem-solving.** In PCC education, students can use rapid prototyping of care plans or service processes, testing them with patient feedback and refining based on what works in real-life contexts.
4. **Interdisciplinary perspective.** Design thinking requires collaboration between different professional backgrounds, aligning with PCC's emphasis on team-based, holistic care.

5. **Focusing on experiences, not just outcomes.** Design thinking encourages mapping the patient journey, helping future professionals identify touchpoints that impact dignity, comfort, and trust-elements essential to PCC.

Design thinking in PCC and PeCC education trains students to think beyond protocols-to innovate, adapt, and design care pathways rooted in real patient experiences (Deitte and Omary, 2019) - **Figure 9.**

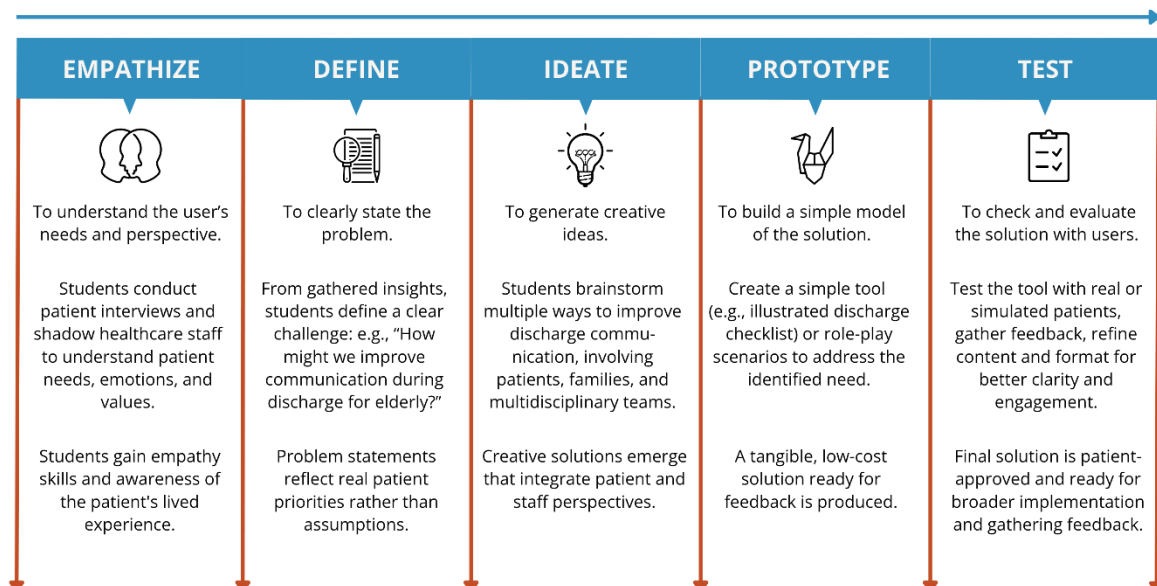


Fig. 9 Five steps of design thinking with an example (Developed by the author, based on Altman et al., 2018; Deitte and Omary, 2019; Nathan et al., 2021)

Teaching by patients

Teaching by patients involves engaging patients or their family caregivers as active educators who share their lived experiences, expectations, and challenges with learners. This approach fosters empathy and a deeper understanding of the patient's perspective, humanizes healthcare training by moving beyond clinical data to real-life impacts, and encourages the development of shared decision-making skills by allowing learners to hear directly how patients value involvement. For example, a patient with a chronic illness might explain how different communication styles influenced their adherence to treatment, prompting reflection and adaptation in learners' future practice (Palla et al., 2024).

Medical simulation

One of the important aspects of education that enable the implementation of PCC is simulation classes and the teaching of advanced communication skills (Ścisło et al., 2022).

Medical simulation uses simulated clinical environments, standardized patients, or virtual reality (VR) to allow learners to practice skills in realistic yet safe settings. It enables the integration of clinical competence with communication and relational skills, offering opportunities

to practice active listening, empathy, and adapting care to individual needs. Feedback from standardized patients often focuses on perceived respect, understanding, and involvement—key indicators of PeCC. For example, a simulation scenario might involve discharging an elderly patient with low health literacy, testing the learner’s ability to communicate clearly and respectfully (Nestel and Tierney, 2007; Lavanya et al., 2024).

Storytelling

Storytelling uses narrative—whether from patients’ stories, clinician experiences, or composite case studies—to convey meaning, context, and emotions behind clinical encounters. It encourages reflection on the human side of care and the influence of values, beliefs, and culture, while also facilitating memory retention and emotional engagement with PeCC principles. This method inspires compassion and reinforces the moral dimension of healthcare. For example, a narrative from a palliative care patient about what dignity meant during their last hospital stay can spark discussion on care priorities and deepen learners’ understanding of person-centred values (Park et al., 2021).

Patient empowerment and activation

Patient empowerment means actively engaging the patient in the decision-making process regarding their health and treatment. A key element here is recognizing the patient as a partner in healthcare - someone with the knowledge, preferences, and ability to make informed decisions about their own health. Key components of patient empowerment are:

- Access to information - clear, understandable, and timely information helps the patient make decisions.
- Shared Decision Making (SDM) - the patient and medical staff explore treatment options together.
- Technological support - applications, telemedicine platforms, and Electronic Health (eHealth) support patient education and monitoring.
- Health education - educational programmes increase patient knowledge and reduce patient dependence on healthcare personnel.

Empowerment helps bridge the gap between clinical knowledge and patient experience (Castro et al., 2016; Pekonen et al., 2020; Náfrádi et al., 2017). It is a key mechanism within both PCC and PeCC, enabling the shift from passive compliance to active participation. While PCC emphasizes engagement in clinical decisions, PeCC goes further embedding empowerment in a broader life context, including long-term health management, social roles, and quality of life.

1.5 Collecting patient opinions and experiences

Patient opinions and experiences can be gathered through various complementary methods. One common approach is the use of surveys/ questionnaires completed by patients after their visit, which assess both the quality of care received and the overall atmosphere at the facility. Another method is the targeted interview, a structured conversation conducted according to a pre-defined scenario, enabling an in-depth evaluation of selected aspects of care. Feedback can also be obtained in a less formal way, through individual patient opinions collected verbally or in writing. Facilities often provide a suggestion box, allowing patients to anonymously share their ideas for improvements. Additionally, some institutions use a simulated patient, a trained individual acting as an incognito patient who tests the facility's operations and later provides a detailed report on their experience (Sharma and Grumbach, 2017; Kumah et al., 2017; Han et al., 2023).

Other effective approaches include focus groups, where a small group of patients discusses their experiences in a moderated setting, allowing for the identification of recurring issues and the exploration of differing perspectives. Patient panels, composed of individuals who regularly provide feedback and participate in consultations on new services or materials, can ensure ongoing dialogue between patients and providers. Observation of patient behaviour in waiting areas or during the care process, conducted discreetly by trained staff, helps identify barriers and inefficiencies without relying solely on self-reported data. Patient diaries, in which individuals record their experiences with treatment or service use over time, can offer valuable longitudinal insights. Monitoring online platforms and social media, where patients share spontaneous opinions, provides access to unfiltered feedback and emerging trends. Reviews published on external platforms, such as healthcare rating websites, can also be systematically analysed to identify strengths and areas for improvement (Sharma and Grumbach, 2017; Kumah et al., 2017; Han et al., 2023).

These strategies align strongly with PeCC principles by recognizing patients as active contributors to the co-creation and evaluation of healthcare services, extending beyond individual treatment episodes to systemic and institutional feedback mechanisms.

Patient involvement in practice development

Patient engagement in shaping healthcare services can also be achieved through organized group activities. A Patient Advisory Council is a standing group of several individuals who meet periodically with staff to share their opinions on the facility's operations. Similar initiatives can be conducted online through a Virtual Patient Council, where groups are created on platforms such as social media to provide feedback on specific projects. Another method is the use of focus groups, moderated meetings with several to a dozen patients, designed to gather opinions on a specific topic in a more interactive setting. In addition, town hall meetings bring

together patients and the local community, creating an open forum for exchanging views and discussing needs. Collaborative workshops, in which patients and healthcare professionals jointly develop new service models or educational materials, allow for co-design and ensure that patient perspectives directly influence outcomes. Patient panels, smaller, standing groups of individuals who regularly test and review new processes, tools, or communication materials, help to maintain continuity of feedback over time. Open-door consultation days, when patients can informally meet staff to raise issues and suggest improvements, further strengthen the relationship between the facility and its community. (Sharma and Grumbach, 2017; Björkqvist et al., 2021; Bryant et al., 2022; Holm et al., 2024).

Patients can also take an active role in improving healthcare quality by becoming members of quality teams, where they participate in planning and implementing initiatives aimed at enhancing care. Their involvement in training and conferences allows them to share their clinical experiences with staff, enriching educational content with real-life perspectives. In some cases, patients may even co-lead training sessions, contributing to the onboarding process for new employees by offering insights into their needs, expectations, and experiences. Involving patients in safety practices, such as verifying medications, confirming surgical sites, or reporting adverse effects, fosters a culture of partnership and reduces the risk of errors (Martin and Finn, 2011; Sharma and Grumbach, 2017).

1.6 Respecting universal patient rights

Universal patient rights are deeply embedded in the principles of PCC, ensuring that care is respectful, responsive, and collaborative. It means upholding dignity, autonomy, informed consent, and confidentiality for every patient, ensuring equal treatment and protecting individuals from discrimination or harm (Kwame and Petrucka, 2022; Cohen and Ezer, 2013; Kummer, 2024; Olejarczyk and Young, 2025).

Although legal and ethical in nature, these rights reflect the humanistic foundations of PeCC, recognizing that clinical care must serve the whole person, not just the disease.

Right to healthcare

Every individual has the right to appropriate medical care without discrimination. This right is enshrined in documents such as the Universal Declaration of Human Rights (Article 25) and the International Covenant on Economic, Social and Cultural Rights (Article 12). Patients have the right to medical care that meets current medical knowledge and quality standards. Healthcare institutions are obliged to provide a safe treatment environment. Healthcare should be accessible to all, regardless of social, economic status, or other personal characteristics. The principle of non-discrimination is fundamental in many international legal documents.

Right to continuity and coordination of care

Ensuring that care is consistent and well-coordinated across different services addresses the comprehensive needs of patients. Effective coordination is crucial for successful treatment outcomes and patient satisfaction.

Right to information

Patients have the right to complete and understandable information regarding their health status, diagnosis, proposed treatments, and possible alternatives. This right is emphasized in the World Medical Association's Declaration of Lisbon on the Rights of the Patient. PCC emphasizes that patients should be fully informed about their health status and available treatment options, enabling them to make informed decisions regarding their care. This right is fundamental to respecting patient autonomy and fostering trust between patients and healthcare providers.

Right to informed consent

Patients have the right to give or withhold consent for proposed medical procedures after receiving appropriate information. This principle is fundamental in the Convention on Human Rights and Biomedicine (Oviedo Convention). PCC promotes active patient involvement in healthcare decisions. Recognizing patients as experts in their own experiences encourages collaboration with healthcare professionals in planning and implementing care.

Right to privacy and confidentiality

Health information concerning a patient is confidential and cannot be disclosed without their consent, except in specific situations prescribed by law. This right is also outlined in the Declaration of Lisbon. Maintaining the confidentiality of medical information and ensuring patient privacy are integral to PCC. These practices create a safe environment where patients feel comfortable sharing sensitive health information.

Right to respect for dignity and autonomy

Patients have the right to be treated with respect, regardless of their health status, age, gender, race, or beliefs. Their autonomy in making decisions about their own health should be respected. PCC respects the unique values, beliefs, and needs of each individual. Acknowledging and incorporating these personal aspects into care plans ensures that treatment is empathetic and effective.

Right to access medical records

Patients have the right to access their medical records and obtain copies. This right is recognised in many countries and is an important element of transparency in healthcare.

Right to complain and appeal

Patients have the right to file complaints regarding healthcare and to appeal medical decisions. These mechanisms are essential for ensuring accountability and improving service quality. PCC acknowledges the importance of mechanisms that allow patients to express opinions, file complaints, and receive feedback. Such openness contributes to continuous improvement in care quality and strengthens trust between patients and the healthcare system.

Right to spiritual and emotional support

Patients have the right to spiritual and emotional support in accordance with their beliefs and needs. This right is particularly important in palliative care and crisis situations.

This reflects the holistic philosophy of PeCC, attending to not just physical symptoms, but the full human experience of health, suffering, and care.

1.7 Personalisation of medical care

The PCC model effectively utilizes a tool - a pre-consultation checklist of health problems - that allows patients to prepare for their appointments in advance (Wolff et al., 2014). Before the consultation, they receive a form where they can highlight their most important symptoms, assess their severity, and indicate any issues they believe require discussion with the doctor. This document can also be completed by the patient's companion, allowing for a better understanding of their needs and expectations (Jarczewska and Tomasik, 2018).

Examples of international perspectives on person-centred care:

Pharmacists play an essential role in interdisciplinary healthcare teams, particularly in managing patients with chronic diseases and polypharmacy. Evidence suggests that interdisciplinary care models involving pharmacists, primary care physicians, nurses, and dietitians are associated with significantly improved clinical outcomes. For example, patients under such care have demonstrated greater reductions in HbA1c levels compared to those receiving standard care. Similarly, collaborative efforts in lipid management-where pharmacists coordinate medication titration and lifestyle interventions with physicians and nutritionists-have led to notable improvements in lipid profiles.

In Denmark, PeCC is supported by long-term doctor-patient lists, a mixed capitation and fee-for-service payment model, same-day access, and integrated electronic prescribing. Out-of-hours physician-led services with access to health records ensure smooth care transitions, reinforcing continuity, accessibility, and coordinated care. In Denmark, patient-centred care and SDM are recognised in policy initiatives but lack direct legislative support for patient involvement. Recent progress includes integrating SDM recommendations into national clinical guidelines, funding SDM projects, and establishing dedicated regional centres to advance

training, implement patient decision aids (PtDAs), and promote cultural change. A national online template for developing PtDAs has also been introduced. Despite these developments, unclear definitions, varying priorities among policymakers, leaders, and clinicians, and the absence of a central legislative push hinder consistent implementation. Embedding SDM into routine practice will require stronger national coordination, consensus on its purpose, and sustained investment in training and leadership (Davis et al., 2005; Steffensen et al., 2017; Steffensen et al., 2022).

In Australia, PeCC is promoted across micro (practice), mezzo (support resources), and macro (national standards) levels, with varied initiatives implemented in most states. Examples include homecare services in Western Australia and New South Wales, palliative care in Tasmania, the state-wide Essentials of Care programme, Victoria's toolkit for older people's care, and South Australia's Caring with Kindness framework aligned with national quality standards. In addition, the Australian Commission on Safety and Quality in Healthcare recognises PeCC as a core component of its National Safety and Quality Health Service Standards, embedding it into accreditation requirements for health organisations. National policy and professional bodies emphasise partnerships between patients, families, and clinicians, with a strong focus on respect for individual values, shared decision-making, and coordinated, holistic care. Nursing-led programmes, such as Essentials of Care, play a key role in translating PeCC principles into daily practice, while public health campaigns promote the "nothing about me, without me" ethos across healthcare settings (McCormack et al., 2015; Delaney, 2018; Flitcroft et al., 2020).

In England, PeCC is promoted at policy, organisational, and practice levels, with NICE guidelines and the *personalisation agenda* driving national strategy. While progress is seen in older people's, dementia, and mental healthcare, gaps remain between policy and practice, with inconsistent adoption and limited evaluation (McCormack et al., 2015). The new GP contract links up to 30% of income to quality targets, including patient surveys and feedback-driven improvements (Davis et al., 2005).

In the Netherlands, PeCC has increasingly gained national policy attention in recent years, building on earlier academic advocacy for relational, "generous care." Key initiatives include Vilans' guidelines and training for long-term care, Radboud University's personalised care model, and the adoption of McCormack and McCance's framework by universities such as Windesheim and Fontys (McCormack et al., 2015). Recent reports further highlight the growing integration of patient-centred care into healthcare systems and research programmes, emphasising its role in improving quality of care and patient involvement (NIVEL, 2023). This is further supported by empirical research from the Dutch primary care setting, which underscores the importance of person-centred approaches in improving care delivery and aligning healthcare with patient needs and preferences (Ahmed et al., 2023). The Centring Pregnancy prenatal care model improves woman-centred maternity services, increasing

prenatal visits, breastfeeding initiation, and women's involvement in care decisions compared with traditional care (Rijnders et al., 2019). Additionally, initiatives such as the Family and Patient Centred Intensive Care foundation bring together professionals, patients, and relatives to improve emotional support in Intensive Care Units, embedding patient values in both policy and clinical practice (van Mol et al., 2016).

In Northern Ireland, person-centred practice has been a strategic focus, driven by practice development to create effective care cultures. Guided by McCormack and McCance's framework, initiatives have included national standards for patient experience, a robust measurement framework, and integration of PeCC principles into nursing curricula at Ulster University. The Person-Centred Practice Research Centre leads international research in person-centred practice development, evaluation, and care for older people, with growing cross-professional engagement (McCormack et al., 2015).

In Norway, person-centredness is being advanced in response to demographic shifts and increasing long-term care needs, guided by national policy in mental health, substance abuse, health promotion, and rehabilitation. Development focuses on two main areas: services for older people-especially in nursing homes-and services for those with mental health or substance abuse issues. A proposed Lifelong Treatment Model for rheumatoid arthritis uses an Integrated Practice Unit to deliver person-centred, decentralized follow-up care. The model combines early diagnosis and treatment with patient-empowered disease management and telehealth, aiming to achieve early remission, improve quality of life, and sustain long-term remission while reducing outpatient visits without compromising safety (McCormack et al., 2015).

In Scotland, PeCC is central to national health policy, driven by the National Health Service (NHS) Scotland quality strategy and the Person-centred Health and Care Collaborative. This programme promotes evidence-based interventions, patient feedback, and staff wellbeing, while fostering shared learning and personalised support. Initiatives such as the Five Must Do With Me Areas and the Leadership in Compassionate Care Programme strengthen practice and research. The 2018 GP contract expanded multidisciplinary teams (MDTs) to free General Practitioners (GPs) for complex cases. Patients valued MDT care but still preferred known GPs for serious concerns, citing reduced access, shorter consultations, and poorer continuity-issues most acute in deprived areas (McCormack et al., 2015; Donaghy et al., 2024). In Scotland, Stroke Voices trains stroke survivors, including those with communication difficulties, to influence NHS stroke service development, promoting person-centred care through structured, supported public involvement (MacKellaig et al., 2014).

In the US, PeCC emerged in the 1980s following concerns about nursing home quality, becoming a statutory requirement through the 1987 Nursing Home Reform Act. Models like the Eden Alternative, Well-Spring, and the Green House emphasise small-group, home-like environments. While initially focused on older adults without dementia, recent policies such as the National Alzheimer's Plan Act aim to expand PCC, though adoption is hindered by perceived financial drawbacks (McCormack et al., 2015). The Patient-Centred Medical Home (PCMH) model represents a primary care-level approach that integrates and coordinates care around patients' needs and preferences. It relies on a team-based practice structure to deliver high-quality, accessible, and cost-effective services for acute, chronic, and preventive care. Evidence shows that PCMH implementation has led to reduced mortality and morbidity, improved patient and physician satisfaction, better quality and access to care, and lower use of emergency services and hospital admissions, resulting in decreased per-patient costs (Epperly, 2011). Boulton et al. (2009) conducted a controlled trial in urban clinical settings in the United States, focusing on older adults managing multiple chronic conditions. The intervention involved a coordinated interdisciplinary care team comprising a geriatrician, nurse, pharmacist, and social worker. The approach led to a 26% decrease in hospital admissions and resulted in increased patient satisfaction.

In Sweden, the Swedish government funded the establishment of a dedicated research centre at the University of Gothenburg - The Gothenburg University Centre for Person-Centred Care (GPCC) - focused on the development of person-centred care (Lewandowski et al., 2023). PeCC is supported by national laws, regulations, and policies that promote patients as active partners in healthcare. The system integrates PeCC with co-production and SDM, aiming to position the person as a co-producer of health. Implementation is decentralized across 21 regions and 290 municipalities, guided by principles of human dignity and equity. National infrastructures, such as knowledge management systems and quality registries, are being developed to enable a learning health system that includes patients, relatives, and professionals as partners. While PeCC has reduced patient uncertainty in some settings, its uptake varies, with organisational culture playing a key role - cultures prioritizing stability, control, and goal-setting appear more effective in sustaining desired outcomes than those focused solely on flexibility and cohesion (Alharbi et al., 2012; Hedberg et al., 2022).

Benefits of PeCC

- Positive outcomes were observed in elderly care following the implementation of PeCC. A study involving 138 British residents with dementia in 12 care homes showed that individually tailored PCC interventions reduced the proportion of residents using antipsychotics by approximately 19.1% (Fossey et al., 2006).
- A study involving 112 Swedes over the age of 65 found that applying person-centred care for patients with hip fractures reduced the length of care by 50%. It also lowered

the incidence of medical complications and decreased patients' reported pain levels (Olsson et al., 2009).

- Review of 55 studies found consistent positive links between patient experience, safety, and clinical effectiveness across diverse settings and conditions. Better patient experience was associated with improved health outcomes, greater adherence to treatment, increased preventive care, more efficient resource use, and, in some cases, higher technical quality and fewer adverse events (Doyle et al., 2013).
- The introduction of person-centred care in cancer treatment and palliative care improved patients' quality of life. It also led to more effective symptom relief compared to the control group (Brännström and Boman, 2014).
- An umbrella review of 16 systematic reviews examining the impact of PeCC on patient safety across various clinical settings found that this model of care may reduce the number of falls and lower patient anxiety (Rossiter et al., 2020).
- A systematic review showing that person-centred care can enhance the quality of care and, in certain clinical settings, reduce healthcare costs, combining better patient outcomes with more efficient resource use (Feldthusen et al., 2022).

Take-home message

- **Terminology matters:** "Patient" highlights illness, while "person" acknowledges the whole human being, their context, values, and rights.
- **PCC and PeCC works:** it improves outcomes, enhances satisfaction, lowers costs, and optimises the use of resources.
- **Core pillars:** empathetic communication, shared decision-making, family involvement, and use of patient and community resources.
- **Proven models:** McCormack and McCance's framework (culture, environment, processes) and the Picker Institute's Eight Principles (respect, coordination, information, access).
- **Communication is therapeutic:** plain language, active listening, MI, and storytelling strengthen engagement and adherence.
- **Education matters:** simulation, patient-as-teacher, and design thinking foster empathy, reflection, and co-creation of solutions.
- **Patient as partner:** patients are entitled to informed decisions, feedback, participation in service design, and involvement in safety and training.
- **A global trend:** across countries, PCC and PeCC are becoming a cornerstone of healthcare quality and safety, benefiting patients, families, and systems alike. Nevertheless, PCC is not without challenges: it may complicate treatment decision-making, increase costs due to higher staffing demands, and in some cases fail to produce measurable benefits compared to standard care. Moreover, patient-driven decisions can sometimes be misguided ("I know better" or "I read it online"), leading to inappropriate choices and suboptimal outcomes.

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2. Collaboration among healthcare professionals across disciplines

Weronika Guzenda, Magdalena Waszyk-Nowaczyk

Short insight

Interprofessional collaboration (IPC) has become a vital component of high-quality, patient-centred care, particularly in the context of chronic disease, polypharmacy, and increasing clinical complexity. It is more important than ever that professionals adopt a team approach in working. However, developing and maintaining effective working relationships requires more than goodwill; it depends on structured education, clear standards, and shared professional values. Global outcomes show that when pharmacists, physicians, nurses, and other experts collaborate, patient outcomes improve, preventable errors decline, and health systems run more effectively.

2.1 Basic definitions

IPC is key to confronting the increasing complexity of modern patient populations' health needs. Across healthcare systems, doctors, nurses, pharmacists, physiotherapists, psychologists, dietitians, and other allied health professionals have been recognised to hold complementary knowledge that, when integrated, can meaningfully contribute to improved patient outcomes (Angibaud et al., 2024; Zielińska-Tomczak et al., 2021a). Yet, the degree and nature of participation of various professions in interprofessional teams differs significantly across countries and is influenced by legislative systems, cultural beliefs, education models, and models of healthcare organisation (Bouton et al., 2023; Moecker et al. 2022). Drawing on qualitative, quantitative, and systematic review studies - and also on theoretical models such as the World Health Organization (WHO) Model of Collaborative Practice (Framework for Action on Interprofessional Education and Collaborative Practice, 2010) and Theory of Planned Behaviour (TPB) - it discusses barriers to and facilitators of collaboration.

Provision of healthcare has significantly changed over the past decades. Life expectancy, development of chronic and comorbid disease, and technology advancement have resulted in more complex care needs globally (WHO, 2010). Such complexity demands comprehensive solutions, and as such, IPC is not just desirable but unavoidable. As the WHO defines, IPC exists when "a number of health workers from a range of professional backgrounds work together with patients, families, carers and communities to achieve the best possible quality of care (Framework for Action on Interprofessional Education and Collaborative Practice, 2010). Effective IPC increases continuity of care, reduces adverse drug events, and improves patient and provider satisfaction (Bouton et al., 2023; Kaiser et al., 2022). It is especially important in primary care and chronic illness management, where there are multiple providers: physicians, pharmacists, nurses, therapists - who must communicate effectively to achieve optimal

outcomes (Angibaud et al., 2024; Moecker et al., 2022). While most healthcare systems, such as those in Canada, Australia, and the Netherlands, have institutionalized interprofessional teams with shared responsibilities and planning of care, others face regulatory, cultural, or educational barriers that dissuade teamwork (Moecker et al., 2022; Przymuszała et al., 2023). This difference compels the following basic questions: What determines successful collaboration among professionals? Why are medical professions effective collaborators in certain systems but remain excluded in others? How do professional culture, health policy, and education systems influence collaboration? And perhaps most importantly: How does this affect patient health?

