Supplementary Appendix

Appendix Table 1 gives an overview of implementation determinants - general system-level determinants as well as determinants related specifically to the implementation of PCC. The first column from left ("Categories") identifies the main determinant categories that have been analysed in the literature. The second column from the left ("Examples describing the relevance of categories") gives example citations to illustrate the relevance of the category. The third column from the left ("Sources Health care") lists literature sources in which references to system-level determinants related to the implementation of interventions in the health care sector have been found in the course of the literature research. The last column from the left ("Sources PCC") completes the literature list with sources in which references to the system-level determinants have been found in direct relation to PCC.

Appendix Table 1: System-level determinants influencing the implementation of interventions in health care

Categories	**Examples describing the relevance of categories**	**Sources Health care**	**Sources PCC**
External policies & regulations	"Broad constructs that encompass external strategies to spread interventions, including policy and regulations (governmental or other central entity), external mandates, recommendations and guidelines, pay-for-performance, collaboratives, and public or benchmark reporting." (Damschroder et al., 2009, p. 7) "Beginning at the broadest level, the state and federal sociopolitical and funding contexts influence the exploration of innovative interventions or practices." (Aarons et al., 2011, p. 6) "A policy "push" occurring at the early stage of implementation of an innovation initiative can increase its chances of success, perhaps most crucially by making available a dedicated funding." (Greenhalgh et al., 2004, p. 610)	Grol (1997); Meyers, Sivakumur, & Nakata (1999); Wagner et al. (2001); Denis et al. (2002); Greenhalgh et al. (2004); Fixsen et al. (2005); Cochrane et al. (2007); Mendel et al. (2008); Durlak & Dupre (2008); Damschroder et al. (2009); Aarons et al. (2011); Lau et al. (2016)	Wagner et al. (2001); Ashton (2015); Alridge et al. (2016); Scholl et al. (2018)
External resources	"The factors most often mentioned were reimbursement policies and the behavior of health plans and insurers." (Wagner, 2001, p. 76) "The implementation and ongoing sustainability of CCMs was sometimes costly, and without sufficient funding, the process was likely to fail." (Davy et al., 2015, p. 8) "If there is dedicated and ongoing funding for its implementation, the innovation is more likely to be implemented and routinized." (Greenhalgh et al., 2004, p. 611) "Resource constraints of various types were identified as one of the most common barriers to innovation uptake. Innovations that could not be billed for or reimbursed under a fee-for-service model were difficult to sustain." (Moore et al., 2016, p. 25) "Community resources available to assist with interventions can help make a complex	Grol (1997); Wagner et al. (2001); Grol & Grimshaw (2003); Greenhalgh et al. (2004); Fixsen et al. (2005); Institute of Medicine (2001); West et al. (2005); Cochrane et al. (2007); Mendel et al. (2008); Durlak & Dupre (2008); Feldstein & Glasgow (2008); Damschroder et al. (2009); Epstein et al., (2010); Aarons et al. (2011); Davy et al. (2015); Moore et al. (2016); Lau et al., (2016)	West et al. (2005); Levinson et al. (2010); Epstein et al., (2010); Pelzang (2010); Porter & Lee, (2013); van der Eijk et al. (2013); Ashton (2015); Davy et al. (2015); Lüdecke, (2014); Bergeson & Dean (2006); Alridge et al. (2016); Santana et al. (2018)