National guidelines, empirical research, and systematic reviews inform the investigation of collaborative practice across multiple professions. Theoretical models such as the TPB are utilized to describe drivers and barriers at an individual level (Ajzen, 1991; Bendowska and Baum, 2023; Zielińska-Tomczak et al., 2021a). IPC is not just collaboration; it is a structured approach to care. It involves not just communication - it is working together, shared responsibility, decision-making, and accountability (WHO, 1988).

In healthcare, the terms multidisciplinary, interdisciplinary, and interprofessional are frequently used, often interchangeably, yet each represents a fundamentally different model of collaboration (Reeves et al., 2010; Choi and Pak, 2006; Hall, 2005). Clear definitions are essential for understanding how integrated healthcare functions and why interprofessional approaches - and the Interprofessional Education that supports them - are critical for effective, patient-centred practice (WHO, 2010; IPEC, 2023).

A **multidisciplinary** approach involves professionals from different disciplines working in parallel, each carrying out their own tasks independently and contributing their specific expertise to patient care (Choi and Pak, 2006; Reeves et al., 2010). Communication between team members is typically limited and formal, and each discipline maintains its own goals, responsibilities, and care plans (Hall, 2005). While this model acknowledges the importance of diverse perspectives, it often leads to fragmented care because the professionals do not integrate their approaches or develop a shared understanding of the patient's needs (Reeves et al., 2010; Busetto et al., 2016).

An **interdisciplinary** approach moves beyond parallel work by emphasizing coordination, interaction, and integration of knowledge (Choi and Pak, 2006; Reeves et al., 2010). Professionals from various fields communicate more openly, share insights, and jointly develop a comprehensive care plan (Zwarenstein et al., 2009). Although each discipline continues to operate within its own scope of practice, interdisciplinary collaboration fosters stronger connections among team members and allows for a more holistic understanding of the patient's situation (Hall, 2005). However, it may still fall short of fully unified decision-making and shared accountability (Reeves et al., 2017).

In contrast, an **interprofessional** approach represents the highest level of collaboration (WHO, 2010; IPEC, 2023). Here, professionals from different health fields work interdependently, jointly establishing goals, making shared decisions, and collectively taking responsibility for outcomes (IPEC, 2023; Reeves et al., 2017). Interprofessional collaboration is grounded in the principle that professionals learn with, from, and about each other (WHO, 2010), intentionally integrating their expertise to deliver seamless, coordinated, and patient-centred care (Reeves et al., 2010). This model aligns most closely with the aims of integrated healthcare systems, which rely on strong, continuous collaboration across settings and professions to improve safety, efficiency, and patient experiences (Busetto et al., 2016).

Understanding these distinctions reinforces the rationale for prioritizing an interprofessional approach in integrated healthcare. Because integrated care seeks to eliminate fragmentation and ensure continuity across different providers and sectors (Busetto et al., 2016), only interprofessional practice - rather than purely educational or interdisciplinary models - offers the structure needed for shared accountability, unified care planning, and real-time collaborative problem-solving (Reeves et al., 2017). Evidence consistently shows that interprofessional teams improve patient outcomes, reduce errors, enhance communication, and deliver care that is better aligned with patients' holistic needs (Zwarenstein et al., 2009; Reeves et al., 2017).

IPC plays a foundational role in ensuring high-quality Patient-Centred Care (PCC). As health systems struggle with progressively complex demands, IPC facilitates clinical excellence across several key areas, including safety, efficiency, workforce well-being, and patient outcomes.

IPC improves care in several key areas:

Safety

Communication breakdown is among the most common reasons for adverse events, especially in high-risk areas such as maternity care, emergency medicine, and hospital inpatient wards. IPC promotes interprofessional communication to allow important information about diagnoses, treatment, and medication plans to be communicated appropriately. For example, Romijn et al. (Romijn et al., 2018) discovered that structured interdisciplinary discussions in the maternity health in the Netherlands markedly reduced avoidable complications by clarifying role expectations and improving handovers. Similarly, WHO has identified IPC as an important strategy for reducing medical mistakes and patient safety globally (Framework for Action on Interprofessional Education and Collaborative Practice, 2010).

Efficiency

Team-based care models reduce fragmentation and redundancy of services (Bollen et al., 2019). When professionals work separately, patients end up getting replicated testing, prescribing at the same time, and contradictory advice. IPC reduces process complexity, simplifies functions, and eliminates duplication. This leads to better management of time, better resource utilization, and lower system cost (Bouton et al., 2023). Evidence from France and Germany has recognised that the combined effort of physicians and pharmacists reduces inappropriate hospital readmission and improves care continuity in chronic disease management (Angibaud et al., 2024). Yet, theory and practice are not always aligned. Several underlying factors may hinder the effectiveness of team-based responsibility, including fear of liability, lack of trust in other professionals' competencies, and reluctance to share decision-making authority. This may lead professionals to avoid shared decision-making and assume tasks independently in order to minimise perceived personal liability (Bouton et al., 2023; Moecker et al., 2022). However, while team-based responsibility is widely recommended, it also carries potential risks: unclear accountability for final treatment decisions, the possibility of "passing the buck" among professionals, and increased patient confusion about whom to approach for definitive guidance.

Workforce satisfaction

Collaborative practice environments are also associated with greater job satisfaction among healthcare professionals. When team members feel heard, respected, and valued, professional morale improves. Studies among pharmacists and physicians in Canada and Australia found that IPC reduced workplace stress, improved mutual trust, and increased professional fulfilment (Gregory and Austin, 2016; Haley et al., 2019). Additionally, well-functioning teams can mitigate burnout by distributing cognitive and emotional labour more equitably across disciplines.

Clinical outcomes

Most significant, IPC has a measurable impact on clinical outcomes. The evidence indicates that collaborative care models improve blood pressure control, diabetes glycaemic control, medication adherence, and medication safety (Reeves et al., 2017; Carter et al., 2009; Tricco et al., 2012). In Canada, for example, pharmacists working with physicians in primary care practices helped achieve significant reductions in systolic blood pressure and LDL cholesterol (Angibaud et al., 2024). A systematic review from Germany concluded that IPC improves both objective clinical outcomes and patient-reported outcomes, including satisfaction with care, feeling safe, and health-related quality of life (Kaiser et al., 2022). Since healthcare is evolving towards patient-centred, population-based, and value-based models, IPC should therefore be regarded not only as an optimal model of care, but as an essential component of modern healthcare delivery.

2.2 Collaboration across healthcare professions

Multidisciplinary teams remain the norm in both in hospitals and outpatient clinics, however, interprofessional models are getting more and more accepted as the gold standard of care quality. The latter are characterized by overlapping professional roles and collective decision-making. Pharmacists' effectiveness in collaborative practice increases when they are not only placed in physician-pharmacist dyads but integrated in the larger health team. Take, for example, the case of primary care for chronic diseases. Here dietitians are responsible for nutrition, psychologists for behavioural support, nurses for ongoing monitoring, and pharmacists for medication optimization. Success depends on clear upon role definition, communication systems, and most importantly, respect among all those concerned (WHO, 2010; Reeves et al., 2010; Sabater-Galindo et al., 2016).

The WHO as well as the Canadian Interprofessional Health Collaborative (CIHC) have been emphasizing IPC as a patient-centred approach for a long time. This means that professionals should not be satisfied with their own deliberations but should be actively involved in collective planning and decision making processes (Anderson et al., 2008; Reeves et al., 2010). Chronic illnesses such as diabetes or cardiovascular disease, which have become increasingly complicated, can only be managed through the coordinated efforts of various domains. Therefore, integrated teams are the only way forward.

Examples of broad-spectrum collaboration

Interprofessional collaboration is increasingly recognised as a key component in improving healthcare outcomes and addressing the complex needs of patients with multiple conditions. The following international examples illustrate how IPC is operationalised in different healthcare contexts. Primary care networks (PCNs) in Canada are basing their regular activity on team-based models that bring in pharmacists, nurses, mental health professionals, and physicians to co-manage patients having multiple comorbidities. Pharmacists who are part of these teams are, therefore, allowed to start therapy, keep the therapy on track through the monitoring of the therapeutic outcomes, and provide education to both patients and their peers regarding pharmacological strategies (Anderson et al., 2008). Similarly, in the Netherlands, maternity care teams such as those of obstetricians, midwives, nurses, and pharmacists undergo joint rounds and audit sessions that have been designed to facilitate the implementation of feedback loops across professional boundaries (van der Palen et al., 1997). Pharmacists in Australia work not only with General Practitioners (GPs) but also with long term care nurses, palliative care specialists, and occupational therapists in the process of Home Medicines Reviews, which they conduct, most of the time, within the patient's home, thus, in this model of collaboration interprofessional communication is seen to be limited in clinical settings but can also be extended to the community level, which is the place of the most vulnerable populations (Thistlethwaite, 2012).

Interprofessional team dynamics and trust

IPC complexity arises from interpersonal, organisational, and historical factors organisation. Trust, mutual recognition of expertise, and flattened hierarchies are very important. In groups where physicians are overly dominant, the level of meaningful collaboration is so low that it hardly happens, even if the necessary infrastructure is in place (CAIPE, 2013).

Successful models such as the ARMIN model in Germany or team-based medication reviews in Canada demonstrate that if pharmacists and other professionals speak the same language, both technologically and professionally, patient outcomes are better and professional satisfaction is greater (Anderson et al., 2008; WHO, 2010).

Toward an interprofessional culture

An authentic interprofessional health system requires conscious cultural change. All allied healthcare professionals must understand collaboration as core to their practice, not an ancillary skill. Role ambiguity must be addressed by Interprofessional Education (IPE) and policy, and interprofessional behaviours must be evaluated alongside clinical competence (Frenk et al., 2010; Parsell and Bligh, 1999).

Health professionals must be trained not only in clinical decision-making, but also in the social skills of collaboration: negotiation, assertiveness, and shared leadership. Only then can the full potential of interprofessional synergy be realized.

2.3 The role of education and training

Education is core to defining IPC. It not only defines professional identity but also informs attitudes, communication, and practice. The WHO (2010) notes that IPE - learning in the two or more professions "about, from, and with each other" - underpins effective collaboration.

Interprofessional education in undergraduate and graduate training

Different stakeholders have integrated IPE into health science education to various extents of commitment and design:

- Canada and Australia lead the way with systematic, mandatory IPE curriculum in pharmacy, medicine, nursing, and allied health schools (Gregory and Austin, 2016).
- Surveys of Polish students indicate strong support for teamwork, while also suggesting that formal exposure to interprofessional learning is still developing (Bendowska and Baum, 2023; Przymuszała et al., 2023).
- In the United States, IPE programmes are growing exponentially, usually centred on case-based exercises, book clubs, and simulations of paediatric practice (Haley et al., 2019; Kesselheim et al., 2019).

- Collaborative academic activities in the Netherlands and Germany include case-based seminars and simulation-based approaches, often involving interactions with medical students, general practitioners, and practicing pharmacists. These simulation-based formats, such as the Pharmacy Game, provide authentic, practice-oriented learning environments that foster interprofessional collaboration and prepare students for real-world practice (Fens et al., 2021). However, IPC remains more practice-oriented than curriculum-directed (Moecker et al., 2022; Romijn et al., 2018). Education interventions that engage medical professionals and students promote early exposure to team-based care, improve role clarity, and discourage professional stereotyping - one of the most significant behavioural barriers to IPC (Przymuszała et al., 2023).

Theory of planned behaviour

The TPB provides us with a useful insight in knowing how perceived control, perceived norms, and attitudes influence collaborative behaviour. Research reveals that (Zielińska-Tomczak et al., 2021a; Przymuszała et al., 2024):

- Positive attitudes towards collaboration are common among disciplines.
- Students are supported socially for IPC.
- Perceived behavioural control is poor -they are not confident about their ability to join or initiate collaboration.

Developing IPC is not merely about altering attitudes but also about giving medical professionals the ability, language, and institutional support to be active contributors.

Continuing professional development

Beyond formal education, in-service team-based training and continuing professional development are essential components of strengthening interprofessional collaboration. In several countries, such as Canada and the Netherlands, interprofessional workshops and audit meetings are regularly attended by medical professionals as part of routine practice (Romijn et al., 2018). In other settings, such as Saudi Arabia, structured postgraduate training programmes emphasize interprofessional competencies, particularly in high-acuity areas like critical care (Ismail et al., 2018). Despite these developments, continuing education in interprofessional collaboration remains limited or voluntary in many health systems, especially within primary care and community-based practice.

Training of trainers as a tool for strengthening collaboration

Another essential strategy for sustaining IPC is the Training of Trainers (ToT) model. This model trains selected health professionals, e.g., pharmacists, nurses or dentists, with advanced training in knowledge and facilitation competencies, enabling them to train colleagues

in their immediate work environments. The cascade model of ToT maximizes the impact of education intervention such that IPC practices are effectively transmitted and uniformly disseminated (Frenk et al., 2010).

In the health professions, ToT has been applied in areas such as chronic disease management, inhaler use, vaccination, and medication safety. Trained medical professionals acting as trainers not only enhance their own practice, but also create supportive learning environments by involving physicians, nurses, pharmacists, and other team members in joint educational activities. This strengthens mutual understanding of professional roles, reduces barriers, and improves teamwork (Anderson et al., 2008).

European data show that ToT-based inhaler-technique workshops increased the competence of participating health professionals and facilitated systematic dialogue across disciplines (van der Palen et al., 1997). In low-resource settings, ToT has enabled large-scale expansion of health-intervention delivery, demonstrating both scalability and sustainability (Odegard et al. 2011). Another example is ToT-supported training for administering injections and vaccinations, illustrating how the model can be used to expand professionals' scope of practice and meet public health needs.

2.4 Barriers to effective collaboration

Despite global momentum, many health systems continue to struggle with fully integrating medical professionals into effective interprofessional teams. Barriers are context-specific and multidisciplinary, but most often fall into structural, cultural, and educational domains (Table 1).

Tab. 1 Key barriers to interprofessional collaboration and recommended interventions

Barrier	Potential strategy
Professional hierarchies	Shared decision-making models, leadership training
Stereotyping	Interprofessional education, job shadowing
Communication gaps	Structured communication tools (SBAR), simulation training
Lack of resources	Virtual meetings, integrated case reviews
Organisational culture	Leadership support, IPC champions, recognition of collaborative practice

Structural barriers

Administrative constraints: In many countries, medical professionals such as pharmacists, nurses, physiotherapists, or dietitians lack a formal mandate to participate in clinical decision-making, even when their expertise would support safer and more efficient care.

Inconsistent practice law: Interprofessional collaboration often depends on fragmented or profession-specific regulation. In the USA, collaborative practice arrangements vary widely between states (Gregory and Austin, 2016), impacting not only pharmacists but also nurse practitioners and physician assistants, whose scope of practice may shift significantly across jurisdictions.

Lack of shared infrastructure: Limited access to shared digital systems impedes real-time collaboration for multiple health professions. For instance, French and German pharmacists are frequently excluded from access to Electronic Health Records (EHRs), reducing informational continuity (Angibaud et al., 2024; Moecker et al., 2022). Similar challenges are reported by physiotherapists and occupational therapists in the UK, who often lack access to laboratory and imaging data despite being responsible for longitudinal aspects of care.

Cultural and professional barriers

Power hierarchies: Physicians often remain primary decision-makers, especially in hospitals, as ultimate accountability cannot be diffused without risking fragmentation and confusion (Cronie et al., 2019). Yet every member of the interprofessional team-whether pharmacists, nurses, paramedics, or therapists-requires sufficient autonomy to contribute within their legal scope of practice. Failure to recognise these competencies limits collaborative potential.

Stereotyping and misperception: Many professionals still hold outdated or incomplete views of the roles and competencies of other health professions. For example, the clinical expertise of pharmacists is frequently underestimated (Bendowska and Baum, 2023), and similar misperceptions affect nurses, physiotherapists, and dietitians, whose contributions to clinical decision-making are not always fully valued. **Inflexible team structures:** Highly hierarchical or rigid environments may undermine teamwork. In Saudi Arabia and Germany, strict job descriptions and controlled lines of authority can reduce flexibility for interprofessional cooperation (Ismail et al., 2018). Comparable challenges are observed in surgical teams or intensive care units, where predefined routines may restrict cross-professional initiative.

Educational gaps

Lack of interprofessional training: Most countries still lack sufficient, system-wide interprofessional education (IPE) across all major health professions. Opportunities for shared learning remain uneven and often optional. **Communication skill gaps:** Health professionals across multiple fields, including pharmacists, nurses, and junior physicians - often report insufficient training in assertiveness, negotiation, and conflict resolution (Zielińska-Tomczak et al., 2021a). Even strong clinical knowledge does not automatically translate into confidence during interprofessional discussions.

Behavioural insights

Even when system-level supports exist, individual behavioural barriers persist. As shown in TPB literature, intention does not inevitably translate into action. Social pressure, unclear norms, lack of institutional support, and perceived professional inferiority discourage many healthcare providers from initiating collaboration - despite recognizing its value (Zielińska-Tomczak et al., 2021a). Similar dynamics affect nurses reluctant to challenge physician decisions, or junior doctors hesitant to seek input from allied health professionals.

Addressing these barriers requires more than regulatory change; it also demands a gradual transformation of organisational culture. Leadership support, the promotion of shared goals, and the creation of psychologically safe environments where all professionals feel empowered to contribute are essential for fostering effective interprofessional collaboration. In resource-constrained settings, low-cost strategies such as regular interprofessional case discussions, joint clinical meetings, shared educational activities, and the use of digital communication tools may help strengthen collaborative practice without requiring substantial financial investment. These approaches can facilitate mutual understanding of professional roles, reduce hierarchical barriers, and support the development of a collaborative team culture.

2.5 Facilitators of collaboration and future strategies

While barriers do exist, successful IPC does happen - and when it does, it transforms care. Knowing what motivates effective collaboration enables health systems to replicate and expand what works.

System-level enablers

- Clear policy frameworks: The fact that provincial policies in Canada delineate scopes of practice and mandate IPC training has made it possible for pharmacists to join primary care teams (Interprofessional Collaboration Guidelines, 2023).
- Collaborative Practice Agreements (CPAs): CPAs between physicians and pharmacists in the United States and Canada establish clear roles and legal protection for collaborative decision-making (Gregory and Austin, 2016).
- Integration in health records: Combined EHRs facilitate real-time communication and collaboration, especially in the Netherlands and Canada (Romijn et al., 2018).

Education and IPE

- Early IPC exposure: Simulation-based education, case-based instruction, and book clubs (e.g., in the U.S. and Australia) facilitate empathy, teamwork, and respect (Haley et al., 2019; Kesselheim et al., 2019).
- IPE within curricula: Countries with IPE at the undergraduate level -e.g., Australia and Canada - demonstrate greater preparedness and enhanced interprofessional attitudes early in their careers (Interprofessional Collaboration Guidelines, 2023).

Behavioural drivers

Applying the TPB, the following facilitate collaboration:

- Positive attitudes: Both doctors and most pharmacists agree IPC improves patient care (Zielińska-Tomczak et al., 2021a).
- Supportive norms: In institutions where team care is fostered by the culture, professionals are more likely to engage (Przymuszała et al., 2023).
- Perceived control: If the pharmacists are trained, recognised, and included in the decision-making, they're more proactive and confident (Gregory and Austin, 2016).

2.6 Impact on patient outcomes

The strongest case for investing in interprofessional collaboration (IPC) is its proven impact on outcomes.

Clinical outcomes

- Reduction of cardiovascular risk: French and German evidence indicates that team-based interventions, through collaboration, enhance blood pressure and lipid management (Angibaud et al., 2024; Moecker et al., 2022).
- Diabetes management: Multidisciplinary teams composed of physicians, nurses, pharmacists, and allied health professionals have been associated with reduced cardiovascular risk and better treatment adherence (Tricco et al., 2012).
- Polypharmacy and safety: Interprofessional coordinated medication review and shared monitoring decrease errors, adverse drug reactions, and inappropriateness in prescribing (Bouton et al., 2023).

Patient-reported outcomes (PROs)

A systematic review by Kaiser et al. (Kaiser et al., 2022) found that IPC can improve:

- Patient satisfaction.
- Quality of life.
- Perceived safety.
- Understanding of their own care.

Organisational benefits

- Reduced readmissions: The involvement of multiple specialists in transitions in care, particularly on discharge from hospital, has been linked with fewer readmissions and emergency visits (Kesselheim et al., 2019).
- Reduced length of stay: IPC is correlated with more efficient workflows and faster alignment of treatment plans (Interprofessional Collaboration Guidelines, 2023).

Economic outcomes

Although under-researched, early evidence suggests that IPC has the potential to reduce healthcare costs through:

- Prevention of complications due to drugs.
- Avoidance of unnecessary tests or orders.
- Better adherence to evidence-based guidelines.

2.7 Implications and future directions

To enhance IPC and make it more effective, reforms must be enacted on various levels: education, practice, policy, and organisational culture. From cross-national evidence, the following is advised.

Embed IPC in health education curricula

- Incorporate IPE modules as a requirement across all medical professions' courses.
- Use simulation, case-based learning, and interprofessional clinical placements to develop realistic-world collaborative competencies.
- Assess behavioural readiness using models like the TPB.

Clarify and expand roles through legislation

- Enact or unify policies and agreements to strictly define roles on interprofessional teams.
- Adopt the multidisciplinary health professional's role in chronic disease management, medication review, prevention, and patient education.
- Standardize these laws to reduce regional variation (e.g., within the U.S. or European Union (EU) nations).

Improve infrastructure for team-based care

- Provide joint access to EHRs to allow multiple professionals to contribute and follow through on care plans.
- Allow secure communication devices and embedded digital platforms to support collaboration.

Foster organisational and cultural change

- Encourage team-building activities within clinical settings, e.g., routine interdisciplinary conferences.
- Train leadership in inclusive, non-hierarchical structures where the voice of all professionals is heard.
- Establish performance metrics recognizing the collaborative contribution to the quality of care.

Incentivize research and evaluation

- Support outcome studies that report quantitative measurements of IPC's impact on clinical and patient-reported outcomes.
- Encourage comparative policy research to determine how legal frameworks influence IPC.

IPC is prerequisite for effective, person-centred healthcare. Across professions, health professionals obviously contribute to patient safety, chronic disease management, and therapeutic optimization, but the level of integration varies by country (Angibaud et al., 2024; Romijn et al., 2018; Zielińska-Tomczak et al., 2021a).

According to the TPB and WHO IPC model, developing cooperation requires collective investment in people (education and skills), processes (clear roles and consensus decisions), and systems (policy, interoperable records, facilitative culture). Health systems need to move from intention to action so that interprofessional teamwork is the norm and not the exception (Zielińska-Tomczak et al., 2021b).

Take-home message

- IPC is essential to deliver safe, effective, and patient-centred care.
- All medical professionals have the competence to contribute to the value of clinical teams, though their roles and responsibilities may vary across health systems.
- Effective IPC depends on clear role definitions, supportive policies, shared information systems, and IPE.
- Evidence shows that integrating medical professionals into clinical teams improves patient outcomes, reduces errors, and enhances satisfaction for both patients and healthcare providers.
- Healthcare systems should implement concrete organisational, educational, and policy measures to translate the vision of collaboration into routine clinical practice.
- Promoting greater integration of all health professionals is not only beneficial - it is fundamental for modern healthcare.

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3. Models of integrated healthcare

Michał Gackowski

Short insight

This chapter presents integrated care (IC) as a paradigm shift - from short-term, reactive treatment to continuous, person-centred care linking physical and mental health. It outlines models of healthcare integration, linking theoretical frameworks with practical examples from around the world, and illustrating them through specific disease areas and conditions.

3.1 Basic concepts and definitions

IC is a concept that gaining increasing global attention as a response to the growing fragmentation of health systems. Its main goal is to ensure continuity, coherence, and coordination across medical and social services, particularly for complex patients, those who are chronically ill, often older, and frequently affected by both physical and mental health problems (Garattini et al., 2022). The emergence of IC reflects a fundamental shift from systems designed to treat acute illnesses toward those capable of managing long-term, comprehensive care.

The rising burden of chronic diseases worldwide highlights the limitations of traditional, reactive, and episodic models of care, which focus mainly on acute episodes rather than long-term health management (Bhat et al., 2021; Thornicroft et al., 2019). These models often lack continuity, prevention, and holistic planning. For example, in Australia, 35% of atrial fibrillation costs relate to disease management, whereas 65% result from complications associated with poor care coordination. (National Stroke Foundation, Australia, 2010).

IC, broadly defined as the effort to connect all components of healthcare into a coherent service continuum (Thaldorf and Liberman, 2007), involves the design, delivery, and evaluation of services that support continuity and personalization. The aim is not just to treat the disease but to care for the person as a whole. This shift in focus, from illness to patient needs, entails integrating physical and mental healthcare and the connection between health services with social support systems (Thornicroft et al., 2019).

However, integration is not without challenges. Involving more specialists and organisations in care delivery, while potentially improving treatment quality, can also increase complexity and confusion and result in service duplication if not carefully coordinated (Bhat et al., 2021). The success of integrated models depends heavily on how well they are designed and tailored to the specific needs of the population they serve (Wolfe et al., 2020).

Walter N. Leutz's (1999) classic “Five Laws of Integration” captures some of the paradoxes and practical limitations of the concept. These include the insight that “you can't integrate all services for all people”, that integration “costs before it pays”, “your integration is my fragmentation”, “you can't integrate a square peg and a round hole”, and “the one who integrates calls the tune” (Leutz, 1999). These observations remain highly relevant today, as integration often requires trade-offs, adaptation, and the redefinition of professional and organisational roles.

IC models operate at policy, management, financing, and clinical levels, and involve physicians, nurses, pharmacists, physiotherapists, social workers, and others (Baxter et al., 2018). Their effectiveness relies on joint planning, shared access to information, clearly defined roles, and efficient communication across the care team (Jennings and Astin, 2017).

In recent years, numerous models of integrated healthcare have been proposed. Despite their clinical diversity, most literature highlights several core domains and features essential to IC, regardless of specific conditions or populations.

Jennings and Astin (2017) stress the importance of interdisciplinary teams working collaboratively across different levels of planned care to address complex patient needs that no single profession can meet alone. They outline key domains and indicators for effective Interdisciplinary Healthcare models, including behavioural counselling, goal setting, monitoring, and nurse prescribing, particularly cardiovascular disease management (Jennings and Astin, 2017). The key domains are collected in **Figure 10**.

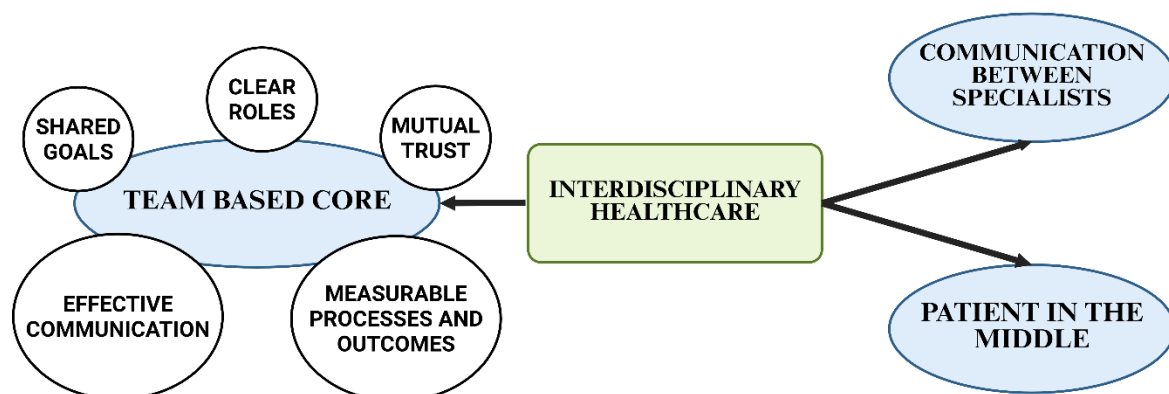


Fig. 10 Key domains of interdisciplinary healthcare based on a team-based core (Developed by the author, based on Jennings et al., 2017)

Bhat et al. (2021) emphasize that Integrated Chronic Care Models (ICCMs) for atrial fibrillation support coordination through community engagement, streamlined service delivery, decision support tools, integrated health records, and patient self-management. These models promote multidisciplinary care pathways and joint decision-making.

Baxter et al. (2018) identified four main categories of IC initiatives: improving patient care, organisational/system reforms, staff practice changes, and financial or policy shifts. They caution that new models are often more effective when targeted at specific patient groups, rather than as universal solutions.

Regarding paediatric care, McLeigh et al. (2022) point to the potential of integration to improve behavioural health outcomes, but stress the need for rigorous validation across different settings and populations, along with proper provider training and system-level support.

IC is a dynamic and promising approach that requires careful implementation and contextual adaptation. No single model fits all settings; success depends on identifying the specific needs of patient groups and the capacity of the local health system to respond (McLeigh et al., 2022). Significantly, the outcomes of integration differ by country context. In high- vs. low-income settings, the factors that integration can positively influence vary significantly, reinforcing the need for locally adapted approaches (Yuan et al., 2022). In this chapter, we will examine both the clinical and organisational dimensions of IC models. Our focus will include different levels and types of integration, as well as specific medical fields in which IC has been implemented. Through selected examples, we will explore the structure and function of these models and critically assess their effectiveness.

3.2 Health information technologies and systems

Integrated healthcare information systems bring together data from multiple sources to streamline care coordination and management. These systems enable faster communication and decision-making by connecting patient records, lab results, and administrative systems across hospitals and clinics. The result is more efficient workflows: for example, clinicians can avoid duplicating tests and quickly access a patient's complete medical history. Ultimately, integrated systems help ensure that providers have the same information, improving continuity of care and patient outcomes. Key enabling technologies include Health Information Systems (HIS) or electronic medical record (EMR) platforms, cloud computing, blockchain, and artificial intelligence (AI) (Wu and Trigo, 2021). HIS platforms aggregate patient data across care settings, manage EHRs, and support administrative workflows. Cloud computing provides scalable storage and processing, sharing data across regions and institutions. Emerging technologies such as blockchain are being explored to secure data exchanges and enable interoperability, while AI and machine learning algorithms leverage integrated datasets for predictive analytics and decision support. By leveraging these technologies, healthcare organisations can share and process information more seamlessly across providers. Integration of information technology (IT) systems yields multiple benefits (Hariyati et al., 2020). For example, it can reduce duplicate tests and paperwork, saving time and costs. Clinicians with consolidated records can make more informed decisions, improving patient safety by reducing errors. Integrated data supports population-level analyses and quality-improvement efforts, helping hospitals identify trends and improve care delivery. In sum, better

IT integration improves operational efficiency and care outcomes. Widespread integration also faces significant challenges (Bayramzadeh and Aghaei, 2021). Implementing interoperable systems can be costly, and the technical complexity of linking disparate IT platforms is high. In addition, centralizing sensitive health data raises serious privacy and security concerns. These barriers can slow adoption and require robust governance and resources to address. Wan et al. identified six key integration mechanisms in healthcare delivery systems (Wan et al., 2002). These are summarized as follows:

- Informatics integration: Linking disparate information systems and databases to share patient data seamlessly across units and providers.
- Case management: Coordinating patient care through dedicated case managers or multidisciplinary teams (MDTs) that follow the patient through different services.
- Hybrid physician-hospital integration: Establishing formal affiliations or joint programmes between physicians (or physician groups) and hospitals.
- Forward integration: Expanding services downstream in the care pathway, such as hospitals operating outpatient clinics or community care services.
- Backward integration: Bringing upstream services under the system's control, such as acquiring specialist practices or diagnostic labs that feed into the hospital.
- Service differentiation (high-tech services): Offering specialized advanced services (e.g., cutting-edge diagnostics or treatments) to attract patients and improve efficiency.

These mechanisms influence how hospitals coordinate services and can improve efficiency when implemented effectively. Empirical data show that five of the six integration mechanisms (excluding forward integration) are positively associated with healthcare. However, the effectiveness of these mechanisms in reducing inefficiencies varies. Notably, informatics integration and physician-hospital integration appear to have more favourable impacts than case management or backward integration strategies (Wan et al., 2002).

Technological integration is a cornerstone of IC transformations, offering innovative tools to enhance healthcare delivery, from patient management systems to telemedicine applications. Yet, adapting and optimizing these tools to the specific needs of healthcare environments remains a significant challenge, particularly when the ultimate goal is high-quality patient care. Even though integrated systems can improve data management, diagnostic accuracy, treatment planning, and interdepartmental coordination, implementation still faces obstacles, including high initial costs, system incompatibility, professional resistance, and data security concerns.

Research highlights substantial improvements resulting from integration, including a 35% increase in operational efficiency, a 25% reduction in data duplication, and a 40% decrease in patient wait times (Kuswari et al., 2025). These outcomes underscore the transformative

potential of integrated systems to streamline workflows, support clinical decisions, and improve patient satisfaction. Strategic investments, stakeholder collaboration, and practical implementation are crucial for success. Advanced technologies like AI and blockchain further accelerate efficiency by enabling secure data sharing, faster diagnostics, and enhanced multidisciplinary collaboration. By providing real-time access to critical information and optimizing resource use, integrated systems serve as transformative tools in modern healthcare settings (Kuswari et al., 2025).

3.3 Healthcare system integration levels

The degree of integration within a healthcare system is a key determinant of its effectiveness, efficiency, and service quality. Research indicates that structural and functional integration can increase patient satisfaction, improve continuity of care, and reduce service duplication and administrative errors. However, excessive or poorly managed integration may generate additional costs without yielding proportional benefits (Bayramzadeh and Aghaei, 2021; Kuswari et al., 2025; Wan et al., 2002; Wang et al., 2024).

IC models differ in the intensity and scope of integration. A commonly cited framework distinguishes between three primary levels: linkage, coordination, and full integration (Leutz, 1999). Linkage refers to basic communication and cooperation between institutions, while each maintains its operational independence. Examples include medical and social service professionals collaborating to exchange patient information or ensure referrals. Coordination involves more systematic mechanisms, such as joint discharge planning, assigning responsibility for care transitions, and facilitating interprofessional communication. The most advanced model, full integration, involves merging resources and creating MDTs within shared organisational and information systems (Leutz, 1999). Detailed information about the differences between levels is shown in **Table 2**.

A similar three-stage model is reflected in the Substance Abuse and Mental Health Services Administration - Health Resources and Services Administration (SAMHSA-HRSA) - Centre for Integrated Health Solutions framework, which defines six levels of integration, grouped into three categories: coordination (levels 1-2), co-location (levels 3-4), and integration (levels 5-6) (McLeigh et al., 2022; Heath et al., 2013). This model assesses integration across five core dimensions: team collaboration, clinical service organisation, patient experience, organisational structure, and financial model. Level 1 represents minimal communication and separate services, whereas level 6 reflects whole team integration, shared treatment planning, and unified financing structures (McLeigh et al., 2022; Heath et al., 2013) - **Table 3**.

Tab. 2 Levels of integration in interdisciplinary healthcare across operational areas (Leutz, 1999)

Operations	Linkage	Coordination	Full integration
Screening	Screen populations for needs	Screen at key points (e.g., discharge)	Receive referrals, team meets needs
Clinical practice	Respond to person with disabilities' needs in care	Use key workers for linkage	MDTs manage care
Transitions/service delivery	Refer and follow up	Smooth transitions	Provide/control care in settings
Information	Provide information when needed	Share reports routinely	Joint record for daily management
Case management	None	Case managers and linkage staff	Teams manage all care
Finance	Know who pays for services	Decide on payment in cases	Pool funds, new services
Benefits	Follow the eligibility rules	Maximize efficiency/coverage	Merge benefits, redefine eligibility
Need dimensions			
Severity	Mild/moderate	Moderate/severe	Moderate/severe
Stability	Stable	Stable	Unstable
Duration	Short to long term	Short to long term	Long term/terminal
Urgency	Routine/nonurgent	Mostly routine	Frequent urgency
Scope	Narrow-moderate	Moderate-broad	Broad
Self-direction	Self-directed/ informal	Varied self-direction	Weak self-direction

Tab. 3 Levels of integration (McLeigh et al., 2022)

	COORDINATED		CO-LOCATED		INTEGRATED	
Scope of Integration	Level 1 (Minimal)	Level 2 (Basic Collaboration)	Level 3 (Basic Collaboration)	Level 4 (Close Collaboration)	Level 5 (Partially Integrated)	Level 6 (Fully Integrated)
Communication	Referral from the list	Referral to known provider	Written	In-person	Routine	Ongoing
Provider Interaction	Only when needed	Rarely	Meet Occasionally	Meet Regularly/ Defined Roles	Meet Regularly/ Team	Meet Continuously Roles Blended
Location	Separate	Separate	Same health system	Same office space	Shared Clinic	Shared
Medical Record Systems	Separate	Separate	Separate	Same System	Increased Sharing	Seamless Sharing
Management	Consult only	Consult only	Collaborative	Coordinating Treatment Plans/ Acknowledge Barriers	Shared Treatment Plans/ Resolving Barriers	Cultural Change/ System Support
Clinic Visits	Separate	Separate	Separate	Separate	Shared	Shared

A study by Tamaki et al. (2022) found that higher levels of mental health service integration were associated with reduced suicide risk among youth. Facilities rated at integration level 5 (close collaboration with shared systems) were linked to a 60% lower risk than those operating at level 2 (basic remote coordination). These findings reinforce the notion that deeper integration may significantly improve health outcomes.

In a review of paediatric integrated care (PIC) models, McLeigh et al. classified 32 interventions using the SAMHSA-HRSA framework. The majority (19) fell within the co-location range (levels 3-4), while only 5 demonstrated partial or complete integration - levels 5-6 (McLeigh et al., 2022). Grimes et al. confirmed the effectiveness of higher-level models; patients in a level 4 model were seven times more likely to engage in treatment than controls (Grimes et al., 2018).

In China, two main models of healthcare integration are observed: tight integration and loose collaboration, organisation which differ across administrative, organisational, and service-delivery domains. Primary Health Institutions (PHIs) remain under local government ownership

in tight integration, but hospitals lead management. Formal contracts define cooperation, and dedicated coordination offices (2-3 staff or entire departments) oversee the integration process. Hospitals support the creation of new departments at PHIs based on service needs and ensure shared local information systems. Service delivery includes dual referral channels, structured joint training programmes funded by hospitals and local authorities, and regular specialist visits to PHIs. In contrast, loose collaboration relies on nominal agreements with PHIs managing themselves. Coordination is limited to part-time hospital staff, and new departments are rarely established. While information systems may be shared, their content is minimal. Referrals are mostly upward only, and training or specialist support depends on local government policy or personal contacts, lacking a clear structure or consistent funding (Yuan et al., 2022).

Ultimately, the appropriate level of integration should reflect the system's structure, available resources, and population needs. While higher levels of integration offer greater potential for quality and efficiency improvements, they require substantial investments (organisational, technological, and cultural) and careful change management (Heath et al., 2013).

3.4 Types of healthcare system integration

Evolution of integration processes and strategies - as the concept of IC has matured and the implementation plan has undergone significant transformation. These changes reflect the growing complexity of health systems and the need to tailor care approaches to patient needs and local contexts (Yuan et al., 2022). Evans et al. (Evans et al., 2018) defined the evolution as:

- From horizontal to vertical integration. Initial integration efforts focused mainly on horizontal integration, meaning collaboration between entities at the same level, such as among primary care providers (PCPs). Over time, vertical integration has gained prominence, involving coordination across different levels of care, from social services to primary care to hospitals. This form of integration is essential to building seamless care pathways that enable patients to transition smoothly across care stages.
- From institution-centred to community-based IC. The community-based focused care model provides a more community and patient-centred approach. Integration is no longer just an administrative task but a way to align care with local population needs. In this model, the patient becomes an active participant, and care is embedded in the community's social fabric.
- From economic to quality arguments for integration. Early justifications for integration were often rooted in expected cost savings. Today, there is a growing emphasis on quality-related outcomes, such as patient safety, experience, and quality of life. This shift signals a broader understanding of integration to improve care effectiveness rather than contain costs.

- From organisation-focused to patient-centred evaluation. Historically, integration has been evaluated using institutional or system-level indicators. More recently, attention has turned to patient-centred measures, such as individual experiences and well-being. These metrics provide a clearer view of how integration affects real-world outcomes from the patient's perspective.
- From structural to operational and cultural change. While structural reforms, such as merging institutions, were key to early integration, there is now greater recognition of the importance of operational, relational, and cultural factors. Sustainable integration requires changes in structure, everyday practices, communication styles, and organisational culture.
- From universal to targeted integration. Initially, integration strategies were often designed with a "one-size-fits-all" approach. Today, the focus is increasingly on targeted populations, such as the elderly, chronically ill, or socially vulnerable groups. By concentrating efforts where they are most needed, integration becomes more impactful and resource-efficient.

The evolution of integration reflects a shift from institution-based, cost-driven models to patient-centred, quality-oriented, and locally tailored approaches that embrace cultural and operational change.

Vertical integration in healthcare

Vertical integration in healthcare refers to the coordination of services and providers across different levels of care, most typically linking primary care, hospital (acute) care, and post-acute or rehabilitative services. Unlike horizontal integration, which connects providers on the same level (e.g., networks of General Practitioners (GPs)), vertical integration aims to reduce fragmentation by organizing services across the continuum of care, under a unified structure or shared governance (Wang et al., 2024).

This model plays a central role in developing continuity of care by aligning various medical professionals and institutions along the patient's treatment pathway. Classic examples include integrating primary care with hospital care or hospital care with post-acute services. However, the concept has evolved to include more diverse forms, such as the integration of hospitals with pharmaceutical organisations (Calvert et al., 2012), academic medical centres with clinical practice (Van den Abbeele et al., 2016), or affiliations between hospitals and laboratories (Whaley et al., 2021), and even hospitals and insurance companies (Baranes and Bardey, 2015).

Vertically integrated systems are typically structured around two key elements:

- Structural integration - all essential services are available under one umbrella.
- Functional integration - effectiveness of coordination across these services.

While structural integration is more straightforward to implement, achieving functional integration remains challenging, requiring robust management, communication, and clinical alignment.

Organisational forms and typologies

The literature identifies various organisational models within vertically integrated systems (Heeringa et al., 2020). These include:

- Physician-Hospital Organisations (PHOs): formal alliances between hospitals and physicians aimed at collective contracting with health plans, while maintaining operational autonomy.
- Management Services Organisations (MSOs): entities that provide administrative support and infrastructure to physician practices, often as part of hospital integration.
- Clinically Integrated Networks (CINs): collaborations between hospitals and independent physicians designed to coordinate care while meeting specific quality and cost-control requirements.
- Foundation Models: non-profit entities that employ or contract with physicians under professional service agreements within hospital systems.
- Integrated Delivery Systems (IDSs): comprehensive structures that unite hospitals, medical groups, and often post-acute or behavioural health providers (BHPs) under unified governance or contractual collaboration.

These models vary in ownership, financial risk-sharing, and the degree of clinical oversight, but all seek to foster collaboration across care settings.

Implementation in China: tight vs. loose integration

China's national health reform strategy, launched in 2009, strongly emphasized vertical integration to strengthen primary healthcare (PHC). Vertical integration typically involves coordinating senior medical specialists and resources between hospitals and PHC institutions (PHIs) through organisational and managerial reforms (Yuan et al., 2022).

Based on Leutz's framework, Chinese models fall into two categories:

- Tight integration, characterized by contractual partnerships, shared resources, and strong managerial oversight.
- Loose collaboration, defined by limited formal ties and weaker operational links.

Empirical studies show that vertical integration in China, particularly in tight models, has improved efficiency, quality of care, inpatient service volumes, better management of chronic diseases such as hypertension and diabetes, and enhanced care coordination. However, it also brought challenges, including losing autonomy among PCPs, increased workloads, and higher turnover rates (Yuan et al., 2022).

According to existing evidence, vertical integration between PHIs and hospitals in China, whether targeting the general population or patients with specific conditions, has proven effective in improving the health system's output and outcomes (Wang et al., 2024).

Effectiveness, benefits, and limitations

Vertical integration has been associated with positive impacts in various contexts, including improved coordination across providers, access to capital and infrastructure for quality improvements, and more substantial alignment of incentives and standardization of care (Amado et al., 2022; Heeringa et al., 2020; Machta et al., 2019).

In the UK, vertical integration between NHS trusts and general practices showed modest reductions in emergency attendances, readmissions, and outpatient visits, though patient experience remained unchanged. Improvements appeared temporary and limited in scope (Sidhu et al., 2023).

Meta-analyses suggest clinical benefits, including reduced blood pressure and glucose levels among chronically ill patients and improved treatment adherence (Wang et al., 2024). Nonetheless, evidence regarding system-level outcomes remains inconclusive. Some studies report better quality of care (Amado et al., 2022; Machta et al., 2019), while others note no impact or even declines in efficiency, as measured by service utilization, spending, and prices (Machta et al., 2019; Post et al., 2018).

Concerns also arise regarding market consolidation, antitrust risks, and bureaucratization, which may compromise PCC. Increased system size may change provider behaviour, sometimes leading to overuse of specialized services and higher hospital utilization (Machta et al., 2019).

Vertical integration is a multidimensional strategy to enhance connectivity and collaboration across levels of healthcare. Its implementation varies widely, from formal structural mergers to contractual partnerships focused on clinical coordination. While its potential benefits are considerable, particularly for chronic disease management and continuity of care, evidence remains mixed. Outcomes depend on design, context, and the balance between structural alignment and functional collaboration. Thus, the effectiveness of vertical integration depends not only on structural design, but also on contextual and organisational factors. As health systems increasingly turn to vertical integration to address fragmentation, carefully considering local conditions, governance models, and patient needs remains critical to achieving their promised outcomes.

Horizontal integration in healthcare

Horizontal integration refers to the linkage of provider organisations operating at the same healthcare system level, most commonly across institutions offering similar types of care,

such as hospitals, physician groups, or PCPs. The core aim is to increase service delivery capacity, reduce fragmentation, and improve coordination by minimizing organisational boundaries (Heeringa et al., 2020).

This form of integration became prominent during the 1980s and 1990s as hospitals and physician groups in the United States sought to reorganize to achieve greater efficiency, financial sustainability, and improved patient outcomes (Bazzoli et al., 2004). Healthcare providers formed networks, merged with similar institutions, or created shared service arrangements to consolidate resources and increase their strategic positioning.

Organisational forms of horizontal integration

Several models of horizontal integration have evolved to serve distinct organisational goals and patient needs:

- **Single-Specialty Group Practices:** Physicians of the same specialty form larger groups to achieve economies of scale, improve market positioning, and gain administrative support. These groups may operate independently or be affiliated with hospitals or health plans (Burns et al., 2013).
- **Independent Practice Associations (IPAs):** These are loosely organized networks of independent physicians that contract collectively with insurers. IPAs maintain provider autonomy while enabling shared financial risk and improved negotiation leverage (Burns et al., 2013; Casalino et al., 2013; Page, 2003).
- **Multispecialty Group Practices (MSGPs):** Bringing together primary and specialty care providers, MSGPs aim for internal coordination and shared resources. Their scope allows for broader service offerings and patient retention within the group (McCarthy, 2015; Shortell et al., 2010).
- **Virtual Physician Networks:** Especially relevant in underserved or rural areas, these networks provide infrastructure, coordination tools, and resource access, often functioning as the foundation for Medicaid ACOs (Shortell et al., 2010).
- **Multihospital Systems:** These involve horizontal integration of acute care hospitals across multiple locations to increase access and achieve operational economies. While originally designed horizontally, many of these systems have since evolved into vertical structures (Burns and Pauly, 2002).

Observed benefits of horizontal integration

Research has identified several anticipated and realized benefits resulting from horizontal integration (Bazzoli et al., 2004; Heeringa et al., 2020):

- **Administrative Efficiency:** Post-merger organisations report successful consolidation of finance, strategic planning, and quality improvement functions, with quick unification of administrative support services.

- **Operational Streamlining:** Consolidating key administrative units, closing or repurposing underused capacity, and reducing service duplication have improved efficiency.
- **Educational Integration:** Merged hospitals often integrate educational and training functions effectively.
- **Motivation through Financial Incentives:** Decisions to consolidate services were more successful when aligned with reimbursement schemes, such as the Medicare Prospective Payment System.
- **Internal Referral and Coordination:** Especially in MSGPs, physicians refer patients within the same organisation, improving continuity and comprehensiveness of care.

Key limitations and challenges

Despite its strengths, horizontal integration also presents significant limitations (Bazzoli et al., 2004; Torres and Diana, 2024).

- **Limited Clinical Integration:** While administrative unification is typically successful, achieving deep clinical integration proves more difficult. Pre-merger plans for clinical consolidation are often not fully implemented. Therefore, it is crucial to standardize procedures (at the organisational or healthcare system level) to clearly define collaboration rules and delineate responsibilities.
- **Slow Cultural Integration:** Merging staff cultures, particularly among medical professionals, remains a significant obstacle, often persisting for years after a merger.
- **Stakeholder Resistance:** Community opposition to hospital closures or significant changes can hinder integration efforts.
- **Organisational Complexity:** Larger systems often suffer from decentralized decision-making, lack of shared vision, and unclear leadership structures within clinical departments.
- **Geographic and Staffing Barriers:** Lack of proximity and non-overlapping medical staff diminish the potential for effective clinical consolidation.
- **Mixed Results on Quality and Patient Experience:** Some studies have found no significant improvement in quality of care following mergers and limited evidence of deterioration in certain areas. Patient experience scores have generally remained unchanged.

Horizontal integration in primary and community care

Beyond hospital networks, horizontal integration has become particularly relevant in community-based care, including palliative care, mental health, and primary care services. In these domains, integration is often aimed at coordinating fragmented services to address complex needs (Bainbridge et al., 2015):

- A study on a palliative care network found strengths in team collaboration, hospice services, and community engagement, but highlighted gaps in resource availability, training, and information sharing.
- Respondents emphasized the need for standardized practices, shared data systems, and more coordinated planning, particularly for end-of-life care and cross-provider communication.

The evidence suggests that well-organized horizontal integration, especially when embedded in community settings, can improve access, continuity, and coordination. However, its success depends heavily on local infrastructure, governance, and workforce support.