	intervention affordable for organizations." (Feldstein & Glasgow, 2008, p. 237)		
System characteristics & structures	"The emerging categories of barriers (TABLE 2) are: […] ▪ System and process barriers: lack of organization and structure, lack of harmony with health and oversight systems, lack of referral process, lack of workload-outcome balance, lack of teamwork structure and ethic" (Cochrane et al., 2007, p. 97) "Partnering with other healthcare services such as hospitals and specialist services was considered to facilitate the implementation and sustainability of CCMs." (Davy et al., 2015, p. 8) "Interorganizational Networks. The more complex the implementation that is needed for a particular innovation, the greater the significance of the interorganizational network will be to the implementation's success." (Greenhalgh et al., 2004, p. 612)	Grol (1997); Meyers et al. (1999); Wagner et al. (2001); Greenhalgh et al. (2004); Cochrane et al. (2007); Mendel et al. (2008); Feldstein & Glasgow (2008); Durlak & Dupre (2008); Damschroder et al. (2009); Aarons et al. (2011); Davy et al. (2015); Moore et al. (2015)	Bergeson & Dean (2006); Pelzang (2010): Porter & Lee (2013); van der Eijk (2013); Lüdecke (2014); Davy et al. (2015); Ashton (2015); Kadu & Stalee (2015); Alridge et al. (2016); Santana et al. (2018)
Peer pressure & competition	"Mimetic or competitive pressure to implement an intervention, typically because most or other key peer or competing organizations have already implemented or in pursuit of a competitive edge." (Damschroder et al., 2009, p. 7) "The sheer number of organizations adopting an innovation can cause a bandwagon pressure, prompting other organizations to adopt this innovation. […] Competitive bandwagon pressures occur because nonadopters fear below-average performance if many competitors profit from adopting." (Abrahamson & Rosenkopf, 1993, p. 487) "Institutional theory perspectives of isomorphic pressures and institutional strategies may provide a new understanding for health care organizations seeking effective knowledge creation strategies within institutional environment of health care sector." (Yang et al., 2007, p. 263)	Abrahamson & Rosenkopf (1993); Meyers et al. (1999); Greenhalgh et al. (2004); Yang et al. (2007); Feldstein & Glasgow (2008); Damschroder et al. (2009);	Moore et al. (2017)
Cosmopolitanism	"The degree to which an organization is networked with other external organizations. Organizations that support and promote external boundary-spanning roles of their staff are more likely to implement new practices quickly." (Damschroder et al., 2009, p. 7) "An important influence on an organization's decision to adopt is whether a threshold proportion of comparable (homophilous) organizations have done so or plan to do so. […] A 'cosmopolitan' organisation (one that is externally well networked with others) will be more amenable to this influence." (Greenhalgh., 2005, p. 13)	Robertson & Wind (1983); Rogers (1995); Greenhalgh et al. (2004); Damschroder et al. (2009); Mendel et al. (2008); Aarons et al. (2011)	Wagner et al. (2001)

Patient needs & resources	"The extent to which patient needs, as well as barriers and facilitators to meet those needs, are accurately known and prioritized by the organization." (Damschroder, 2009, p. 7) "Thirty studies found that patient characteristics, attitudes, knowledge, or behaviors such as adherence were barriers to evidence-based care or implementation of guidelines." (Cochrane et al., 2007, p. 99)	Grol & Grimshaw (2003); Cochrane et al. (2007); Feldstein & Glasgow (2008); Durlak & Dupre, 2008; Damschroder et al. (2009); Davy et al. (2015); Keith et al. (2017)	Brown et al. (2006); Davy et al. (2015); Kadu & Stalee (2015)
Information & proclamation	"Media & change agents: While potential adopters of interventions are best characterized as active participants in the processes of diffusion, so too are external sources of information and influence on innovative practices." (Mendel et al., 2008, p. 27) "[…] there is evidence that these channels of communication (mass media interventions) may have an important role in influencing the use of health care interventions." (Grilli et al., 2002, p. 2)	Grilli et al. (2002); Grol & Grimshaw (2003); Mendel et al. (2008); Lau et al. (2016)	

Appendix Table 2: Interviewees by gender, age, type of care organisation, and organisational tenure

Characteristics	Total (N = 24)
Gender	
Male	15
Female	9
Age (years)	
25-34	1
35-44	6
45-54	11
55-64	6
Type of HSCOs	
GPs and private practice specialists	3
Psychotherapists	3
Long-term outpatient care	4
Outpatient rehabilitation services and rehabilitation clinics	4
Long-term inpatient care (including hospices)	5
Hospitals	5
Organisational tenure (years)	
less than 5	5
5-10	5
10-19	10
20 or more	2

Note: organisational tenure not available for n=2 interviewees.

A coding agenda with the title of codes and subcodes, definitions, and coding rules was generated at the beginning of the qualitative content analysis and extended continuously in the process of analysis.