Efficiency and economic outcomes

While horizontal integration often aims at economies of scale, empirical data reveal mixed economic effects. Some studies report productivity gains in group practices, especially among smaller groups (5-10 physicians), while others find no meaningful efficiency improvements or even rising overhead costs in large organisations (Bazzoli et al., 2004). The anticipated benefits, such as shared fixed costs, bulk purchasing, and internal referrals, may exist but often plateau beyond a specific organisational size (Bazzoli et al., 2004). Coordination difficulties, diluted leadership, and administrative complexity may offset theoretical efficiencies in large multispecialty settings. Ultimately, management quality and structural alignment matter more than organisational scale.

Horizontal integration is vital to healthcare system reform, particularly in community and primary care settings. Linking organisations operating at the same level of care offers opportunities to reduce fragmentation, enhance coordination, and improve system-level efficiency. However, successful implementation requires attention to cultural integration, governance alignment, and clinical coherence. The evidence suggests that when designed around the needs of local populations and supported by strong administrative frameworks, horizontal integration can serve as a foundation for adequate, person-centred healthcare.

Integrated care in high- and low-/middle-income countries: different contexts

IC strategies differ significantly between high-income countries (HICs) and low- and middle-income countries (LMICs), reflecting diverse priorities, health system capacities, and population needs (Mounier-Jack et al., 2017).

Diverging approaches and models

In HICs, integration focuses on chronic disease management, quality improvement, and patient experience. Typical models include MDTs, care coordination, virtual wards, and support for self-management, all of which address complex and ageing populations.

In LMICs, integration tends to be narrower in scope, targeting specific populations, such as pregnant women, children, or those with infectious diseases, and aiming to expand access, increase service uptake, and optimise limited resources. Models include integrated outreach services and child health days, often shaped by donor requirements.

Expectations and challenges

HICs seek to reduce hospital use, improve outcomes, and enhance community care, while LMICs prioritize basic access, efficiency, and the equitable use of shared resources. Both settings face challenges like fragmentation and siloed programmes, though structural barriers tend to be more severe in LMICs.

Evidence and mutual learning

In LMICs, integration shows promise in improving service coverage and outcomes, especially with screening, but evidence remains limited, with little data on cost-effectiveness or patient experience. In HICs, system-wide reforms do not always guarantee better outcomes.

Lessons flow both ways: LMICs can learn from HICs' focus on quality and patient-centred metrics, while HICs may benefit from task-sharing models and integration of prevention with treatment, common in LMICs. Despite differences, the shared goal across all settings is a more responsive, coordinated, and accessible health system.

Comparison of horizontal and vertical integration

Horizontal and vertical integration represent two distinct yet increasingly interrelated strategies for transforming healthcare systems. While horizontal integration typically involves the merging of providers operating at the same level, such as hospitals or primary care organisations, vertical integration seeks to align services across different levels of care, such as primary, secondary, and tertiary care, often linking outpatient, inpatient, and community-based providers (Wan et al., 2002).

Studies highlight essential differences in the impact of these two approaches. In a review of over 25 years of international literature, Evans et al. observed a strategic shift from horizontal to vertical integration, emphasizing linking acute care and community-based services in a more coordinated continuum (Evans et al., 2018).

Patient experience metrics also point to this distinction. Health systems characterized by physician-hospital vertical integration reported 2% higher overall patient impression scores than systems lacking such integration. Similarly, vertically integrated features organisation such as contract management or membership in a group purchasing organisation were associated with 2-3% higher overall and environmental scores. In contrast, investor-owned hospital sys-

tems, often part of horizontal multihospital networks, demonstrated a 5% lower patient experience score, suggesting that horizontal integration alone may not yield tangible patient benefits.

These findings suggest that vertical integration may have more direct and positive implications for patient-centred outcomes, particularly in settings that rely on well-aligned care pathways. By contrast, horizontal integration, especially in the form of multihospital ownership, may lead to administrative consolidation without significant improvements in the quality of care from the patient's perspective (Torres and Diana, 2024).

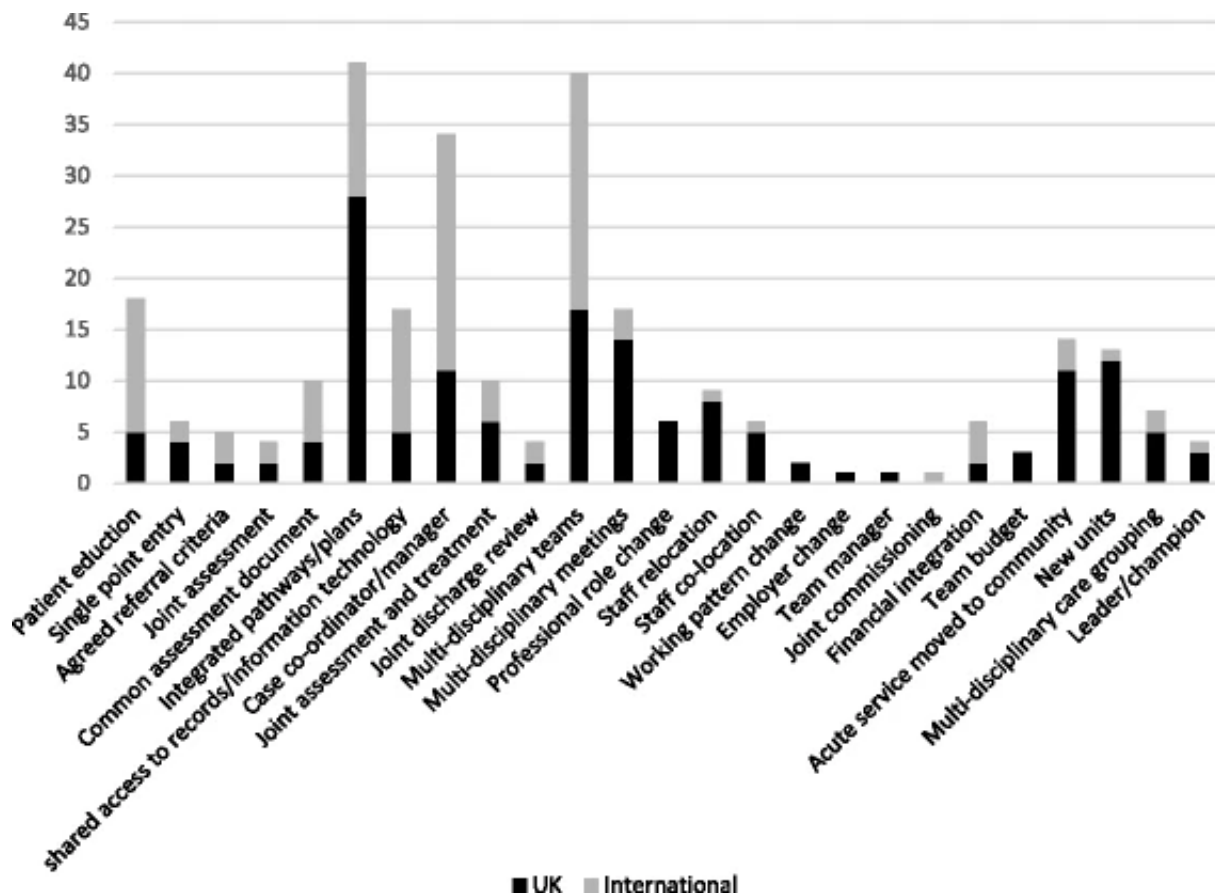
One promising application is the development of IDSs that combine vertical and horizontal structures to provide a seamless continuum of care. These systems aim to incentivize cost-effective, coordinated services by connecting providers across settings, aligning incentives, and improving communication throughout the care process (Wan et al., 2002).

In summary, while horizontal and vertical integration have roles, current evidence supports a more patient-centred value in vertical approaches. Horizontal strategies should be implemented cautiously and with consideration of their limited impact on outcomes alone (Torres and Diana, 2024).

3.5 Integrated interventions and disease-focused models

IC programmes are often designed around specific health needs, such as chronic illnesses, mental health conditions, or multimorbidity, enabling tailored therapeutic and social responses. A review by Baxter et al. found that the most common components of IC vary across contexts. International models often include tools such as shared care plans, joint documentation, and multidisciplinary reviews. At the same time, UK-based interventions more frequently emphasise co-location, changes for staff, and shared leadership (Baxter et al., 2018) - see **Figure 11**.

Recent evidence from the ADVANCE network confirms that the structure of behavioural health integration matters. Among patients with serious mental illness (SMI) and chronic diseases, co-located care was linked with better outcomes in blood pressure, HbA1c, and Body Mass Index (BMI). However, results differed by diagnosis; bipolar disorder and depression showed benefits, while schizophrenia did not respond similarly (Matthews et al., 2024).



Reproduced from Baxter et al. The effects of integrated care: a systematic review of UK and international evidence. *BMC Health Serv Res* 18, 350 (2018), <https://doi.org/10.1186/s12913-018-3161-3>

Fig. 11 Elements of new models of integrated care

These findings highlight the importance of matching integration strategies to the needs of specific conditions and populations. The following sections examine how different models perform across various clinical areas.

Cardiovascular risk management

Cardiovascular diseases (CVD) remain a leading cause of mortality and healthcare burden globally, particularly in the context of population ageing and increasing multimorbidity. Traditional fragmented care models have proven insufficient in addressing the complex needs of this population. IC has thus emerged as a patient-centred, team-based solution that promotes care continuity and system efficiency by coordinating GPs, specialists, nurses, pharmacists, educators, and care managers (Ski et al., 2023; Valentijn et al., 2024).

Systematic reviews demonstrate that IC models for CVD lead to substantial health gains, including a 40% reduction in mortality, a 37% decrease in hospitalizations, and improved quality of life and patient self-management (Valentijn et al., 2024). One promising intervention model, particularly for atrial fibrillation (AF), is nurse-led ambulatory care. Studies, including RACE 4, confirmed that such care reduces cardiovascular mortality and readmissions, though

its effectiveness depends on appropriate training and clinical context. Emergency care pathways for AF, incorporating early cardiology referrals and prompt anticoagulant initiation, have also shown benefits, including shorter hospital stays and fewer rehospitalizations. In primary care, the ALL-IN trial demonstrated that a nurse-managed quarterly AF review focused on symptom control and anticoagulation reduced all-cause mortality by 45% compared with usual care. Risk factor modification remains a core strategy. Programmes like CARDIO-FIT and LEGACY highlight the effectiveness of lifestyle interventions, including weight loss, exercise, and blood pressure control, in reducing AF recurrence. Additional interventions such as alcohol cessation counselling have shown clinical benefits in reducing AF episodes and hospitalizations, particularly among moderate to heavy drinkers. Integrated models also address comorbidities like hypertension, chronic obstructive pulmonary disease (COPD), and sleep apnoea, improving patient outcomes through tailored pharmacological and behavioural interventions. Decision-support technologies and multidisciplinary collaboration (e.g., between cardiologists, haematologists, GPs, and pharmacists) have improved alignment of treatment with clinical guidelines, especially regarding anticoagulation. Digital health tools, including mobile apps offering health records, educational content, and monitoring functions, improve adherence, satisfaction, and clinical outcomes. Despite earlier mixed evidence, current studies underscore the value of integrating digital solutions thoughtfully into broader care models (Bhat et al., 2021).

The CareHND trial introduced a novel model for complex patients integrating cardiology, nephrology, and diabetology. Though it did not demonstrate clear superiority in hard outcomes like mortality, it significantly improved quality of life and reduced heart failure hospitalizations in specific subgroups. The intervention's quality was therefore high; patients reported greater satisfaction with their care, felt better informed, and were more involved in their treatment (Evén et al., 2024). Models such as the collaborative care model, Chronic Care Model (CCM), and PCMH also demonstrate effectiveness in coordinating services, supporting self-management, and personalizing care strategies for patients with CVD (Rossi et al., 2023). Interventions such as case management, psychosocial support, remote monitoring, and lifestyle counselling are central to these approaches.

Particularly in low-resource settings, there is growing interest in integrating HIV care with chronic disease management. Evidence shows that combined care for HIV, diabetes, and hypertension, delivered through shared clinical pathways, joint risk screening, and team-based services, can improve clinical outcomes and service accessibility. For instance, in integrated Kenyan and Ugandan clinics, detection of undiagnosed Non-Communicable Diseases (NCDs) and retention in care were markedly improved. In contrast, 63% of patients in UK clinics reached target blood pressure, and cardiovascular risk was reduced by 39% (Haldane et al., 2018). These examples confirm that IC models in cardiovascular and metabolic conditions are clinically effective and economically promising. Their successful implementation, however, requires structural alignment, interdisciplinary collaboration, and continuous adaptation to patients' individual and population-level needs.

Chronic respiratory diseases

In respiratory diseases, particularly COPD, IC models play a key role in addressing patients' multidimensional needs. Individuals with advanced COPD struggle not only with severe respiratory symptoms but also with frequent comorbidities, reduced physical capacity, psychological consequences of chronic illness, and difficulties adhering to therapeutic recommendations. Fragmented treatment systems, based on the “one disease - one specialist” approach, often fail to meet these challenges (Nici and ZuWallack, 2018).

IC for patients with COPD focuses on multifaceted interventions carried out by interdisciplinary teams. These teams typically include pulmonologists, primary care physicians, nurses, physiotherapists, and often dietitians, psychologists, or clinical pharmacists. Together, they implement essential care components such as health education, self-management planning, optimization of pharmacotherapy, pulmonary rehabilitation, psychosocial support, lifestyle counselling, and remote health monitoring (telemonitoring). According to a Cochrane review (Poot et al., 2021), integrated disease management (IDM) programmes for COPD yield clear benefits in disease-related quality of life, exercise tolerance, and reduction of hospitalizations due to COPD exacerbations. The average improvement in the six-minute walk test ranged from 45 to 52 meters, exceeding the clinically meaningful threshold and reflecting a real improvement in physical capacity. Meanwhile, hospitalizations decreased by approximately 36%, and the average length of hospital stay was reduced by 2 days per patient (Poot et al., 2021).

One of the most critical elements is pulmonary rehabilitation, which, according to the definitions of the American and European Thoracic and Respiratory Societies, combines physical exercise, education, and behavioural interventions aimed at improving patients' physical and mental condition and promoting long-term lifestyle changes (Nici and ZuWallack 2018). In many models, rehabilitation programmes are supplemented with education provided by nurses or case managers, who assist patients in recognizing exacerbations and applying action plans.

The palliative care component is also particularly important. Models such as ALDS in Australia, Breathlessness Intervention Service in the UK, and INSPIRED in Canada demonstrate that integrating respiratory and palliative care enables better symptom control (especially dyspnoea), improves end-of-life planning, and allows patients to die at home or in hospice settings rather than in intensive care units. Moreover, the ALDS, ROCKER, and VERMA studies demonstrated a reduction of approximately 52% in emergency department visits leading to hospital admissions (Smallwood et al., 2018). These models ensure patients can access home consultations, psychological support, rapid intervention pathways, and personalized treatment plans.

A further step in the development of integrated COPD care is the consideration of coexisting cardiovascular diseases. Patients with COPD often have heart failure, coronary artery disease, and atrial fibrillation. Joint cardiopulmonary clinics have been proposed to integrate diagnostics, treatment, and cardiopulmonary rehabilitation. Such approaches promote better care coordination, may reduce hospitalization risk, and improve the quality of life for patients with multimorbidity (Roversi et al., 2016).

Contemporary integration models also utilize digital technologies. An example is the BREATHE programme, which combined nurse-led education, self-management planning, and remote monitoring of health parameters, enabling early detection of exacerbations and reducing hospitalization rates (Poot et al., 2021). Studies have shown that such technologies can also improve the quality of life and increase patient satisfaction with care.

It is worth noting that pharmacists' involvement in integrated programmes has been limited. Still, in selected models, such as the programme by Rice et al., they played a significant role in medication education and pharmacotherapy optimization (Rice et al., 2010; Foot et al., 2017; Poot et al., 2021.). This suggests that broader inclusion of pharmacists could bring additional benefits, especially regarding treatment safety and effectiveness.

Not all interventions, however, proved effective. For example, the RECODE study conducted in a well-developed primary care setting in the Netherlands found no advantage of the IC programme over standard practice. The authors noted that the intervention was overly focused on staff training and insufficiently on patient activation, which may have limited its effectiveness (Kruis et al., 2014).

In summary, IC models in respiratory diseases, especially COPD, offer tangible benefits: they improve quality of life, increase physical capacity, reduce hospitalizations, and enhance patients' care experiences. Their effectiveness, however, depends on selecting appropriate intervention components, patient engagement, and effective collaboration among healthcare teams. Optimal care considers not only the clinical context but also the patient's emotional and social needs, supporting them at every stage of the disease.

Oncology care

Cancer care requires complex, multidisciplinary management that addresses both treatment and psychosocial, spiritual, and comorbidity-related needs that change over time (Cortis et al., 2017). Integrated oncology care responds to these needs by coordinating services across healthcare providers, emphasizing MDTs, shared care plans, and structured decision-making processes.

The Lancet Oncology Commission identifies three levels of oncology and palliative care integration:

- Linkage: planned care along standardized care pathways.
- Coordination: structured treatment plans while oncology and palliative services remain separate.
- Full integration: merging competencies and resources into a unified team, eliminating silos, and managing care collaboratively within MDT frameworks (Kaasa et al., 2018).

In practice, integration includes:

- Outpatient and home-based palliative consultations.
- Routine symptom screening in oncology clinics.
- Early palliative care referrals.
- MDT discussions including palliative specialists.
- Collaborative care planning and prognosis discussions with patients and families.

Integrated oncology models commonly feature: joint MDT consultations, early palliative care (e.g., ENABLE, Temel studies), ambulatory and community-based palliative care, systematic symptom monitoring and rapid response to deterioration, psychoeducation, and psychological support. They should also encompass comprehensive care for non-palliative patients with a high chance of full recovery, ensuring access to nursing, pharmaceutical, dietary, psychological, and spiritual support services.

Structured shared decision-making using tools like the Integrated Oncological Decision-Making Model (IODM), ensuring medical options, patient preferences, and overall health are considered when planning treatment (van der Wal-Huisman et al., 2025).

For example, the ENABLE project demonstrated that telehealth-based psychoeducational support improved patient mood and quality of life, while early palliative care also extended survival (Kaasa et al., 2018). Temel et al.'s landmark study showed that early palliative care for patients with advanced lung cancer reduced depression, improved symptom control, and increased survival.

Evidence shows that integrated oncology and palliative care improves symptom control and psychological well-being, reduces anxiety and depression levels, enhances quality of life and patient and family satisfaction, decreases unnecessary interventions (e.g., aggressive end-of-life chemotherapy), reduces terminal hospitalizations and healthcare system burden, and may improve survival rates (Fulton et al., 2019; Kaasa et al., 2018). Ambulatory palliative care clinics are particularly valuable for enabling early palliative involvement, while team-based and coordinated models are crucial for effective integration (Hui et al., 2015).

The integrated oncological decision-making model

The IODM was developed to support shared therapeutic decision-making for older cancer patients by integrating:

- Medical treatment options aligned with guidelines.
- Patient goals and preferences.
- Overall health status, including functional, psychological, and social factors (van der Wal-Huisman et al., 2025).

Implemented within MDT meetings, IODM supports personalized, holistic care planning, enhancing PCC beyond technical medical management.

Integrated oncology care merges cancer treatment and palliative care, addressing cancer patients' complex, evolving needs and enhancing system efficiency and patient outcomes. Evidence consistently supports early palliative integration, MDT-based care, and structured decision-making tools like IODM, confirming their role in improving quality of life, symptom control, and survival for cancer patients (Cortis et al., 2017; Fulton et al., 2019; Hui et al., 2015; Kaasa et al., 2018; van der Wal-Huisman et al., 2025).

Psychiatry and substance use disorders

Individuals with SMI and substance use disorders (SUDs) face significantly higher rates of premature mortality compared to the general population, driven by both a higher burden of chronic physical illnesses and inequities in healthcare access and treatment pathways. Mental health disorders, particularly depression and anxiety, frequently co-occur with chronic conditions such as diabetes, cardiovascular diseases, and HIV/AIDS, mutually worsening health outcomes, and complicating treatment adherence. These challenges underscore the necessity of IC models that bridge mental and physical healthcare, especially in LMICs, where structural limitations and social determinants further exacerbate health disparities (Richardson, 2021; Thornicroft et al., 2019).

IC frameworks, including the CCM and the WHO-adapted Innovative Care for Chronic Conditions Framework (ICCCF), emphasize the need for coordinated care for patients with multimorbidity and recommend integrating mental health into primary care systems. These frameworks encourage actions across system levels: macro-level policy and financing integration, meso-level organisational redesign with interdisciplinary care teams, and micro-level personalized patient support focusing on self-management and psychoeducation. Collaborative care models, in particular, have shown effectiveness in aligning primary and psychiatric care through systematic screening, the provision of psychoeducation, behavioural interventions alongside pharmacotherapy, and structured follow-up with shared decision-making that actively involves patients in their care (Thornicroft et al., 2019).

Meta-analysis demonstrates that collaborative care models that incorporate psychotherapy elements are more effective in improving depression outcomes than medication-focused approaches alone. For example, the TeamCare trial demonstrated enhanced physical and mental health outcomes in patients with comorbid diabetes or coronary artery disease and depression under a comprehensive IC model, compared to standard care. Implementation of IC in LMICs has shown both potential and challenges. In South Africa, adaptations of the PACK (Primary Care 101) and ICCCF frameworks led to improved diabetes medication management, though depression detection remained limited in the absence of systemic support. In Pakistan, the introduction of systematic screening in primary care significantly increased the detection rates of depression and chronic conditions, demonstrating the feasibility of even simple organisational interventions. Brazil's Equilibrium programme effectively combined biopsychosocial interventions for children with mental disorders, while community-based integration initiatives in Jamaica helped reduce stigma towards mental health conditions (Thornicroft et al., 2019).

Integrated Medical and Psychiatric Units (IMPUs) have emerged as specialized hospital settings that address the needs of patients requiring simultaneous psychiatric and medical care, thereby reducing fragmented transfers between medical and psychiatric wards. These units typically feature multidisciplinary staff skilled in somatic and psychiatric care, secure environments that allow dual interventions, and structures that promote integration within care pathways. Although evidence on IMPUs is currently of moderate quality, studies suggest that these units can reduce hospital length of stay, improve care continuity, and decrease treatment refusals and intra-hospital transfers, illustrating their potential in managing complex comorbid conditions efficiently (van Schijndel et al., 2022).

For individuals with co-occurring SMI and SUD, IC is critical. This population often experiences higher rates of chronic physical health issues, including cardiovascular and respiratory diseases. It requires frequent healthcare services, yet faces systemic barriers to preventive and life-extending care. In Australia and New Zealand, the societal costs of premature mortality linked to comorbid SMI and physical health conditions amount to billions of dollars annually, underscoring the economic and public health imperatives for integrated models. Integrated interventions in this context frequently involve case management to support self-management and care coordination, co-location of mental health, addiction, and physical health services, and systematic screening with clear referral pathways to specialist care. These interventions have demonstrated improvements in social functioning, self-management, preventive care engagement, and chronic disease control, while reducing hospitalization rates and enhancing patient participation in healthcare decisions. However, gaps remain, particularly in ensuring consistent community engagement and shared decision-making practices, highlighting the need for structured, comprehensive IC frameworks capable of addressing mortality and health disparities in individuals with SMI and SUD (Richardson et al., 2020).

Social workers play a crucial role in IC for individuals with co-occurring SMI and SUD, particularly in preventing relapse. Evidence suggests that an autonomy-supportive approach fosters patient engagement and reduces relapse risk, with medical intervention and cognitive-behavioural therapy proving effective when integrated into care plans. The MATCH project highlighted that even moderate improvements in mood during treatment significantly reduced alcohol consumption among participants, demonstrating the interplay between mental health improvement and substance use reduction (Kelly and Daley, 2013).

In youth populations, integrated psychiatric care models have shown moderate effectiveness in reducing depressive symptoms and improving access to care. A meta-analysis of interventions for individuals aged 12-25 demonstrated that IC improves treatment engagement and accessibility while achieving modest but significant reductions in depressive symptoms. These outcomes are most notable in models emphasizing shared care planning, interdisciplinary collaboration, and consistent care coordination, although effectiveness varies depending on the implementation context and population characteristics (McHugh et al., 2024).

Overall, the integration of psychiatric care and SUD treatment into chronic care frameworks is essential for addressing the high mortality and morbidity in these populations. Such integration improves health outcomes, reduces healthcare fragmentation, increases detection and treatment adherence, and addresses social determinants through community-based and case management approaches. Effective IC requires systemic support, sufficient resource allocation, and adaptable, context-sensitive implementation to truly reduce disparities and enhance quality of life for individuals with mental health conditions and SUDs.

Paediatrics

IC for children and young people (CYP) with ongoing conditions demonstrates the potential to improve health-related quality of life. However, evidence for other outcomes, such as health service use, healthcare quality, educational attendance, and cost-effectiveness, remains mixed (Wolfe et al., 2020). Interventions within paediatric IC have spanned various conditions, employing vertical integration (coordination across primary and secondary care) and horizontal integration (collaboration across health and social services).

In managing paediatric obesity, vertical integration models have included collaboration between primary care nurses, secondary care exercise consultants, and dietitians, as well as partnerships between paediatricians and dietitians with GPs, showing promising outcomes (Banks et al., 2012; Wake et al., 2013). For chronic illnesses, horizontally integrated interventions between child health and social services have been associated with improved psychological functioning (Chernoff et al., 2002).

Asthma management has utilised multiple integration strategies. Horizontal models involving public health nurses and school staff have positively affected quality of life, emergency department use, and patient education (Cicutto et al., 2013). In contrast, vertical models linking primary and secondary care asthma teams, and combined vertical-horizontal approaches with community services and psychoeducational workshops, have demonstrated improvements in health status and quality of life (Gorelick et al., 2006; McWhirter et al., 2008; Seid et al., 2010). Similarly, diabetes care has benefited from vertical integration involving diabetes nurses and school staff, improving healthcare quality and achieving cost savings (Tiberg et al., 2016, 2014, 2012), while horizontal integration with therapists and school staff has shown positive effects on quality of life, health status, psychological functioning, and reductions in healthcare utilisation and costs (Ellis et al., 2008; Ellis et al., 2005a, 2005b).

For suicide risk, horizontal models engaging mental health professionals and social workers to coordinate care have been linked to improved utilisation of primary and secondary care services (Grupp-Phelan et al., 2012). In chronic pain management, horizontally integrated multidisciplinary care involving health professionals and educators has improved health outcomes and achieved cost savings (Hechler et al., 2014). Interventions addressing behavioural problems through vertically integrated primary and behavioural health services have improved health status, quality of life, healthcare quality, and cost reductions (Kolko et al., 2014). Meanwhile, horizontally integrated health and social services for children with HIV have demonstrated health status improvements (Letourneau et al., 2013).

In children with chronic lung disease, vertical integration between primary and secondary care nurses and neonatologists has been implemented (O'Shea et al., 2007), while in cases of medical complexity, vertical integration involving MDTs in secondary care collaborating with PCPs has improved healthcare quality and utilisation, albeit with increased associated costs (Simon et al., 2017).

The indicators used across these interventions to assess health status include, among others, HbA1c levels, pain scores, disability measures, attention-deficit/hyperactivity disorder (ADHD) symptoms, viral load, and asthma symptoms. In contrast, psychological outcomes assessed have included anxiety, stress, depression, psychosocial functioning, well-being, body dissatisfaction, behavioural symptoms, and self-worth measures.

Evidence suggests that caregiver and educational involvement are critical in delivering positive health outcomes for CYP. However, the influence of IC on secondary care use varies depending on whether the intervention aims to enhance service accessibility or reduce reliance on secondary care, and no studies have conclusively reported its impact on primary care use (Wolfe et al., 2020).

PIC, which involves collaboration between primary care and behavioural health clinicians working with patients and families, has been highlighted as best practice, particularly in addressing behavioural health conditions such as mental health and SUDs, stress-related physical symptoms, and health behaviours. Integrated models enhance access to and the quality of care, though further research is needed to delineate the most effective models and policy frameworks for cost-efficiency and sustainable outcomes.

Approximately 20% of adolescents in the United States have experienced behavioural health problems, a figure likely exacerbated by the COVID-19 pandemic. The prevalence of ADHD, depression, anxiety, and behavioural/conduct problems remains substantial among children, underscoring the importance of effective IC models. The models studied vary in their level of integration and the types of behavioural health professionals involved. Lower levels of integration often rely on consultative roles for psychiatrists, whereas higher levels involve direct participation by psychiatrists, psychologists, social workers, and care managers. However, a notable limitation across many IC models is the absence of standardised training for BHPs and PCPs, with informal and inconsistent training approaches affecting satisfaction and outcomes. Developing a standardised curriculum on IC theory, implementation, and evaluation for healthcare providers could improve IPC and patient outcomes, particularly if incorporated during professional training. Evidence suggests that PIC generally improves access to care and engagement. However, there are exceptions, such as a study indicating that care coordination alone may not suffice for adolescent depression, which may require more comprehensive intervention strategies. While IC has shown effectiveness in addressing specific conditions like depression and ADHD, its potential in managing a broader range of paediatric mental health concerns and prevention strategies within primary care remains under-explored. Finally, provider-focused analyses highlight PIC's perceived acceptability and benefits among clinicians and patients while recognising persistent barriers requiring rigorous evaluation. Institutional support, system-level adaptations, and standardised provider training are necessary to successfully implement, sustainably, and scale up paediatric IC models (McLeigh et al., 2022).

Geriatrics: multimorbidity, polypharmacy, and frailty

In the context of rapidly ageing societies, the need for integrated health services for older adults is becoming increasingly visible, aiming not only for more coordinated care but also for curbing the escalating healthcare costs primarily driven by the curative sector. A clear trend can be seen towards combining long-term care with curative and preventive services, particularly at the community level, utilising horizontal and vertical integration across public and private sectors, with primary care playing a central role in nearly all models.

Many chronic conditions in older adults require long-term medical and social care, as multimorbidity complicates the delivery of shared care. Despite the recognised value of preventive and health-promoting care, many health systems remain dominated by curative services, which, along with fragmented service provision, hinder patient-centred care for older people.

Singapore is frequently highlighted as an example of an effective system that has responded proactively to population ageing by shifting from “healthcare” to “care,” focusing on community-based rather than hospital-centred models, and prioritising quality and value in care delivery (These Are the Economies With the Most (and Least) Efficient Healthcare, 2018). The Regional Health Systems (RHS) in Singapore connect hospitals and other healthcare institutions to facilitate vertical integration, improving synergy and quality of care for older adults. Initiatives such as the Community Health Assist Scheme (CHAS) and family medicine clinics aim to provide comprehensive chronic care through accessible funding mechanisms.

Singapore has also experimented with innovative IC models, including geriatric service centres, community-based prevention initiatives, day care centres for seniors, home nursing, and dementia care programmes (He and Tang, 2021). However, challenges such as staff shortages, task duplication, and limited interdisciplinary collaboration require targeted policy interventions. A noteworthy advancement is the National EMR, designed to facilitate seamless data sharing across public and private sectors, promoting continuity of care under the “one patient, one record” principle. Specific initiatives such as Delivering on Target (DOT), CARITAS Integrated Dementia Care, the Frailty-ready Initiative, and the Singapore Programme for IC for the Elderly (SPICE) illustrate operational models combining preventive, rehabilitative, and social care, delivered through interdisciplinary teams and community-based settings to improve continuity of care and reduce unnecessary hospitalisations (He and Tang, 2021).

In Sweden, the Good Quality Local Healthcare Model (GQLHM) underscores the importance of home-based care for older adults with complex needs, aiming to provide a sense of security while reducing the stress of frequent hospital visits. This model’s success depends on IPC across health and social services, trust-building with families, and personalised care planning, especially in palliative care contexts (Gustafsson et al., 2024).

As people age, frailty, multimorbidity, and polypharmacy become more prevalent, coupled with prolonged and uncertain functional decline trajectories that require tailored care approaches. Identifying the right time to introduce palliative care can be challenging, especially for frail individuals and those with non-malignant conditions such as dementia. This often leads to late recognition of palliative needs, resulting in overuse of aggressive treatments with minimal benefits and inadequate symptom management, particularly for pain and anxiety (Evans et al., 2018). Thus, the analysis defines Integrated Geriatric Care as person-centred care that emphasizes maintaining and strengthening functional capacity and reversing the causes of acute deterioration, which is critical, as frail older adults are particularly vulnerable to adverse outcomes from even minor health incidents. Integrated approaches should not overlook end-of-life care, which often comes with the highest care needs. Moreover, the proposed Integrated Palliative Care, involving specialist and generalist care, shares common elements with geriatric care, particularly in patient-centredness and staff, patient, and caregiver education (Evans et al., 2018).

Three key processes underpin effective integration: comprehensive assessment, case management, and interprofessional teamwork, enabling tailored care aligned with individual needs and goals. IC models such as the Acute Care for Elders (ACE) and the Integrated General Hospital (IGH) illustrate hospital-based strategies focusing on patient- and family-centred care, supported by technological tools and IPC (Bonvin et al., 2025). Transitional care models emphasise seamless transitions between care settings, with education and patient empowerment at their core, contributing to reduced hospitalisations, shorter hospital stays, and improved quality of life for older adults with chronic conditions (Bonvin et al., 2025). Despite these advancements, IC still faces barriers related to guidelines, financial and organisational constraints, and concerns regarding the interaction of conventional and complementary therapies. Countries and institutions must define integration strategies based on local needs and resources, supported by a shared understanding of integration, to guide effective reforms and investments (Evans et al., 2013).

In summary, IC models for older adults with multimorbidity, polypharmacy, and frailty demonstrate clear potential to improve quality of life, maintain functional capacity, and reduce symptom burden. Their effectiveness is grounded in patient-centred approaches, interdisciplinary collaboration, and continuity of care across settings. However, sustained success requires addressing systemic challenges, securing appropriate resources, and adapting strategies to local contexts to ensure care that aligns with the values and preferences of older adults.

3.6 Professionals involved in integrated care

Effective implementation of IC models relies on active engagement across multiple medical and social professions, ensuring comprehensive, patient-centred service delivery for individuals with complex needs. Usually, at the heart of these models lies the care coordinator, who plays a pivotal role in aligning team activities, maintaining coherence of care processes around the patient, and ensuring continuity across services and settings.

Given the increasing complexity of older adults' health needs, vocational education programmes must shift to systematically train a growing workforce of qualified nurses, dietitians, occupational therapists, pharmacists, psychologists, and other professionals, enabling them to support individuals with multimorbidity and frailty effectively.

Clinical guidelines, discharge pathways, post-discharge care plans, case management protocols, and community care standards should be developed and regularly updated based on interdisciplinary research and user feedback, ensuring care is evidence-based and adaptable to evolving needs (He and Tang, 2021).

Recognising the complexity of IC, nine core competency categories for multidisciplinary staff were proposed through a joint initiative led by SAMHSA-HRSA, the National Council for Behavioural Health, and the Annapolis Coalition. These competencies are globally applicable across educational and workforce development settings within integrated behavioural health and primary care, supporting recruitment, role clarity, training, and performance assessment.

The competencies include: interpersonal communication, collaboration and teamwork, screening and assessment, care planning and coordination, intervention, cultural competence and adaptation, systems-oriented practice, practice-based learning and quality improvement, and informatics (Poster and Poster, 2015). Moreover, shared training for behavioural health and PCPs is critical for fostering collaboration and increasing effectiveness within integrated models (McLeigh et al., 2022).

Medical professionals usually engage in IC:

- GPs are central in providing continuity of care, early identification of health issues, and managing chronic conditions within integrated systems.
- Medical specialists offer disease-specific expertise and contribute to multidisciplinary decision-making, essential for cases requiring advanced or targeted interventions.
- Nurses often serve as care coordinators, conduct comprehensive assessments, provide patient education, monitor health status, and support adherence to treatment plans, playing a vital role across community and hospital settings.
- Pharmacists contribute by managing polypharmacy, monitoring medication safety, and advising on pharmacotherapeutic plans to optimise treatment, particularly in frail older adults.
- Emergency Medical Services (EMS) personnel support timely interventions, particularly in transitional care situations, ensuring stability and continuity during acute health episodes.
- Physiotherapists aid in maintaining and improving functional capacity, which is crucial for rehabilitation.
- Dietitians provide nutritional counselling and intervention, critical for maintaining health in multimorbid patients and those with specific dietary needs.
- Psychologists and therapists address mental health needs, support behavioural change, and contribute to maintaining psychological wellbeing in integrated models.
- Social workers facilitate access to community resources, provide psychosocial support, and contribute to comprehensive care planning, addressing social determinants of health.

Other professionals, such as occupational therapists, may be engaged depending on patient needs, focusing on promoting independence and quality of life.

The application of logic models in intervention design and evaluation is strongly recommended to enhance the effectiveness of IC interventions. Logic models facilitate systematic mapping of intervention components, including participant roles, moderating factors, and contextual influences, enabling a clearer understanding of interventions' mechanisms and potential outcomes. This systematic approach is particularly valuable in complex and adaptive interventions, allowing for strategic planning, assessment, and modification of implementation processes in response to evolving needs and conditions (Mills et al., 2019).

Despite promising developments, current evidence on the overall effectiveness of integrated services remains moderate, and further research is needed to clarify which elements and configurations of IC deliver the most substantial benefits across contexts and patient groups (Wolfe et al., 2020).

Take-home message

- IC reduces fragmentation by ensuring continuity, coordination, and person-centred services, particularly for patients with chronic and complex conditions.
- Effective integration requires local adaptation; there is no single model that fits all health systems and populations.
- Vertical and horizontal integration serve complementary roles, linking different care levels and unifying providers at the same level to enhance efficiency and quality.
- Technology is a key enabler, facilitating information sharing and decision-making, but requiring attention to interoperability and privacy.
- IC improves patient outcomes and experiences, but its impact on system-wide costs and long-term sustainability needs further evaluation.

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4. Tools and technologies for integrated healthcare

Katarzyna Wszolek

Short insight

Digital tools and health information technologies are essential enablers of integrated healthcare, but they do not create integration by themselves. Their value depends on how they support interprofessional collaboration, evidence-based decision-making, continuity of care, and patient-centred outcomes. This chapter discusses the role of digital readiness, evidence-based medicine, patient data systems, collaboration tools, and interoperability in building a safe and coordinated healthcare ecosystem.

4.1 Modern preparation of the medical team for an integrated healthcare

The need for a skilled and adaptive medical workforce

As healthcare systems become increasingly digital and interconnected, healthcare professionals must possess the necessary skills, training, and mindset to use new technologies and collaborate in an integrated system effectively. Medical teams must adapt to AI-driven tools, telemedicine, digital health platforms, and interdisciplinary collaboration frameworks to ensure optimal patient care. Integration requires continuous education, leadership involvement, and institutional support (Bilodeau et al., 2010; Mohaupt et al., 2012; Murdoch et al., 2017).

In order to thrive within an integrated healthcare environment, healthcare teams must develop the following competencies:

Digital literacy and technological proficiency

- **Understanding and Using Electronic Health Records (EHRs):** Physicians, nurses, and allied health professionals must be proficient in navigating interoperable EHRs to enhance communication and care coordination (Li et al., 2012).
- **AI and Decision-Support Tools:** Training should focus on how AI-driven diagnostics and predictive analytics assist in decision-making and reduce diagnostic errors.
- **Telemedicine and Remote Care Platforms:** Teams must be adept in virtual patient consultations, remote monitoring, and digital communication to ensure patient accessibility (International Labour Organisation, 2018; Marius et al., 2019; Skinner and Chandra, 2017).

Interprofessional collaboration (IPC) and team-based care

- **Breaking Down Silos:** Training programmes must encourage collaboration between doctors, nurses, midwives, radiologists, social workers, and Information Technology (IT) professionals to ensure holistic patient care (Burridge et al., 2016; Gonzalo, 2020; Institute of Medicine, 2015; Sigmon et al., 2023).
- **Team Communication Protocols:** Standardized communication models like Situation, Background, Assessment, Recommendation (SBAR) improve information exchange among team members.
- **Interprofessional Case Reviews:** Joint clinical meetings where specialists discuss complex cases fostering knowledge-sharing and Integrated Care (IC) planning.

Patient-centred and culturally competent care

- **Shared Decision-Making Models:** Providers must be trained to engage patients in their treatment decisions, respecting cultural and personal preferences (Price, 2006).
- **Cultural Sensitivity Training:** Understanding social determinants of health and cultural differences in healthcare expectations helps teams provide more inclusive care (Darivemula et al., 2021).

Ethical and security awareness in healthcare

- **Data Protection and Privacy Laws:** All healthcare team members should be familiar with the Health Insurance Portability and Accountability Act (HIPAA), the General Data Protection Regulation (GDPR), and local data protection regulations to ensure ethical handling of patient data.
- **AI Bias and Ethical Decision-Making:** Awareness training should focus on recognizing and mitigating biases in AI-driven tools that may impact healthcare equity.

Training strategies for medical teams in integrated healthcare

Continuous medical education (CME) and digital training programmes

- **Online Learning Platforms:** Institutions should provide on-demand courses on AI in healthcare, telemedicine, and EHR best practices through accredited platforms.
- **Workshops and Hands-On Simulations:** Hands-on training with AI-powered diagnostic tools, telehealth platforms, and robotic surgery systems prepares teams for real-world scenarios.
- **Virtual Reality (VR) and Augmented Reality (AR) Training:** VR-based simulations help medical professionals practice surgical procedures, emergency response scenarios, and complex patient interactions in a risk-free environment.

Interprofessional team simulations and role-playing

- Simulated Patient Cases: Training sessions where doctors, nurses, and allied health staff work together on digital case simulations improve decision-making in integrated settings.

Mentorship and leadership development in digital healthcare

- Cross-Disciplinary Mentorship Programmes: Encouraging junior medical professionals to learn from experienced digital healthcare specialists fosters a culture of adaptation and innovation.

Policy integration and institutional support

- Healthcare institutions must align digital transformation strategies with workforce training. Providing protected time for training, certification incentives, and professional development will ensure the long-term integration of these tools.
- Recording and notification of occupational injuries and diseases collecting relevant data from the suppliers and sharing it with national authorities under national law would help give competent authorities more reliable indicators of the effectiveness of national occupational safety (OSH) and health systems (Nine Business Practices for Improving Safety and Health Through Supply Chains and Building a Culture of Prevention and Protection, 2021).

Table 4 Outlines key challenges associated with preparing medical teams for integration and suggests practical solutions to address them.

Tab. 4 Challenges and solutions in preparing medical teams for integration (Marwaha et al., 2022)

Challenges	Solutions
Resistance to New Technologies	Implement user-friendly, intuitive platforms and provide incentives for learning digital tools
Lack of Standardized Training	Establish national or institutional frameworks for digital healthcare education
Concerns Over AI Replacing Human Judgment	Train medical teams on how AI serves as a decision-support tool rather than a replacement for expertise
Unequal Access to Training Resources	Provide online, scalable training programmes accessible to all healthcare workers
Cybersecurity and Data Privacy Risks	Integrate mandatory cybersecurity training into medical education

4.2 Evidence-based medicine and healthcare integration

Evidence-based medicine (EBM) is a fundamental approach in healthcare that integrates clinical expertise, patient values, and the best available research evidence to guide decision-making (Evidence-Based Medicine and the Changing Nature of Healthcare: 2007 IOM Annual

Meeting Summary, 2007; Tenny and Varacallo, 2025). In an increasingly digital healthcare environment, digital tools-such as AI-powered decision-support systems, interoperable EHRs, and real-time analytics platforms-are essential for the effective implementation of Evidence-Based Medicine (EBM) in clinical practice.

Digital tools supporting evidence-based practice

- **Clinical Decision Support Systems (CDSS):** AI-powered CDSS can process heterogeneous clinical datasets, including laboratory results, imaging findings, and medication histories, to generate context-sensitive, evidence-based recommendations for clinicians. Their implementation has been shown to reduce diagnostic uncertainty and promote adherence to established clinical guidelines (Li et al., 2012).
- **EHRs:** Integrated EHR systems support clinicians by providing centralized access to updated clinical guidelines, comprehensive patient histories, and validated treatment pathways. This facilitates continuity of care and supports IPC in decision-making (Slater, 2006).
- **Big Data and Machine Learning:** Analytical platforms using machine learning algorithms process population-level data to detect epidemiological trends, forecast disease progression, and inform the development of tailored treatment strategies. These tools enable the transition from reactive to predictive healthcare (Vanagas et al., 2018).
- **Medical Research Databases:** Evidence repositories such as PubMed, the Cochrane Library, and UpToDate serve as critical resources for clinicians, enabling real-time access to peer-reviewed studies, systematic reviews, and clinical guidelines. This enhances clinical reasoning and supports informed therapeutic choices (Britt et al., 2004).

Benefits of EBM in healthcare integration

- **Improved Patient Outcomes:** Evidence-based approaches ensure that clinical interventions are grounded in high-quality research, contributing to enhanced therapeutic efficacy and patient satisfaction.
- **Standardization of Care:** The application of EBM principles fosters the development of standardized protocols, thereby reducing variability in clinical practice and improving the consistency of healthcare delivery (Schulz and Wirtz, 2023).
- **Enhanced Decision-Making:** Access to validated clinical evidence and decision-support tools empowers healthcare providers to make precise, data-driven decisions, minimizing redundant procedures and optimizing clinical workflows (Li et al., 2012).
- **Cost-Effectiveness:** Strategic application of EBM minimizes the use of low-value interventions and unnecessary diagnostics, reducing healthcare expenditures without compromising the quality of care (Marius et al., 2019).

By embedding EBM within digital infrastructures, healthcare systems can advance toward more reliable, efficient, and patient-centred clinical environments, where decisions are consistently supported by the best available evidence.

Digital health solutions and information systems

Digital health solutions, such as mobile applications and EHRs, have revolutionized how healthcare professionals coordinate patient care (Marwaha et al., 2022). According to Vanagas et al. (Vanagas et al., 2018), mobile health (mHealth) applications enable real-time monitoring of patients, facilitate remote consultations, and enhance data-sharing across healthcare teams. Similarly, integrated information systems bridge gaps between disciplines by ensuring interoperability among healthcare platforms (Li et al., 2012).

Electronic health records

EHRs are foundational to modern healthcare integration, offering a centralized repository of patient information accessible to authorized personnel. They support clinical decision-making, reduce medical errors, and enhance care coordination. The adoption of EHRs has been particularly beneficial in IPC, ensuring that providers across specialties have access to up-to-date patient information (Slater, 2006). However, challenges such as system compatibility, data privacy, and user training must be addressed to maximize the effectiveness of EHRs (Evidence-Based Medicine and the Changing Nature of Healthcare: 2007 IOM Annual Meeting Summary, 2007; Marwaha et al., 2022).

Telemedicine and remote monitoring

Telemedicine has significantly expanded access to healthcare, particularly in remote and underserved areas. The ability to conduct virtual consultations reduces the need for physical visits, lowering healthcare costs and improving patient satisfaction. Moreover, wearable health monitoring devices collect real-time data on vital signs, helping clinicians track chronic conditions and intervene proactively (Vanagas et al., 2018). These innovations not only support individualized patient care but also help manage public health crises by reducing hospital overcrowding and enabling timely interventions.

Blockchain and data security in healthcare

With the increasing reliance on digital health solutions, ensuring data security and privacy is paramount. Blockchain technology offers a decentralized and tamper-proof system for storing medical records, enhancing transparency and reducing fraud (Haleem et al., 2021; Sabu et al., 2021; Tripathi et al., 2020). Secure access management ensures that only authorized personnel can retrieve sensitive patient information, improving trust and compliance with regulatory standards (Marius et al., 2019).

4.3 Patient data storage and management

The secure storage and proper management of patient data are critical for maintaining confidentiality, compliance, and efficient healthcare delivery. Best practices for patient data management include:

- **Encryption:** Encrypting patient data both in transit and at rest minimizes unauthorized access (Guidance on Risk Analysis Requirements under the HIPAA Security Rule).
- **Role-Based Access Control (RBAC):** Healthcare institutions should implement RBAC to allow only authorized personnel to access specific patient information based on their roles (Ferraiolo et al., 2001).
- **Data Backup and Disaster Recovery:** Regularly backing up patient records and having a disaster recovery plan prevent data loss due to cyberattacks or system failures (Ait Abdelouahid et al., 2023; Mehrtak et al., 2021; Pradeep Kumar et al., 2024; Rindfleisch, 1997).
- **Interoperability Standards:** Adopting standardized formats such as Health Level Seven International (HL7) and Fast Healthcare Interoperability Resources (FHIR) ensures that patient records are accessible across different healthcare platforms (Bates and Samal, 2018; Tabari et al., 2024).
- **Compliance with Regulations:** Adhering to privacy laws such as HIPAA (Health insurance portability and accountability act of 1996) and GDPR (Regulation EU 2016/679, 2016; Code of Conduct for the Healthcare Sector, 2025) helps maintain ethical and legal handling of patient data.

Implementing these measures enhances data integrity, reduces the risks of breaches, and ensures seamless health information exchange across providers.

4.4 Collaboration tools

Healthcare integration depends on effective IPC, where tools such as shared communication platforms and standardized documentation frameworks facilitate teamwork. Studies indicate that structured IPC improves patient safety, enhances decision-making, and fosters a holistic approach to treatment (Schulz and Wirtz, 2023).

Standardized communication protocols

Communication tools like the SBAR framework improve clarity and reduce misunderstandings among healthcare professionals (Müller et al., 2018; Tool: SBAR, 2019). These structured handoff tools enhance patient safety, particularly in high-risk settings such as maternity and perinatal care (Boesveld et al., 2017). Adopting digital communication platforms, including encrypted messaging services and teleconferencing solutions, further strengthens real-time collaboration.

AI and decision-support systems

AI is playing an increasing role in supporting clinical decision-making. AI-driven diagnostic tools assist in early disease detection, predictive analytics improve patient risk assessments, and automated workflows optimise resource allocation (Li et al., 2012).

AI applications in healthcare include (Al Kuwaiti et al., 2023; Alowais et al., 2023; Bajwa et al., 2021; Eguia et al., 2024; Olawade et al., 2024; Pierre et al., 2023):

- **Predictive Analytics:** AI models analyse patient data to identify at-risk individuals, enabling early intervention and personalized treatment plans.
- **AI-Assisted Radiology and Imaging:** Deep learning algorithms enhance image recognition for detecting conditions such as tumours, fractures, and cardiovascular diseases.
- **Natural Language Processing (NLP):** AI-driven NLP tools streamline documentation by transcribing physician notes, extracting relevant patient information, and reducing administrative burden.
- **CDSS:** AI-powered CDSS provide real-time recommendations to healthcare professionals, improving diagnostic accuracy and treatment effectiveness.
- **Automated Administrative Processes:** AI enhances efficiency in scheduling, patient flow management, and medical billing, allowing healthcare staff to focus on direct patient care.

Integrating AI not only accelerates clinical decision-making but also improves accuracy and reduces human errors, ultimately leading to enhanced patient outcomes.

Patient-centred care (PCC) and MI

Beyond technology, patient-centred approaches such as MI are critical to healthcare integration. This technique fosters effective communication between healthcare providers and patients, encouraging shared decision-making and improving adherence to treatment plans (Britt et al., 2004). Person-centred care principles emphasize tailoring treatments to individual patient needs, fostering a more holistic healthcare experience (Price, 2006). Digital patient engagement platforms, such as mHealth apps and online portals, further empower patients to participate actively in their health management (Slater, 2006).

Specialized tools and technologies in integrated healthcare

Cardiology: innovations in cardiovascular care

Cardiovascular diseases remain a leading cause of mortality worldwide, making the integration of advanced tools essential for early diagnosis, real-time monitoring, and collaborative treatment.

How these tools integrate into healthcare systems:

- **EHR and AI-Powered Electrocardiogram (ECG) Analysis:** AI-powered ECG systems seamlessly integrate with EHRs, ensuring that abnormal cardiac events detected via wearables (e.g., Apple Watch, KardiaMobile) are instantly recorded and flagged for review by cardiologists (Powerful Medical Receives FDA Breakthrough Device Designation for PMcardio STEMI AI ECG Model, 2025).

- Remote Monitoring and Hospital Networks: Wireless implantable defibrillators and pacemakers transmit real-time data to centralized hospital networks, allowing clinicians to detect arrhythmias and adjust patient management plans proactively (Access TeleCare, 2025).
- Interoperability of Blood Pressure and Cardiac Imaging Systems: Wearable blood pressure monitors and AI-driven echocardiography tools communicate with hospital databases, providing real-time insights into patient vitals across multiple facilities (Qayyum et al., 2025).
- Telecardiology for Coordinated Care: Integrated telehealth platforms allow cardiologists, primary care physicians, and rehabilitation specialists to collaborate seamlessly, ensuring a continuous patient care cycle from diagnosis to post-treatment recovery (Access TeleCare, 2025).

Impact on Integrated Healthcare (Access TeleCare, 2025; Powerful Medical Receives FDA Breakthrough Device Designation for PMcardio STEMI AI ECG Model, 2025; Qayyum et al., 2025):

- Reduces unnecessary emergency visits by flagging cardiac anomalies early.
- Ensures real-time communication between cardiologists, emergency responders, and General Practitioners (GPs).
- Supports cross-hospital data exchange, improving outcomes for patients requiring cardiac interventions.

Nephrology: enhancing kidney disease management

Kidney disease management requires long-term patient tracking and interdisciplinary coordination, which is greatly improved through digital health solutions.

How These Tools Integrate into Healthcare Systems:

- AI-Driven Risk Prediction Models and EHRs: AI-driven Chronic Kidney Disease (CKD) prediction tools integrate with EHR systems to proactively identify at-risk patients and recommend early interventions across multiple healthcare providers (Singh et al., 2025).
- Remote Monitoring and Cross-Specialty Coordination: Patients with CKD often have comorbidities like hypertension and diabetes. Integrated digital platforms allow nephrologists, endocrinologists, and cardiologists to share patient data and coordinate interventions (Singh et al., 2025).
- Blockchain-Based Organ Transplant Tracking: Blockchain technology enhances organ transplant registries, providing secure and transparent patient-donor matching, reducing errors, and improving transplant outcomes (Nilesh et al., 2025).

Impact on Integrated Healthcare (Nilesh et al., 2025; Singh et al., 2025):

- Enables proactive CKD management, reducing the need for emergency dialysis.
- Improves patient adherence to treatment by allowing remote follow-ups and medication tracking.
- Strengthens cross-specialty collaboration, ensuring timely intervention for kidney-related complications.

Oncology: digital innovations in cancer care

The complexity of cancer treatment demands seamless integration of AI, genomic data, remote monitoring, and multidisciplinary teamwork.

How These Tools Integrate into Healthcare Systems:

- **AI-Assisted Radiology and Pathology Linked to EHRs:** AI-enhanced diagnostic imaging tools are increasingly integrated with hospital information systems, enabling oncologists to access and analyse scan results and biopsy reports from various facilities. This integration facilitates a more holistic approach to patient care by combining medical imaging, EHRs, and genomic data, thereby allowing for personalized treatment plans and improved monitoring of treatment responses (Najjar, 2023).
- **Precision Medicine and Cloud-Based Genomic Databases:** Genetic profiling tools connected to cloud-based databases allow oncologists worldwide to compare genetic markers and personalize treatments based on the latest medical findings. These platforms are crucial for identifying actionable somatic genomic biomarkers essential for tumour survival, determining corresponding drug targets, and selecting appropriate treatments based on the mutational profile of each patient's tumour (Gazola et al., 2024).
- **Teleoncology and Virtual Tumour Boards:** Cloud-based virtual tumour boards facilitate collaboration among oncologists, radiologists, and geneticists to discuss patient cases, thereby improving treatment planning for complex cancers. This approach leverages digital platforms to enhance multidisciplinary teamwork and decision-making in oncology care (John et al., 2024).
- **Robotic-Assisted Surgery and Remote Integration:** AI-assisted robotic surgery tools are increasingly being integrated with centralized surgical data systems to enhance surgical precision and patient care. These systems collect and analyse intraoperative metrics, such as force measurements and instrument movements, providing surgeons with detailed feedback on their performance. This data-driven approach supports continuous improvement in surgical techniques and outcomes. Furthermore, AI modelling applied to surgical procedures enables advanced intraoperative assessments and has the potential to automate certain surgical tasks, contributing to increased efficiency and safety in the operating room (Knudsen et al., 2024).

Impact on integrated healthcare

- Reduces time from diagnosis to treatment through seamless AI and genomic data integration.
- Enhances collaborative decision-making via cloud-based oncology platforms.
- Improves post-treatment care coordination, ensuring better patient recovery.

Maternal and foetal health technologies

The integration of digital tools and technologies has significantly improved maternal and foetal healthcare, providing better monitoring, early diagnostics, and enhanced communication between healthcare providers and expectant mothers.

Remote foetal monitoring

Advancements in wearable technology and telehealth have enabled continuous foetal monitoring for high-risk pregnancies. Remote foetal heart rate monitoring allows healthcare providers to track foetal well-being in real-time and detect potential complications early (Boesveld et al., 2017). These tools improve outcomes by reducing the need for frequent hospital visits and allowing early intervention if abnormalities are detected.

Mobile applications for prenatal and postnatal care

Mobile applications play a vital role in educating and supporting pregnant women. Apps designed for maternal health provide guidance on nutrition, foetal development tracking, appointment reminders, and symptom management. Additionally, digital health records allow seamless communication between obstetricians, midwives, and paediatricians, ensuring continuous and well-coordinated care (Schulz and Wirtz, 2023).

AI in maternal care

AI-powered predictive analytics help identify high-risk pregnancies by analysing patient history, genetic factors, and real-time health data. Machine learning algorithms assist healthcare providers in making timely decisions, thereby reducing maternal and infant mortality rates. AI-driven ultrasound analysis improves the accuracy of foetal anomaly detection, leading to more effective prenatal interventions (Li et al., 2012).

Enhancing maternal safety with digital solutions

Maternal safety remains a priority in healthcare, and digital solutions such as EMRs, AI-powered risk assessments, and teleconsultations contribute to safer childbirth experiences. Digital patient tracking systems ensure that healthcare providers can monitor maternal progress during labour, reducing the risk of complications and improving emergency response times.

Despite the substantial benefits of digital health technologies, several challenges and unintended consequences must also be considered. Digital inequalities may limit access to telemedicine, mobile health applications, and remote monitoring tools among older adults, socioeconomically disadvantaged populations, and individuals living in areas with limited internet connectivity. Furthermore, the increasing use of artificial intelligence has raised concerns regarding workforce displacement, particularly in administrative and diagnostic tasks, although current evidence suggests that AI is more likely to augment rather than replace healthcare professionals. Additional challenges relate to data governance, including issues of data ownership, cybersecurity threats, algorithm transparency, and the ethical use of patient information. Addressing these concerns requires robust regulatory frameworks, equitable access strategies, and continuous oversight to ensure that technological innovation supports rather than exacerbates existing healthcare inequalities.

4.5 The bigger picture: a fully integrated healthcare ecosystem

Each of these specialties-cardiology, nephrology, oncology, and maternal and foetal health-demonstrates how digital tools are not isolated innovations but rather integrated components of a larger healthcare ecosystem.

- **Cross-Specialty Collaboration:** AI-driven risk prediction in nephrology benefits cardiology teams managing hypertensive patients, while oncology AI imaging tools improve early detection of renal carcinomas.
- **Patient-Centred Data Exchange:** A CKD patient undergoing chemotherapy will have renal function data automatically linked to oncology care plans, ensuring medication dosages are adjusted based on kidney function.
- **Standardized Data and Interoperability:** The adoption of FHIR and HL7 standards ensures that patient data is accessible across different health systems, reducing redundancy and improving diagnostic accuracy.

By integrating these cutting-edge technologies into a cohesive healthcare framework, providers can enhance patient outcomes, optimise resource allocation, and reduce medical errors. However, achieving a fully integrated digital healthcare ecosystem requires careful attention to issues of equity, workforce adaptation, data governance, and ethical oversight to ensure that the benefits of technological innovation are distributed fairly across all patient populations.

Take-home message

- Building a digitally fluent, and ethically aware workforce is essential for safe, effective use of digital tools.
- EBM is the compass; digital tools (EHR, CDSS/AI, real-time analytics) should augment, not replace, clinical decisions. Technology alone cannot replace clinical expertise.
- Institutional backing is essential: protected training time, certification incentives, and policies aligned with implementation.
- Specialty integration (cardiology, nephrology, oncology, perinatal care) plus AI, telehealth, and connected data shortens the diagnosis-to-treatment pathway and improves patients' outcomes.
- Success should be measured pragmatically: clinical outcomes, process standardization, patient experience, and cost-effectiveness.

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5. Professional and personal skills for integrated healthcare

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Short insight

This chapter on the professional and personal competencies required for integrated healthcare begins by examining the drivers of integrated healthcare systems and the factors that facilitate their growth. The initial section seeks to deepen understanding of the rationale for updating skill sets to implement Integrated Care (IC) models effectively. This is followed by a comprehensive description of the professional and personal skills necessary to navigate the complexities of contemporary patient needs. Ultimately, the chapter addresses the enablers that facilitate the acquisition of these skills, including various training programmes and educational opportunities, and is supplemented by case studies from different countries that exemplify how IC models can be successfully adopted in diverse contexts.

5.1 Background and driving factors behind modern care system adoption

The development of integrated healthcare commenced in the 1980s in response to significant challenges faced by healthcare systems during the recovery from the economic recession of the 1970s. This era was characterized by protests and strikes advocating for improved patient rights. During this period, increased accountability among healthcare stakeholders became imperative due to a heightened demand for services, concerns regarding affordability and quality, escalating prescription drug costs attributed to medical advancements, an aging population, and the prevalence of post-traumatic stress disorder among war veterans. A diverse array of stakeholders, including healthcare professionals, policymakers, and subject-matter experts, collaborated to establish strategic objectives to enhance healthcare quality. They recognised the necessity for cohesive strategies and substantial investments across healthcare systems to foster improvements in health and well-being. These strategies in planning, financing, organisation, resource generation, regulation, and administration were seen as enablers of the integration of service delivery across clinical and public health settings (Evans et al., 2018).

The emphasis on holistic patient management represents a significant shift towards prioritizing effective Patient-Centred Care (PCC). This paradigm addresses the complexities of health needs, patient rights, and overall satisfaction (Dawda et al., 2019). The transition to PCC has fostered the development of integrated healthcare models intended to coordinate a variety of services, including primary care, specialty care, and behavioural health, as well as the various providers involved in these services. These models are designed to leverage shared resources in order to enhance patient access, improve health outcomes, and ultimately increase

the efficiency of healthcare systems. Integrated care models are being tailored to accommodate the diverse needs of patient populations, such as the elderly and frail, as well as individuals with conditions like diabetes, cardiovascular diseases, Chronic Obstructive Pulmonary Disease (COPD), and bronchial asthma, among others. In this context, the concept of integrated healthcare represents an evolution in service delivery and management, striving to balance quality, accessibility, and cost in a complex and rapidly changing healthcare landscape. In the early 21st century, the healthcare landscape is undergoing substantial transformation due to the intricate interplay of various factors. These transformations present numerous challenges for health systems, necessitating adaptation. Consequently, these dynamics affect the development of new professional and personal skills within the educational sector. Additionally, they compel policymakers and decision-makers to ensure the effective implementation of innovative care models (Evans et al., 2018).

The healthcare landscape is continuously transforming, driven primarily by the epidemiological transition, demographic changes, and advances in the economic and technological domains. Socio-political, environmental, and cultural shifts also contribute to this dynamic environment. In many countries, there is a significant double burden of disease, encompassing both communicable and non-communicable conditions. This reality underscores the critical importance of regular screenings, vaccinations, and wellness initiatives for health maintenance and disease prevention. It also emphasizes the need for sustained management and support of chronic conditions, moving beyond a focus on acute care alone. In developed economies, the increasing prevalence of chronic conditions such as cardiovascular diseases, cancer, and diabetes, alongside various metabolic and environmental health risks, poses considerable challenges. Furthermore, an increase in patients seeking assistance for mental health concerns-including stress, anxiety, and depression-merits attention (Kushitor and Boatemaa, 2018).

Recent advancements in genomics and biotechnology have catalysed a significant interest in the development of personalized treatment plans that are specifically tailored to individual genetic profiles, lifestyles, and distinct health conditions. Furthermore, the introduction of digital health innovations, including Electronic Health Records (EHRs) and telemedicine, has enhanced patients' desire to access comprehensive health information and data. This increased accessibility empowers patients to make informed decisions regarding their healthcare. Moreover, individuals place a high value on receiving guidance for self-management and healthy lifestyle choices. The growing utilization of e-health applications, wearable devices, and various digital tools underscores a pronounced inclination towards leveraging technology for effective health management (Clinics in Integrated Care, 2022).

Social and cultural preferences, along with insights from open scientific frameworks, present considerable challenges for the timely regulation and skill development of health and care professionals involved in integrated care (IC) models. An increasing number of informed patients are actively seeking complementary and alternative therapies in addition to traditional

medical treatments. There is a noticeable trend toward a preference for holistic care, which addresses not only conventional medical needs but also the emotional, social, and spiritual dimensions of health. Furthermore, patients are showing a strong interest in collaborative approaches, indicating a desire for shared decision-making with their healthcare providers (Manderscheid and Ward, 2024). The evolving needs and expectations of patients may be viewed as a reflection of the challenges posed by fragmented healthcare delivery models. In this context, technological advancements and shifting societal norms can play a pivotal role in fostering positive change. These developments may encourage the adoption and implementation of integrated healthcare approaches among a diverse range of stakeholders, including governance bodies that oversee policy and regulation, planning, financing, and insurance management, as well as healthcare providers and patients.

In addressing the issue of healthcare fragmentation and its adverse effects on patient experiences and outcomes, various approaches and frameworks have been developed to define integrated healthcare (Goodwin et al., 2016; WHO, Regional Office for Europe, 2016). Each strategy highlights the necessity of enhancing the skills and competencies of diverse stakeholders within the healthcare system. In the context of integrated healthcare, the training and work performed in silos by health and care professionals impede efforts to deliver accessible, high-quality, and continuous care, especially for aging populations and individuals with chronic illnesses.

Recent developments highlight several interconnected challenges that collectively drive rising healthcare costs. These include the substantial effects of financial crises, the pressing need for effective pandemic preparedness and recovery strategies, the troubling prevalence of misinformation about public health measures, critical shortages in the healthcare workforce, and geopolitical tensions stemming from ongoing conflicts. In response to rising healthcare costs, patients are becoming more discerning in seeking value from healthcare services. They frequently weigh cost and quality against their insurance coverage and out-of-pocket expenses. Consequently, an integrated healthcare experience—where diverse elements of care, including primary, specialist, and mental health services, are coordinated effectively via insurance—is increasingly viewed as the standard expectation in healthcare delivery (Evans et al., 2018).

In addition to the research-supported recognition of the need to develop the workforce's competencies for integrated healthcare, significant efforts are required to implement and adopt IC across curricula, policy (Grant et al., 2025; Barraclough et al., 2021), and practice (Moss et al., 2023). The pursuit of new skills for integrated healthcare begins with education on the benefits of understanding the concepts of integrated healthcare, its origins, drivers, and enablers of implementation within the healthcare system. Given the complexity of modern patients and the diversity of integrated healthcare models, this theoretical knowledge will make it easier to work together as a team with various professionals in practice. Next, skill-training programmes for integrated healthcare delivery will require designs, tools, and techniques that address the job-specific skills of professionals across different care levels, rather

than a one-size-fits-all approach. Therefore, it is necessary to address a wide range of policy and regulatory problems, including the development and organisation of professionals' skills for integrated healthcare (Nooteboom et al., 2020; Nooteboom et al., 2021; Hatton et al., 2021). In this regard, all stakeholders require specific professional and personal skills to implement changes in healthcare governance towards integrated healthcare. For instance, the trend to address epidemiological and demographic challenges highlights rising healthcare costs, prompting efforts to contain and control expenses while maintaining the quality of care.

Some of the governance efforts to regulate the accountability of the service providers for the quality of integrated healthcare have resulted in decentralization, which has been recognised for providing more autonomy of service providers in decision-making and responsiveness to local needs. Another example shows that patients' expectations regarding quality of care have motivated providers to enhance coordination skills in prevention and care services, shifting the focus from acute care to comprehensive health management. Patients seek healthcare services that effectively mitigate risks and errors while prioritizing safety and quality of care. Therefore, the capacity of healthcare professionals to communicate clearly and transparently is of utmost significance to their overall competence. Such skills enable them to provide patients with clear explanations of medical conditions, treatment options, and follow-up care, thereby enhancing the overall patient experience (Hoge et al., 2014).

Additionally, patients anticipate timely access to healthcare services, which includes reduced wait times for appointments, quicker access to specialists, and expedited diagnostic procedures. In that regard, for instance, managers and healthcare providers incorporated the Total Quality Management (TQM) approach into their work to improve organisational quality assurance and performance, with an emphasis on the continuous development of professional and personal skills in service delivery, patient safety, and satisfaction.

Another enabler of the adoption of integrated healthcare was the Training of Trainers (ToT) with which professionals, who collaborate, can gain new abilities and adopt a unified approach to patient care (Nexø et al., 2024). Both TQM and ToT approaches focus on addressing patients' preferences and needs, ensuring they receive consistent, connected care over time, regardless of the healthcare setting, by involving teamwork to manage their comprehensive needs and improve their experiences and outcomes. Given that the key characteristics of IC are coordination of care, PCC, continuum of care, and interdisciplinary collaboration, the development and enhancement of professional and personal skills became a necessary enabler for integrating different types of service supply according to needs, across sectors and providers within various settings (Nexø et al., 2024).

In summary, the patient profile in the 21st century reflects a proactive attitude towards health, a preference for convenience and technology, and high expectations for quality, personalised, and compassionate care. As the healthcare landscape continues to evolve, healthcare providers need to understand and respond to these changing needs, preferences,

and expectations by improving their professional and personal skills to foster greater patient satisfaction and better outcomes (Evans et al., 2018). Moreover, the evaluation of integrated healthcare should focus on how it contributes to better care experiences and improved care outcomes.

Professional and personal skills required for integrated healthcare

The drivers of integrated healthcare emphasize the importance of fostering collaboration among various sectors, including healthcare systems (responsible for service delivery), the education sector (which cultivates essential professional and personal skills), and the patient community (comprising patients, their families, and the communities to which they belong) (WHO Report, 2016). Effective implementation of integrated healthcare necessitates joint efforts among health professionals and practitioners from other disciplines. The Organisation for Economic Cooperation and Development (OECD, 2023) identifies critical generic competencies that underpin this collaboration, including knowledge of health systems and processes, information technology skills, and transversal (soft) skills.

- **Health system and process knowledge** encompass understanding the integrated healthcare system (roles, responsibilities, processes, costs), knowledge of holistic care approaches, and skills in prevention and patient self-management. To successfully implement integrated healthcare, all stakeholders must be able to guide and manage systematic changes within the healthcare system. Understanding healthcare regulations, advocating for the benefits of this healthcare model, and developing decision-making and problem-solving competencies are essential components of their involvement. Learning to cooperate with other healthcare professionals, such as policymakers, health educators, and various healthcare providers, also needs to happen regularly (WHO, 2016). A holistic approach to patient care is a key component of this concept. It requires skills to identify the patient as an individual, focusing on their social and material needs, emotional and physical safety, involving communication, an understanding of the patient's lifestyle, and empathy, for effective prevention and patient self-management (Guth and Tracy, 2023).
- **Information technology** (IT)-related skills, including digital literacy for using EHRs and digital communication tools, and the ability to use telehealth applications. Since patients place a high value on convenience, IC models require professionals to develop the skills needed to facilitate telemedicine and digital health solutions for remote consultations, flexible scheduling, and online access to health records. Digital Health Literacy (DHL), also known as e-health literacy, is a modern field that enables both health professionals and patients to find, understand, and utilize information and services from web sources to make informed health-related decisions and take appropriate actions. DHL competencies will be essential in the future, so training and extending knowledge about new technologies are must-dos for all parties involved in healthcare (European Commission, 2020).

- **Transversal (soft) skills** are personal attributes that go beyond knowledge and help us to easily get on with changing environments and collaborate with others. They are transversal because they can be developed and are helpful in any sector or position, as well as in personal life (**Table 5**).

Tab. 5 Transversal (soft) skills

Skills	Purpose
Communication	Communicating and active listening
Teamwork	Understanding and valuing different professional roles
Shared decision-making	Work with patients and professionals to agree on care plans
Leadership	Managing governance structures and fostering team commitment
Problem-solving	Conflict resolution within multidisciplinary teams
Adaptability	Adjusting to new roles and ways of working
Openness to learning	Willingness to acquire new skills and perspectives
Mentoring	Supporting junior professionals and peers
Empathy	Understanding perspectives of patients and colleagues

Individual competencies are integral to comprehending and effectively communicating one's role within the healthcare process. While some individuals possess inherent communication strengths, others may require the enhancement of their communication or "soft" skills. Proficient communication skills, which encompass active listening to accurately understand patient concerns and delivering thoughtful responses, are fundamental competencies that healthcare professionals must possess in the context of patient care. Clear communication is paramount; it is essential to avoid medical jargon and utilize language that is accessible to patients and their families. Encouraging patient participation in discussions facilitates joint decision-making (Sigmon et al., 2021). The establishment of mutual trust relies on a non-judgmental attitude, respect for ethical standards, and acknowledgement of patient dignity and autonomy, which empower patients to make informed choices about their health (Guth and Tracy, 2023). When patients develop trust in healthcare specialists, their collaboration with the professional team, engagement in self-care, and involvement in shared decision-making are significantly enhanced. Enhancing integrated care within health systems requires effective leadership, problem-solving skills, and adaptability to foster productive collaboration among stakeholders. It is imperative that doctors, nurses, social workers, patients, and their families work collaboratively to formulate and execute effective care plans. Furthermore, mentorship and a commitment to continuous learning must be regarded as essential competencies that facilitate accountability within multidisciplinary teams (Expert Group on Health Systems Performance Assessment, 2017). Additionally, compassionate care skills are critical for addressing the needs of many patients, as healthcare professionals must acknowledge and demonstrate empathy for their emotional and psychological requirements.

In addition to professional expertise, personal attributes play a critical role in comprehending patients' needs and perspectives. It is essential to respect the diverse backgrounds and viewpoints of patients, appreciate differences positively, and facilitate patient involvement in care

decisions. Research indicates that intrinsic qualities such as the ability to empathize, emotional flexibility, and emotional awareness are significantly correlated with the degree of collaboration among teams and the quality of patient relationships. Boak et al. (2015) assert that the most effective healthcare professionals are those who continuously enhance their interpersonal skills through reflective practices and leadership grounded in appreciation.

Healthcare professionals can acquire the requisite skills to support integrated healthcare delivery through ongoing education and training, Interprofessional Education (IPE), training of trainers (ToT), and continuous professional development, including both pre-service and on-the-job training.

5.2 Training and education

Integrated healthcare models require regular training for healthcare practitioners and other stakeholders to ensure they remain up to date with evolving healthcare needs, expectations, and technological developments. Stakeholder engagement in training programmes can be challenging for multiple reasons. These challenges should be addressed through teamwork and cross-sector collaboration, where different healthcare providers in the community are given the opportunity to be guided and educated to improve their performance in the workplace through the implementation of integrated healthcare (Expert Group on Health Systems Performance Assessment, 2017). Some healthcare systems integrate multidisciplinary training into professional education from the start, while others implement various programmes to train professionals already working in healthcare to develop the skills needed for integrated healthcare. A prerequisite for effective educational programmes and training is the establishment of a skilled team of trainers who will assist interested parties, i.e., healthcare professionals, in adopting and applying the knowledge gained through the provided education. The topic of ToT is discussed in more detail in **Chapter 2**.

Numerous educational programmes have been conducted worldwide to improve healthcare professionals' skills to better implement integrated healthcare (**Table 6**).

There is strong evidence that IPE enhances teamwork and communication among healthcare providers, leading to improved patient outcomes. The WHO emphasizes that institutional support and continuous opportunities for shared learning are essential for embedding IPE as a standard component of all health systems (Hoffman, 2016). The U.S. Institute of Medicine suggests that the changes in behaviour of healthcare professionals, the organisational culture, and clinical outcomes be consistently tracked, along with other measures, for judging the IPE programmes' effect on real-world outcomes (Institute of Medicine, 2015).

Continuous learning (educational or training) courses related to competency development for integrated healthcare emphasize chronic illness management, eHealth, telemedicine, and collaborative practice by exposing trainees to best practices in the European health system, sim-

ulations, and realistic problem-solving exercises on data security, patient privacy, and interoperability between health systems. Senior professionals can mentor junior staff to transfer knowledge and experience in managing IC systems (Expert Group on Health Systems Performance Assessment, 2017).

Tab. 6 Training and education as primary tools to enhance professional skills in integrated healthcare (Barraclough et al., 2021)

Educational and training approaches	Purpose
Interprofessional training	Programmes are designed for healthcare professionals, such as social workers, psychologists, and medical practitioners, to improve teamwork and understanding across health and social care systems
Competency development	Courses focusing on essential competencies like PCC, health promotion, disease prevention, and IPE
Workplace Training	Expose new staff to different professional roles in integrated healthcare, team meetings, and mutual education to improve workflow and communication
Practical and Experiential Learning	Case-based learning, role-playing, and critical thinking exercises
Leadership and Professional Development	Educational models aiming at developing leadership and adaptive expertise among healthcare providers and training programmes that incorporate caregiver education and support
Innovative Approaches	Training models that integrate health and social care perspectives, utilizing simulation-based learning and blended learning methods, including problem-based discussions and case applications

In Spain (Ais-BE Programme), medical students receive practical training in an integrated environment, which includes shadowing experienced professionals in MDTs, rotating through all community care services, and, in the final year of their schooling, participating in multidisciplinary team meetings and providing care in a primary care setting. This programme also includes group training sessions led by nurses for patients and carers, promoting healthy lifestyles and disease prevention. In South Africa, comprehensive healthcare requires students to collaborate with a diverse range of healthcare professionals and other stakeholders, including traditional healers, community representatives, and rehabilitation assistants. Students are taught to be politically perceptive, culturally aware, and emotionally mature, with a strong professional identity; in short, they have to be “integrated,” which means they must possess knowledge and understanding, adhere to ethical and moral principles, adopt an attitude towards the issue in question, and demonstrate technical skills that are very important for problem-solving (Guth and Tracy, 2023).

There are some examples of workplace training conducted throughout Europe: In Germany (*Casaplus Programme*), case managers participated in training focused on knowledge of the integrated healthcare system, a holistic care approach, patient self-management support, communication, and teamwork. This training included a general module on health science for healthcare professionals and a specialization in case management. Within this programme,

geriatric coaching was provided to older patients on fall prevention, nutrition, and social well-being. In Germany, the healthcare management company *Gesundes Kinzigtal* regularly conducts seminars and ad hoc training sessions for staff involved in integrated healthcare delivery, focusing on the use of digital health platforms, team-based decision-making, and patient self-management. A good example of practical and experiential learning is the *Better Together in Amsterdam North* training conducted in the Netherlands for case managers, which also combined online modules, in-person training, workplace assignments, and online tasks. It also included specific training on mental health and IT systems used for patient coordination. These programmes highlight how education and training can prepare healthcare professionals - and even patients - to deliver integrated healthcare effectively (OECD, 2023).

The digitalization of healthcare information systems is an ongoing innovation that is fast accelerating, requiring the current users to take advantage of available technological innovations that improve patient outcomes, optimize efficiency, and drive a digital transformation of healthcare services while ensuring privacy and security provisions. New and emerging technologies aim to collect and generate as comprehensive data as possible about the patient from multiple sources, enabling more valuable insights that contribute to personalized treatment plans and ultimately improve the quality of patient care (European Commission, 2020). The development of the e-skills of the stakeholders, the healthcare providers, and patients, is significant for fully realizing the benefits of eHealth (**Figure 12**).



Fig. 12 A model for developing key professional and personal skills through four phases: understanding, application, analysis, and reflection. An illustration of the concept of continuous professional development in integrated healthcare (Developed by the author, based on IREX, Essential Skills: Power Learning Tool, 2019)

Digital health is increasingly recognised as a vital component of healthcare priorities, and it is essential that it serves individuals in an ethical, safe, secure, equitable, and sustainable manner. Progress in this important area should align with key principles such as transparency, accessibility, scalability, replicability, interoperability, privacy, security, and confidentiality (WHO, 2021). To enhance digital health literacy (DHL) and develop essential digital skills, the active engagement of key stakeholders-including hospital management, the Ministry of Health, and professional representative bodies-is paramount. Informed healthcare policy is essential for fostering an integrated healthcare framework, as it establishes mechanisms

that support the ongoing development of multiprofessional and multidisciplinary teams. This is particularly relevant in primary care, which has consistently been a focal point of policy reforms aimed at optimizing patient care delivery over the years (Dobbins et al., 2016).

Furthermore, it is important to include healthcare professionals in decision-making and co-creation processes, ensuring that they are informed about the benefits of eHealth for both their roles and their patients. Digital health literacy (DHL) is an evolving field characterized by various challenges that may hinder individuals from fully leveraging its advantages. These challenges can impede their ability to find, comprehend, and utilize information and services available online, which are crucial for making informed health-related decisions and taking appropriate actions. A notable initiative comes from the European Medical Students' Association, which encourages medical faculties to integrate digital health topics into their curricula. Their research indicates that students aged 18 to 24 in 38 countries may lack sufficient DHL skills-such as telemedicine, mHealth, artificial intelligence in healthcare, genomics, and data analytics-and often do not receive adequate practical training to prepare them for a rapidly digitalizing healthcare environment. Similarly, in the context of the eHAction project, a significant number of health professionals-including doctors, nurses, midwives, dentists, and pharmacists-from four European nations (Ireland, Cyprus, Portugal, and Serbia) engaged in the Competence Self-Assessment Exercise. Many of these professionals indicated their utilization of new digital technologies in their work; however, they expressed concerns regarding limited time and insufficient educational resources or training (European Commission, 2020). These challenges of time and training may be pivotal factors contributing to difficulties in effectively implementing technology in healthcare. As identified by Greenhalgh and colleagues, the seven critical areas that can influence the success of technology integration include the specific illness or disorder, the characteristics of the technology itself, the value proposition, the various adopters involved (such as patients and staff), the organisation, the broader system, and the process of embedding and adapting these technologies over time (Greenhalgh et al., 2017).

Frenk and colleagues emphasize that educational systems must prepare healthcare professionals not only for clinical excellence, but also for social accountability and teamwork within complex systems (Frenk et al., 2010). Therefore, professional development must focus on leadership competencies that support IPC with non-professional caregivers and patients, such as shared decision-making, conflict management, and respect for the roles, privacy, and security of all team members (WHO, 2021; Amber et al., 2022). Empowering users within integrated healthcare systems can be accomplished by developing health websites and digital tools aimed at enhancing digital health literacy (DHL) among the general public (Xu et al., 2025). For individuals with limited literacy skills, it is essential to devise strategies that bolster their digital health literacy. By presenting concise and clear information prominently at the beginning of the page, we can ensure that it is accessible and understandable for all users, including those who may face challenges such as being undereducated or older adults who often find it difficult to seek, process, and utilize online health information.

Tips to catch health website users' attention (U.S. Department of Health and Human Services, 2025)

- | | |
|--|---|
| ➤ Stay positive and tell the users what they want to do instead of what is not recommended. | <i>"NO - Never ride a bike without a helmet.
YES - Wear a helmet every time you ride a bike.
YES - Physical activity can improve your heart health and help you feel better every day!
YES - Quit smoking -you will have more energy!"</i> |
| ➤ Be focused on tips and tools for overcoming barriers - not on the barriers themselves. | <i>"Remember, it's not all or nothing. Even 10 minutes of activity is better than none! "
"Quitting smoking is hard, but millions of people have done it successfully. In fact, more than half of our population who have ever smoked have quit. You could be one of them!"</i> |
| ➤ Be creative and interactive. | Provide menu planners, printable checklists, and questions to ask a doctor. |
| ➤ Use plain language in a friendly tone and everyday examples to explain medical or technical concepts and define complex terms. | Use readable fonts, meaningful headings, and images that will support your text. |

It is equally important for content creators to consider the diverse age groups and educational backgrounds of their audiences, ensuring that the material is straightforward and does not overwhelm readers with excessive text or a multitude of website elements such as links and icons (U.S. Department of Health and Human Services, 2025).

There is a pressing need for the evolution of integrated healthcare systems to effectively address the increasing complexities of modern health demands. At the heart of this evolution is the development of both professional and personal skills among governing stakeholders, healthcare providers, and patients. These skills are essential for fostering effective collaboration among providers and ensuring responsiveness to healthcare quality requirements.

Digital Health Literacy is a vital competency for professionals and patients alike, as it empowers the utilization of technology to enhance the delivery of high-quality care. Ongoing education and training are critical in preparing the workforce for integrated care, fostering inter-professional teamwork, developing digital skills, and educating patients. It is imperative that these programmes are implemented successfully to bridge notable gaps, such as poor digital literacy and resistance to change. Enhancements in personal competencies-such as communication, empathy, flexibility, and leadership-have a profound impact on patient relations and team productivity. Healthcare systems that consistently focus on skill development and embrace innovative methods are best positioned to meet patient needs and provide sustainable, high-quality integrated healthcare.

Take-home message

- As integrated healthcare continues to evolve, there is a growing need for knowledge about the necessary competencies and ways to implement specific skills within global health and social care workforces.
- Current evidence indicates a three-tiered approach to integrated healthcare that emphasizes continuous support, education, and training for policymakers, healthcare professionals, and patients.
- Key components of this approach include the establishment of strong, evidence-based governance in health policy, as well as the implementation of robust privacy and security measures.
- Functioning effectively in interprofessional teams requires:
 - a solid understanding of the health system, including integrated care, holistic approaches, and prevention,
 - IT-related skills,
 - transversal (soft) skills such as: effective communication, active listening, teamwork, shared decision-making, leadership, problem-solving, adaptability, openness to learning, mentoring and empathy.
- Training and education strategies are designed to improve the skills and effectiveness of stakeholders, healthcare providers, and the patient community in delivering integrated healthcare.
- High-level stakeholder support is crucial for establishing legislation, financial regulation, accreditation, and organisational structures necessary for the systematic implementation of integrated healthcare models.

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6. Challenges and future directions for the development of interprofessional collaboration

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Short insight

Health professionals, as well as healthcare itself, have different goals. These can be divided into general goals, such as improving the health of the population, indirect goals, such as increasing vaccination rates, direct goals, or process or input goals (Ogbeiwi, 2021). Ultimately, one thing can be said about them - they all point in the same direction - towards the patient and the improvement of his or her health. Since the patient is at the centre of care, the system should do everything possible to improve patient care. Nowadays, we observe an increase in the number of patients with chronic diseases, multimorbidity (Nolte and Pitchforth, 2014), and diverse social needs (Koirala et al., 2023; Moffat and Mercer, 2015). Consequently, the traditional uniprofessional model of treating patients is becoming insufficient in the face of the complexity of patients' health problems. This, in turn, can lead to fragmentation of care, conflicts, and medical errors (Lancaster et al., 2015).

This leads to moving towards more integrated models of collaboration, such as interprofessional teams, that better address the challenges of modern healthcare. The World Health Organization (WHO) emphasizes that Interprofessional Education (IPE) and collaboration are key to building responsive and effective healthcare teams (World Health Organization, 2010). The effectiveness of Interprofessional Collaboration (IPC) is also indicated by Pascucci et al. (Pascucci et al., 2021). They indicate that effective IPC in the management of chronic diseases leads to improved health outcomes for patients, including lower blood pressure, glycated haemoglobin levels and LDL cholesterol. Additionally, it reduces the number of hospitalization days, which indicates the effectiveness of this form of collaboration in the care of patients with chronic diseases.

In the face of dynamic changes in healthcare systems, it is necessary to continuously improve IPC. Different specialists possess knowledge, skills, and competences in specific areas, and sharing their resources supports integrated and holistic patient care. Only such a healthcare model can help develop a modern healthcare system. Observing current trends, it is worth mentioning development directions such as building effective interprofessional teams, developing IPE, intensifying scientific research, and using technology in everyday collaboration efforts. This process is complex, requires long-term change, and involves multiple system-level adjustments. The following are the challenges that are part of it and overcoming them results in the continuous development of a better healthcare system.

Both professionals and patients need to be reached and convinced of the validity of this model of care. One of the main problems is the lack of awareness of the benefits of interdisciplinary collaboration - patients often do not understand the concept of coordinated care, feel excluded from decision-making and have a sense of lack of influence over their own care. Professionals may fear a loss of professional autonomy (Hennrich et al., 2020) or an additional burden of responsibilities, which may contribute to resistance to change (Busetto et al., 2015) and lack of commitment to implementation (Safi et al., 2018). There is also a lack of incentives or benefits built by the system. Specialists and General Practitioners (GPs) often have different priorities and distrust of new models of collaboration. In some settings, specialist participation may depend more on financial incentives than on institutional commitment to collaboration (Hennrich et al., 2020). Unfortunately, the system does not reward the time spent on coordination, so doctors are not motivated to cooperate (Kozłowska et al., 2018). Additional administrative burden and poor IT integration discourage the development of interdisciplinary working models (Hennrich et al., 2020). There are also logistical barriers that discourage patients e.g., costs, transport, low health awareness (Friedman et al., 2016). Patients often do not understand their conditions and treatment plans, which lowers their motivation to actively participate in their care. Both patients and professionals need educational support and clearly defined roles and responsibilities. Lack of training, inadequate preparation for teamwork and unclear division of responsibilities further hinders effective implementation of IC (Kee et al., 2023; Koch et al., 2024).

6.1 From traditional healthcare systems to integrated interprofessional models of care

Traditional healthcare systems used to be dominated by an approach based on the so-called parallel models, in which different professions - doctors, psychologists, physiotherapists, pharmacists, etc. - operated in isolation from each other, often without information flow or joint planning. Such division led to duplication of activities, ineffective interventions, and, above all, a decrease in the quality of patient care and low patient satisfaction with the actions taken (Kodner, 2009; Kodner and Spreeuwenberg, 2002a; WHO Regional Office for Europe, 2018; WHO, 2010). Fragmented systems remain one of the most serious challenges in implementing integrated healthcare. Fragmentation means that different parts of the healthcare system - departments, facilities, levels of care, or even individual professionals - operate independently without effective communication and coordination (Goniewicz et al., 2021). Each entity acts on its own, without always having access to full information about the patient's condition. As a result, there are numerous gaps in communication between GPs, specialists and other healthcare professionals (Walsh et al., 2010). This is the opposite of the integrated healthcare model. Lack of collaboration leads to duplication of the same diagnostic tests, unnecessary appointments and inconsistencies in patient treatment. Patients' health information is not communicated efficiently, leading to treatment errors and a reduction in the quality of care provided (Trane et al., 2022). This results in increased administrative costs and difficulties in managing patient records. Above all, patients treated simultaneously by multiple specialists (sometimes for the same disease entity) lose out. Most often it is the

elderly, with multiple chronic diseases, who experience this problem (Sadler et al., 2023). The system fails in transferring patients between different levels of care - from GPs to specialists to hospital and long-term care (Walsh et al., 2010; Busetto et al., 2015; Goniewicz et al., 2021). The lack of interoperable Electronic Medical Record (EMR) systems also remains a major problem (Safi et al., 2018; Goniewicz et al., 2021). Information is still often provided in the form of paper referrals, prescriptions or recommendations. When a patient loses these, it can be difficult or even impossible to retrieve the data. In practice, patients are forced to transfer information about their conditions and treatment history between doctors themselves, which increases the risk of medical errors (Heng et al., 2024). Fragmentation of the healthcare system leads to inefficiencies, increased costs, difficult coordination and a deterioration in the quality of care. Overcoming this challenge requires investment in technology, standardisation of processes, better communication and a clear division of roles and responsibilities across the system.

Considering the above, Integrated Care (IC) models based on the idea of interprofessional patient care have begun to gain importance. The main principle of this approach is the creation of teams in which representatives of different health professions collaborate within the framework of a jointly established therapeutic plan adapted to the specific needs of the patient. IPC is necessary to move from disease-oriented to Patient-Centred Care (PCC) (Butt et al., 2008; Lloyd et al., 2017; Van Dongen et al., 2016; Wankah et al., 2022).

As the WHO emphasizes (WHO | Framework for Action on Interprofessional Education and Collaborative Practice; WHO Regional Office for Europe, 2018) integration of care is essential in the context of an aging population, especially given the increasing number of patients with multimorbidity and the need for long-term care. In the report “Framework for Action on Interprofessional Education and Collaborative Practice” it has been shown that interprofessional teams working in a coordinated manner improve continuity of care, communication, and patient safety.

All around the world, we can see care models that provide integrated patient care. Examples of these (**Table 7**) include:

- **Integrated Care Systems (ICS)** in the UK are regional structures operating from 2022 that bring together hospitals, clinics, social care, and community organisations around a shared responsibility for the health of the population. Interprofessional teams play a key role in the functioning of ICS, enabling the coordination of care and the efficient use of resources. Collaboration between different health and social professions allows for the creation of personalized care plans that are more tailored to individual patient needs (NHS England Integrated Care Systems, 2025).

- **Patient-Centred Medical Home (PCMHs)** in the US is an organisational model of PHC in which the patient is at the centre of the team's activities. The medical team consists of, among others, physicians, nurses, care coordinators, psychologists, pharmacists, and social workers (PCMH - NCQA, 2025).
- **Family Health Teams (FHTs)** in Canada are publicly funded, community-based, multi-professional teams in PHC, often including health educators, dietitians, and addiction counsellors (What Are Family Health Teams? - Couchiching Family Health Team, 2025).

Tab. 7 Examples of integrated patient care models

Country	Care model	Role of the IPC Team	Characteristic features
UK	Integrated Care Systems (ICS) (<i>NHS England Integrated Care Systems</i> , 2025)	Regional care coordination	Integration of hospitals, primary care, social care, and public health
USA	PCMHs (<i>PCMH - NCQA</i> , 2025)	Centre of care around the patient	Planning, coordination, multidisciplinary, continuity of care
Canada	FHTs (<i>What Are Family Health Teams? - Couchiching Family Health Team</i> , 2025)	Interdisciplinary primary care teams	Public financing, integration of dietitians, psychologists, pharmacists

Implementing integrated models is also a response to the rising costs of healthcare. However, financial pressures are only one side of the challenge. Equally critical are staff shortages, which remain one of the most pressing barriers to effective healthcare delivery. Staff shortages in healthcare can be defined as the lack of the right number of people with the right competences, in the right place at the right time (Džakula et al., 2022). Despite continuous training at medical universities, there is still a shortage of qualified medical staff (Kumar et al., 2014; Busetto et al., 2015). This situation has multifaceted causes. In many countries, including Poland, a significant proportion of doctors and nurses are approaching retirement age, and the number of new specialists is not keeping up with the wave of retirements. The impact of poor working conditions, low salaries, lack of promotion opportunities in many professions and lack of general support is also not insignificant (Kumar et al., 2014; Tamata and Mohammadnezhad, 2023). In addition, there is a massive emigration of professionals, especially the young and educated, to richer EU countries, further exacerbating staff deficits (Goniewicz et al., 2021). We suffer various consequences of this, such as reduced availability, decreased quality of care or increased professional burnout (Džakula et al., 2022). Shortages lead to a deterioration in team collaboration, an increase in errors and reduced patient safety (Naseem et al., 2024). Lack of staff, equipment, infrastructure and funding leads to a so-called

“quality chasm” - the gap between best practice and reality (Sharma and Cotton 2023). Staff shortages result in an overload of remaining staff, make it difficult to ensure continuity and quality of care and lead to a deterioration in the availability of health services. There is a shortage of specialists in virtually every field (Walsh et al., 2010; Kumar et al., 2014; Naseem et al., 2024): doctors, nurses (Tamata and Mohammadnezhad, 2023), midwives (Behruti et al., 2017), pharmacists and many others. This shortage leads to an overload of existing staff who have to handle large numbers of patients, which negatively affects the quality and continuity of care. This problem is particularly acute in rural and regional areas (Walsh et al., 2010). Successful integration of care requires not only cooperation between different actors, but also adequate human resources at all levels of the system. Staff shortages become particularly acute during emergencies, when the demand for health services increases rapidly and the capacity of the system is limited (Goniewicz et al. 2021). Lack of strategic planning for staffing and staff development, inadequate staffing structure to meet actual needs and ad hoc, uncoordinated interventions exacerbate the problem. Under such conditions, it is difficult to talk about building multi-specialist interdisciplinary teams. Yet, it is precisely such teams that are key to the success of integrated healthcare models. Effective collaboration between professionals contributes to reducing the number of hospitalizations, shortening the length of stay in hospital, and limiting unnecessary procedures (Kodner and Spreeuwenberg, 2002a).

However, implementing these models requires not only organisational change but also cultural, financial, and systemic change. Based on scientific literature, several key steps for effective implementation can be distinguished:

- I. **Developing a common definition of integrated care**
A key challenge is the lack of a common understanding of what care integration is. Introducing changes in care systems requires a common definition and identifying the purpose and the scope of integration (Kodner and Spreeuwenberg, 2002b).
- II. **Creating multi-professional and multi-sector teams**
Multi-professionalism in healthcare teams is one of the basic criteria for effective patient care. However, it is worth emphasizing that as part of coordinated care, we must also collaborate with social workers who add context and enrich information about the patient (World Health Organization, 2010).
- III. **Integration of IT systems** (Kodner and Spreeuwenberg, 2002b)
- IV. **Team training and soft skills development**
IPE enables healthcare workers and students to develop competencies such as collaboration, joint decision-making, and respect for the professional roles of other healthcare participants (Patel et al., 2025).

V. **Adjustment of the financing system**

It has not been known for a long time that one of the main problems in healthcare is its inadequate funding (Walsh et al., 2010). These range from limited public budgets, a high proportion of private spending, a lack of effective financial protection to insufficient remuneration for staff (Kumar et al., 2011). The underfunding of the health system leads to long queues for services, unsatisfactory quality of services, low wages in the health sector and indebtedness of public health facilities (Goniewicz et al., 2021). It is difficult to talk about investing resources in development when there are not even enough for current needs. And unfortunately, the implementation of IC requires significant investment in staff training, IT systems, redesign of care processes and team coordination. Additional resources are needed for regular team meetings, coordination of activities, monitoring and transfer of information between providers (Tsiachristas et al., 2016; Integrated Care around the world Examples to help improve (primary) healthcare in Poland). The professionals themselves are also not encouraged to carry out interprofessional activities on a financial basis. There is a lack of remuneration for coordination activities and cross-sectoral collaboration, so providers are not motivated to integrate services (Gilles et al., 2020). Due to the lack of new financial resources in the centres, integration often consists of combining existing budgets without increasing the overall pool of resources. This means that necessary investments have to be made at the expense of other areas. There is a lack of investment in community and primary care, as funding systems favour hospitals and specialist care, neglecting funding for primary care and community services, which are key to successful integration (Bliss, Williamson and Alayo, 2024). One of the biggest challenges remains the issue of an ageing population. This is a two-pronged problem - both from the side of increasing costs of care and decreasing numbers of specialists (Tamata and Mohammadnezhad, 2023). Modern healthcare systems typically spend 80 per cent of their resources on 20 per cent of patients - mainly the elderly and chronically ill, who require the most costly, complex care (Goniewicz et al., 2021). The short-sightedness of those with the financial resources for healthcare makes it impossible to achieve long-range goals. It is sufficient to see that, in the long term, increased funding will ultimately reduce the cost of patient care, i.e., introduce savings throughout the system. Numerous scientific publications make it clear to us that the introduction of integrated healthcare reduces costs, but also results in improved health outcomes (Reich et al., 2012; Desmedt et al., 2016; Rocks et al., 2020; Tortorella et al., 2022; Wang et al., 2025). The greatest savings are observed in long-term programmes for people with multimorbidity and chronic conditions (Nolte and Pitchforth, 2014). In summary, the most important financial constraints are:

- high implementation and maintenance costs,
- lack of adequate reimbursement mechanisms for coordination activities,
- budgetary uncertainty and short-term funding,
- cost pressures and lack of new resources,

- underinvestment in primary and community care,
- complexity of billing and lack of long-term planning.

Fee-for-service payments promote fragmentation of the system and the provision of specific services. A payment system for IC must always include a quality component that positively rewards avoidance of services in the long (Amelung and Cheah, 2024).

VI. **Monitoring and evaluating progress**

The evaluation of the effectiveness of IC should always be based on criteria such as improved health outcomes, satisfaction of healthcare staff, and long-term cost-effectiveness (WHO Global Strategy on People-Centred and Integrated Health Services: Interim Report, 2025).

6.2 The importance of interprofessional education for the development of integrated care

IPE is the foundation for effective collaboration between professions. IPE is the process by which members of two or more different health professions learn together, from, and about each other in order to work together more effectively in clinical practice (CAIPE, 2016). As indicated by WHO (WHO, 2010), IPE is essential for preparing staff who can work collaboratively in complex, IC models. It also emphasizes that it should be an integral part of professional education programmes, enabling students to learn from each other and solve problems together. Research indicates that IPE leads to improved attitudes toward collaboration, increased knowledge of professional roles, and the development of communication and teamwork skills. In addition, IPE contributes to the formation of students' professional identity and prepares them for effective collaboration in their future professional practice (Reeves et al., 2016; Thistlethwaite, 2023; Zwarenstein et al., 2000). A key reason for introducing IPE into curricula is the lack of clarity regarding roles and responsibilities in healthcare. Already during medical studies, regardless of the field of study, interprofessional courses are lacking. As a result, future doctors, pharmacists, nurses, physiotherapists and other medical professions are educated without the opportunity to learn about the competencies and skills of other professional groups. In the long term, this results in a lack of opportunities for effective collaboration (Walsh et al., 2010).

Professionals concentrate on tasks arising from their own professional competences, often without realising what activities they could, or even should, entrust to other members of the therapeutic team. Situations arise in which the professional concerned is forced to make decisions or carry out activities beyond his or her actual authority or state of knowledge, when the parallel involvement of another competent member of the team would be much more effective and safer. In this whole process, one person above all loses out - the patient, who - instead of experiencing consistent, comprehensive and professional care - is exposed to delays or errors in treatment. To address this problem, specialised training in interprofessional collaboration is essential (Hassan et al., 2024). Traditional education still largely focuses

on the development of competencies specific to individual professions (e.g., doctor, pharmacist, nurse), with insufficient attention paid to building team collaboration skills, which hinders subsequent cooperation and mutual understanding of roles (Colonnello et al., 2023). Interprofessional classes, meanwhile, allow participants to safely practice communication, collaborative decision-making and team management in a near real-world setting. Such classes prepare future healthcare professionals to work in teams of diverse professionals, which directly improves the quality of patient care (Mohammed et al., 2021; Ganotice et al., 2022). Simulation-Based Training is also an important part of developing team competence. Clinical simulations allow realistic recreation of situations from everyday medical practice in which students or trainees have to cooperate under time pressure, share information and make therapeutic decisions together. Such experiences allow not only the development of technical skills, but also the practice of effective communication and team management in a safe environment for participants (Jung et al., 2020). Participants in simulation training indicate an increase in communication skills, a better understanding of the value of collaboration and a greater willingness to work as part of a multidisciplinary team. Simulations also help to eliminate biases, improve stress management and enable learning from mistakes without risk to the patient. Collaborative, hands-on activities - both at the stage of study and as part of professional development - are therefore essential to break down interprofessional barriers, improve quality of care and patient safety. The integration of IPE and simulation in education programmes should be standard at all levels of the healthcare system.

Implementing interprofessional education into compulsory curricula.

One of the key directions for the development of IPE is its mandatory inclusion in undergraduate medical programmes. Much evidence suggests that early exposure of students to IPC shapes attitudes that are difficult to modify later in their careers (Reeves et al., 2016; WHO, 2010). An important benefit of IPE in educating students is overcoming professional stereotypes, developing a common language of communication, understanding the roles and competencies of other professions, and building an attitude of respect, partnership, and collective responsibility (WHO, 2010). It is observed that IPE conducted in postgraduate education increases the willingness to collaborate (Lapkin et al., 2013) and also reduces the occurrence of conflicts and competence ambiguities (Thistlethwaite, 2023). Implementing IPE into curricula is no longer just an innovative didactic approach - it is becoming a standard in preparing future healthcare workers. More and more universities and national education systems are introducing mandatory IPE components as an integral part of undergraduate education. Many universities around the world - from Canada, through Great Britain and Sweden, to Poland - have developed IPE paths, often implemented in the form of joint courses, simulations, clinical workshops, or team placements. Some countries, such as Canada, are also implementing national interprofessional competency frameworks (e.g., CIHC National Framework), which define educational objectives and standards for all medical disciplines.

Table 8 presents examples of universities and institutions that have already introduced mandatory forms of IPE into their undergraduate education programmes, confirming that this type of education has moved from the experimental phase to systemic implementation.

Tab. 8 Examples of universities and institutions that introduced mandatory interprofessional education into their undergraduate education programmes

Country	University / Institution	Form of IPE classes	Intended participants	Didactic purpose
UK	University of Edinburgh	Skills and Communication sessions, Acute Care Simulation IPE session and ward round IPE simulation based education (Year 4, Bachelor of Nursing and years 1-6 Bachelor of Medicine, Bachelor of Surgery)	Nursing and Medical (also includes mandatory IPE into undergraduate studies - nursing)	To promote a greater understanding of each other's roles in (nursing & medical roles) within the healthcare team, and how pivotal teamwork is to the delivery of effective patient care
	University of Manchester	„Interprofessional Learning in Healthcare” Module (Year I-III)	Medical, nursing, pharmacy, and physiotherapy students	Collaborative care planning, clinical communication
Canada	University of Toronto (Centre for IPE)	„IPE Curriculum Pathway” (approx. 50 hours of compulsory classes)	Students of eleven medical professions	Development of team competencies, simulations, case studies
USA	University of Minnesota (National Centre for IPE)	Interprofessional Team Training Seminars (compulsory for first-year students)	Medical, pharmacy, dietetics, and psychology students	Learning to communicate, understand roles, and make decisions together
Netherlands	Maastricht University / University of Groningen	„Skills Lab: IPC” / “Skills Lab Pharmacy” (facility used from multiple courses) and “the Pharmacy Game - GIMMICS “mandatory course with integrated IPC	Medical, physiotherapy and speech therapy students / Pharmacy students, medical students, pharmacy technicians and nurses	Developing communication and teamwork skills / communication, collaboration, teamwork and professionalism
Sweden	Karolinska Institutet	„Clinical IPE Model” (joint seminars and clinical practices)	Medical, nursing, physiotherapy students	Working in teams on real clinical cases
Poland	Poznan University of Medical Sciences	Compulsory interprofessional classes implemented in the study programme	Medical, nursing, pharmacy, and laboratory, diagnostics students	IPC, developing equal partnerships, improving the quality of care

Identification of needs

The first step in the process of implementing IPE is to conduct a diagnosis of needs, both at the institutional level and among students and teaching staff. This stage includes an analysis of the current state of knowledge and competencies in the field of IPC, as well as an assessment of the degree of readiness of the university to implement such an initiative. In this context, it is crucial to formulate clearly defined goals for the introduction of IPE, which should refer to improving the quality of education, better preparing graduates to work in interprofessional teams, and increasing the coherence of teaching programmes in various fields of study. In parallel, actions are being taken to acquire appropriate organisational, personnel, and financial resources, such as training lecturers, preparing teaching materials, providing space for conducting joint classes or obtaining administrative and strategic support (WHO, 2010) .

Programme design

The process of designing interprofessional classes should begin with a precise definition of educational goals, which should be consistent with the applicable professional competence framework and education standards for individual professional groups. The selection of goals should consider not only the dimension of knowledge and practical skills but also aspects of attitudes, communication, and collaboration, which are key to the effective functioning of interprofessional teams. The results of classes should be measurable and adapted to the level of advancement of the participants, as well as to the realities of their future professional work in a healthcare team. On this basis, appropriate teaching methods should be selected to enable the achievement of the assumed goals. In practice, these may include analysis of case studies, allowing for joint solving of clinical problems; simulations of clinical situations, which reflect real scenarios of collaboration; role-playing, which serves to develop communication skills and empathy; and finally, team practices, which allow students to experience real collaboration in clinical conditions (Reeves et al., 2016; Thistlethwaite, 2023).

An equally important element of designing effective IPE classes is considering how students will have the opportunity to learn about each other, from each other and with each other - in accordance with the definition of IPE (Interprofessional Education Handbook: For Educators and Practitioners Incorporating IC and Values-Based Practice - CAIPE, 2021). This requires creating conditions in which students of different fields can not only gain knowledge about the competencies and roles of other professions but also develop the ability to communicate with each other, plan joint activities, and build relationships based on mutual respect and trust. This type of learning requires not only well-chosen methods but also appropriate conducting of classes, moderation of discussions, and providing a safe environment for the exchange of experiences and reflection.

Building a didactic team

The process of creating didactic activities within IPE requires close and conscious collaboration between educators representing different professions. Their collaboration allows not only to integrate the perspectives of different professions but also to create a learning environment that realistically reflects the complexity of teamwork in the healthcare system. Joint design of activities also allows for the identification of common areas for different disciplines, such as clinical communication, decision-making or care coordination, as well as taking into account the specific roles and competencies of individual professions. Thanks to such didactic collaboration, it is possible to prepare more comprehensive educational scenarios that not only convey knowledge but also shape attitudes based on mutual respect, understanding of professional roles, and team responsibility (Bridges et al., 2011).

Integration with the curriculum

The integration of IPE into higher education programmes can also be difficult from the organisational point of view. One of the main challenges are the logistical issues resulting from the need to include a large number of students from different fields of study in common classes. Another particular problem is coordinating the teaching schedules of individual faculties, which often operate according to different hourly schedules, semesters, or credit systems (Bridges et al., 2011).

Implementation of classes

During the implementation of interprofessional classes, it is particularly important for their form to be engaging and motivating for the active participation of students. Only well-designed, dynamic didactic methods are able to effectively support the development of team and communication skills. One of the most effective and attractive forms seem to be simulations based on collaboration between representatives of different professions, which allow students to solve realistic clinical problems together in a safe, educational environment. Such experiences not only facilitate the acquisition of knowledge but also help build trust and mutual understanding in the team (Haddad et al., 2024; Mostafa et al., 2025; Shanahan and Lewis, 2015; Yu et al., 2020).

Informal educational activities (informal IPE)

Informal learning can be characterized as mostly unstructured, unintended, and experiential and can occur, for instance, in the workplace environment (Nisbet et al., 2013; Rees et al., 2018). Correspondingly, informal IPE refers to interprofessional educational activities that take place outside the formal education system, for instance, in the context of professional collaboration in the workplace, group work, and social interactions between representatives of different disciplines. The significance of such hands-on activities has been pointed out

in several IPE guidelines (Barr et al., 2017; Drynan and Murphy, 2013). Opportunities for interprofessional interactions in the workplace setting allow students to form early-on authentic and realistic experiences of the involvement and collaboration of different healthcare professionals in the medical team (Rees et al., 2018). Such occasions and informal contacts between representatives of different professions can be particularly useful in overcoming existing stereotypes, building one's sense of confidence in interprofessional interactions, or allowing for reflection on these relationships and effective teamwork (Cerbin-Koczorowska et al., 2022; Zielińska-Tomczak et al., 2021). Other suggested potential benefits of informal interprofessional learning in the workplace include, for instance, time and cost benefits, increased satisfaction, motivation and engagement among the staff members, improved patient outcomes, or lower incidence of errors (Nisbet et al., 2013). However, it has also been pointed out that the opportunities arising from interprofessional learning in the workplace may not be fully utilized, especially when they are not accompanied by occasions for questioning, critical dialogue, or reflection (Barr et al., 2017). Furthermore, the intergroup contact theory postulates the importance of the equal status and common goals of the members of the team, their cooperation within the group as well as institutional support as essential (Allport Gordon, 1954), suggesting that interactions based on only the mere contact between members of different professions may not be enough to achieve the assumed effects of such activities.

Education of professionally active employees

Teaching new healthcare staff how to care for patients together is an important but insufficient element of the education process - initiatives for professionally active healthcare workers are also needed. The traditional model of postgraduate education focuses mainly on imparting knowledge and skills specific to individual specializations, but in the context of a dynamically changing healthcare system, a broader approach that goes beyond the current boundaries is becoming necessary. Many postgraduate programmes are strictly tailored to specific fields of medicine, which can lead to a situation in which different healthcare professionals do not have the opportunity to learn together and develop interprofessional skills as part of their professional education. Such an approach can lead to the perpetuation of traditional hierarchical structures in the medical team, which may limit the effectiveness of communication and collaboration among different professional groups (Zhang and Thompson, 2023).

A new approach that is gaining importance is Continuing Interprofessional Education (CIPE) (CIPE, 2025). Its aim is not only to develop individual professional competencies but, above all, the skills of collaboration between different professional groups within healthcare. Such a model of education enables the development of not only professional competencies but also interpersonal and communication skills, which are key to ensuring effective healthcare.

CIPE programmes enable the development of competencies in communication, team management, and leadership in the medical environment, which ultimately improves the quality of patient care. Moreover, CIPE promotes the improvement of clinical skills because, through joint learning in an interdisciplinary team, healthcare workers from different areas of specialization have the opportunity to share their knowledge and experience, which leads to better coordination of activities and faster solving of clinical problems. The development of leadership competencies resulting from IPE also enables better team management and more effective decision-making, which has a direct impact on the quality of care provided (CIPE, 2025; Topperzer et al., 2021).

Challenges in assessing patient satisfaction and clinical outcomes

One of the challenges in implementing integrated healthcare is the difficulty in assessing patient satisfaction and treatment outcomes. The problem is mainly due to inconsistent data collection methods, which significantly affects the reliability, comparability and usability of the results obtained (Dunsch et al., 2018). Different medical facilities use different tools, scales, questionnaires and procedures to assess quality of care. The lack of uniform methods makes it difficult to compare results between institutions - both nationally and internally (Ferreira et al., 2023; Ilioudi et al., 2013). There are also differences in the way surveys are conducted: surveys can be completed in different settings (e.g., in the waiting room, at home, online, by telephone), at different times (e.g., immediately after a visit or several weeks later), and with different levels of support from staff, which can lead to distorted responses. The lack of standardisation means that patient satisfaction assessments are often incomplete or unreliable (Kyte et al., 2013; Zielstorff, 1995). In addition, the lack of uniform protocols for dealing with missing data (e.g., omitting parts of questions) can lead to statistical errors and reduce the reliability of analyses (Kyte et al., 2013). Ultimately, the picture of the patient's clinical situation is incomplete or inconsistent. It is also worth noting the risk of errors due to subjective interpretations of questions by patients and the influence of cultural and emotional factors on the answers given. Without reliable and comparable data, it is difficult to determine which interventions actually improve patients' health status and increase their satisfaction with care. All this makes the data obtained difficult to use in practice to improve quality of care and clinical decision-making. In the context of implementing integrated healthcare, this is very important, as the subjective feelings of patients treated by Multidisciplinary Teams (MDTs) compared to treatment by single specialists should be investigated.

Mentoring and interprofessional coaching (interprofessional mentoring)

Mentoring is a form of education, the main goal of which is to combine theory taught in the traditional educational process with practical experience gained in a real professional environment. This approach aims to enable the application of theoretical knowledge in the context of real professional situations, which allows for the development of practical skills and

better preparation for work in one's profession (Barker, 2006). Interprofessional mentoring is a specific form of this type of teaching in which the key role is played by students of various medical professions, as well as teachers or supervisors representing various professions in healthcare (Lait et al., 2011). Interprofessional mentoring provides students with the opportunity to work with members of other healthcare professions, which allows them to better understand the roles of individual members of the healthcare team and learn how to work together in healthcare teams. These interactions help students gain knowledge about how different professions work together to provide comprehensive patient care. Interprofessional mentoring emphasizes the development of competencies related to collaboration, communication, and mutual respect between professions, which are key in a modern healthcare system (Emerson, 2004). It is also worth emphasizing that introducing interprofessional mentoring into the medical education system does not require radical changes in the structure of clinical practices. Interprofessional mentoring can be integrated within existing clinical practice systems, where students of different professions collaborate with each other in everyday tasks (Lait et al., 2011). Interprofessional mentoring, through the integration of various medical professions, becomes an invaluable educational tool that not only supports professional development but also prepares future healthcare workers for effective and modern teamwork.

The role of healthcare services in supporting interprofessional education and collaborative practice

Healthcare services play a critical role as partners in the education of healthcare professionals. Beyond providing clinical placements, healthcare organisations should actively facilitate interprofessional learning opportunities for students, interns, and early-career professionals. Such initiatives should be aligned with organisational strategies promoting collaborative practice, teamwork, and patient-centred care. By embedding interprofessional learning within workplace settings, healthcare services can contribute to the development of a collaborative workforce capable of addressing increasingly complex healthcare needs.

Accreditation as a driver of interprofessional education

Accrediting bodies represent one of the most influential drivers of interprofessional education implementation. Accreditation standards that explicitly include interprofessional competencies encourage universities, faculties, healthcare organisations, and professional bodies to integrate IPE throughout undergraduate, postgraduate, and continuing professional education programmes. The inclusion of IPE requirements within accreditation frameworks provides a powerful mechanism for ensuring the sustainability and quality of interprofessional learning initiatives.

The successful implementation and sustainability of IPE require the engagement of multiple stakeholders. Their complementary roles in education, workplace learning, regulation, and professional development are summarised in **Table 9**.

Tab. 9 Key stakeholders supporting the implementation of IPE

Stakeholder	Contribution to IPE
Universities and Faculties	Curriculum development, delivery, assessment, faculty development
Healthcare Services	Clinical placements, workplace learning, support for collaborative practice
Accrediting Bodies	Integration of IPE competencies into accreditation standards and quality assurance
Professional Bodies	Continuing professional development, advocacy, competency frameworks
Educators	Facilitation, mentoring, feedback, assessment
Learners	Active participation, reflection, lifelong learning

6.3 New technological challenges and interprofessional care

Modern healthcare increasingly relies on digital technologies, which influence not only the way of diagnosing and treating but also the organisation of work of therapeutic teams. In particular, the development of AI and the digitization of medical records carry the potential to significantly support IPC.

Healthcare staff often become attached to tried and tested, routine working methods and may perceive new developments as a threat to their autonomy or comfort (Safi et al., 2018). The developing AI and the risks associated with it play a significant role in all this. Automation is spreading to various fields and has reached the medical world as well, which raises fears for the future of some professions. There is a fear of losing control of the treatment process, of having to learn new skills, and of additional administrative duties or increased working hours (Busetto et al., 2018). Often, new technologies are perceived as complex tools, requiring a lot of time to learn and not always immediately beneficial in day-to-day work. This is a particular challenge for those with more seniority. In addition, the lack of adequate training, technical support and clear implementation procedures exacerbates the reluctance to change, or at least to approach change with considerable reserve (Hennrich et al., 2020). Lack of acceptance of technological change contributes to fragmentation of care, increased decision-making time and increased risk of errors (Trane et al., 2022). It is worth noting that resistance to new technologies and processes is not only an individual issue, but also an organisational one. Overcoming this barrier requires investment in infrastructure and training, but also the involvement of staff early in the implementation of change and the promotion of good practice (Safi et al., 2018). Providing technical support, clear procedures and communicating the real benefits of new solutions are also key.

Attempts to build systems accessible to all healthcare professionals involved inpatient care create data protection and information security challenges and increase the risk of data leakage. The ease with which cybercriminals can steal personal data poses a major technological threat (Goniewicz et al., 2021). This is due to increasing digitalisation, the development of interoperable systems or the growing use of tools based on AI. One of the biggest threats is hacking attacks, which can lead to the leakage of patients' sensitive personal and medical data. Cybercriminals exploit network security vulnerabilities, lack of software updates, weak passwords, as well as human error such as mismanagement of data access (Henriksen et al., 2013). The latter is what we are most vulnerable to when we want to deploy open-access systems that enable MDTs. Modern health systems are particularly vulnerable to attacks due to their complexity and distributed nature - they include not only central databases but also medical devices (e.g., infusion pumps, monitors, radiology systems), which often do not meet modern IT security standards (He et al., 2021). In addition, the rapid growth of telemedicine and remote access to medical records increases the risk of unauthorised access and attacks on terminal devices and wireless networks. IT systems are sometimes outdated, insufficiently updated, and not resilient to modern cyber threats. Another challenge is ensuring compliance with data protection legislation (e.g., GDPR). Facilities are obliged to use security mechanisms, such as data encryption, which may hinder subsequent data sharing. The human factor should not be forgotten either - even the best technologies will not protect data if staff are not properly trained in cyber security and do not follow established procedures. User errors, unknowingly sharing data or using unsecured devices are still some of the most common causes of security breaches (Henriksen et al., 2013). Implementing integrated healthcare requires prioritising cybersecurity, as sensitive patient data, is at stake.

Lack of standardization

Another challenge is the lack of standardisation in healthcare information systems. This means that different facilities, IT systems and service providers use different data formats, coding, terminology and communication protocols, making the smooth flow of information and collaboration difficult if not impossible. Patient information is “trapped” in individual systems and is not accessible to other providers, resulting in duplicate examinations, an incomplete picture of patient health and the risk of treatment errors. The lack of common standards hinders effective communication between different teams and facilities, which negatively affects the quality and continuity of patient care (Sadler et al., 2023). Conversely, the lack of standardised data entry and validation processes results in poor quality information, which translates into the risk of erroneous clinical decisions. Systems integration without common standards requires costly intermediate solutions (middleware, data conversions), additional training and ongoing maintenance. Directors and other managers should make system unification a priority.

If healthcare leaders are not convinced of the need for standardisation and are not involved in the implementation process, staff will not make it a priority. Standardisation should not only include medical procedures, but also a clear division of responsibilities between different levels of care. Expert groups and interoperability councils should be set up to develop good practices and promote their use throughout the system. A further step could be the introduction of a nationwide IT system that includes a complete register of patients' medical and socio-health data, enabling the exchange of information between all participants in the system. Standardisation of data formats, and integration of IT systems would avoid duplication of studies, errors and lost information. Lack of standardisation is a barrier to effective, safe and integrated healthcare. It hinders information sharing, increases the risk of errors, raises costs and limits opportunities for collaboration between facilities. Implementing and promoting widely accepted standards (e.g., ICD-10) and building a culture of collaboration around common data management principles is key.

Artificial intelligence

In recent years, we have observed the dynamic development of technologies based on AI, which are gaining increasing importance in healthcare. This phenomenon raises great hopes in the context of supporting IPC, both at the level of clinical practice and education systems. The use of AI can significantly contribute to improving the quality and safety of patient care. Intelligent systems can support healthcare teams in analysing clinical data, coordinating activities, and making decisions, which is crucial in care models based on the collaboration of many professions. This allows not only for more effective management of patient cases but also for better matching of therapeutic activities to individual needs (Choudhury and Asan, 2020).

Hopes are placed in the use of AI in IPE. Modern technological solutions allow for the design of realistic, repeatable simulation scenarios that allow students and healthcare workers to practice teamwork in a safe environment. This approach can significantly increase the effectiveness of teaching communication, coordination, and decision-making skills - necessary for effective collaboration in an interprofessional team (Guraya, 2024). Therefore, the development of AI can be regarded as an important support both for the practice of IPC itself and for the creation of more advanced teaching tools that can improve the professional preparation of future members of healthcare teams.

Electronic medical records

Digital medical records are playing an increasingly important role in healthcare systems around the world. Their main goal is to aid the provision of safe, consistent, and high-quality patient care, as well as to support a sustainable treatment process that considers both clinical and organisational needs. Electronic documentation systems enable quick access to information, reduce the risk of medical errors, and streamline decision-making processes.

Maintaining digital records can also increase transparency in healthcare team tasks - through clearly assigned responsibilities, tracking activities, and the ability to review the history of clinical decisions. These systems minimize the risk of misunderstandings resulting from illegible records, transmission errors, or data loss, which were previously common in paper records (Alami et al., 2020; Robertson et al., 2022).

An increasingly important concept in the realm of new technological challenges is the idea of medical data donation. This refers to electronic databases that contain anonymized data from individuals who have given their informed consent for data sharing. Such databases serve as valuable resources for healthcare professionals to optimise individualized patient treatment and for researchers to develop diagnostic algorithms and evaluate the effectiveness of emerging therapies. In the context of interprofessional collaboration, access to shared medical data fosters interdisciplinary discussions, facilitating a comprehensive approach to patient care. The European Union has introduced regulatory frameworks to support this practice, notably through the European Health Data Space Regulation (Regulation (EU) 2025/327), which establishes a secure, interoperable infrastructure for the primary use of health data in healthcare as well as its secondary use in research, innovation, and policy-making. Implementing these frameworks requires rigorous attention to privacy protection, ethical data governance, and maintaining patient trust.

However, despite its many advantages, electronic documentation also brings new challenges in the context of teamwork. In many cases, digital documentation systems fragment the work of teams instead of integrating. Working at a computer, often individually, limits direct face-to-face communication, which is the foundation of effective IPC. This lack of communication promotes professional isolation, makes it difficult to understand the roles and perspectives of other team members, and can also reduce the level of trust and mutual support (Robertson et al., 2022). In light of these observations, the question becomes important: how can digital systems be designed and implemented so that they not only support the technical efficiency of care but also do not disrupt - but rather strengthen - team collaboration processes? Solutions are needed that balance the effectiveness of digital documentation with the need to create space for dialogue, co-decision-making, and joint clinical reflection.

Take-home message

- The future of the development of IPC can derive from the established educational principles, theoretical foundations, previous research in the field, and the existing examples of successful implementation and integration of IPC and education into the healthcare and university setting, as well as search out for new opportunities associated with the development of new technologies.
- Integrated care is most effective when it is truly patient-centred, with continuity, coordination, and collaboration embedded in daily practice. Improving communication, removing professional silos, and clarifying roles are key to achieving these goals.

- Technology and clear processes are essential enablers of integration, but must be accompanied by investment in people, leadership, and a supportive organisational culture. Without attention to education, motivation, and system adaptability, even the best tools will remain underutilized.
- Interprofessional education can promote development of shared values, communication and team work which promote collaborative practice and patient-centred care.
- Transformational change takes time and requires persistent effort at every level-from policy and management to clinical teams and patient engagement. Sustainable progress depends on continuous monitoring, feedback, and adaptation to the evolving needs of both professionals and populations.

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