Appendix Table 3: Coding agenda

Determinants of PCC implementation related to the system-level: external policies & regulations, system construction, system processes, & external resources	
External policies & regulations	
External guidelines	Characteristics of external regulations and extent to which these influence the way in which patient care can be provided by HSCOs.
Economic pressure	Extent to which external regulations generate financial and economic pressure on HSCOs
Bureaucratisation & administration	Specifications on external requirements for documentation, bureaucratic processes, and formalities, which impair healthcare delivery.
Competence assignments	Legally defined scopes of action of professional groups that restrict patient care.
Decision makers at system-level	Representation of healthcare actors in the decision-making by government or panels of the joint self-administration.
Patient directed policies	Ways in which the implementation process is enforced by laws and regulations that are directly addressed to influence patient care.
Information	Ways in which PCC related topics are advertised and spread by public bodies.
System characteristics & structures	
System construction	Regulation of the healthcare system and interrelation between healthcare actors influencing the implementation of PCC
Healthcare provision	Shortages of healthcare services in different care settings affecting the adequate and continuous provision of healthcare.
Profit orientation	The extent to which the orientation of certain organisations towards profit changes the way healthcare is delivered.
Digital infrastructure	The provision and accommodation of IT infrastructure and e-health platforms by the healthcare system.
System processes	
Continuity of care processes & transition	Ways in which the system provides a framework for collaboration between providers in relation to continuous, cross-sectoral care for patients
Communication & information sharing	Ways in which the system provides a framework for collaboration between providers related to how providers communicate with each other and share information.
Cosmopolitanism & networks	Ways in which providers collaborate in a systematic way and build formal or informal networks.
Collaboration between HSCOs & payers	Actions between healthcare providers and payers, e.g. social health insurance, social accident insurance, or employers' liability insurance association
Patient guidance & support	Ways in which activities on system-level promote support of patients or guidance through healthcare processes.
External resources	
Staffing	Specifications on healthcare personnel resources, reasons for shortages and impact on patient care.
Qualification & education	Extent to which the staff available on the labour market meet the requirements for adequate patient care
Reimbursement of operating costs	Ways in which reimbursement forms influence the way providers deliver PCC activities.

Financial incentives & investment costs	Extent to which financial incentives are set on system-level to implement new models of care. It also included the extent to which investment costs required for the implementation are financed.
Community resources	Ways in which services of the community are used to support professional healthcare delivery.

The main category 'Patient needs and resources' displays the decision makers' view of which patient related aspects are important for PCC and in what they are currently recognised and prioritised on system-level.

Appendix Table 4: Coding Agenda

Determinants of PCC implementation related to the system-level: patient needs & resources	
Patient needs & resources	
Access to care	Ways in which the patient needs of getting access to care as well as determinants to meet those needs are recognised and considered on the system-level.
Transition & information sharing	Ways in which patient needs of continuous care pathways and flow of information, as well as determinants to meet those needs, are recognised and considered at system-level.
Person-related care	Ways in which patient needs to be treated as a person as well as determinants to meet those needs are recognised and considered at system-level.
Participation & self-management	Ways in which activities to use patients' resources and to support patients' participation and self-management are promoted on the outer setting.

In the following, summaries, code definitions and example quotes (Appendix Table 3) are presented to describe decision maker`s perspectives about the understanding of patients' needs and resources on system-level.

Access to care

Decision makers pointed out that the ability of the healthcare system to provide rapid and local access to appropriate healthcare was essential for meeting patients' needs. While interviewees did not criticise the delivery of first aid nor of interventions in life-threatening situations, they did censure capacity limits and healthcare deficits in specialised outpatient care, psychotherapy, and long-term care because they complicate the adequate and continuous delivery of care to patients suffering from chronic or complex diseases.

Transition and information sharing

Well-functioning transitions including continuous care pathways and transfer of information within a healthcare network were highlighted as fundamental to meeting patient needs, especially in the care of chronically ill and elderly patients. Information gaps due to missing communication structures between providers not only waste resources - in the form of double examinations - but are also a burden on patients. If information about the patient's medical history was transferred and inter-organisational platforms and providers interact with each other, care could be more target oriented. Decision makers from medical centres evaluated as integral to PPC a high degree of information transfer and interdisciplinary all-around care from a single source.

Person-related care

Interviewees saw the holistic view of the patient as a person with various individual health and psychosocial issues as an important dimension of PCC. Decision makers did not call into question evidence-based medicine but asserted that, in addition to medical processes, standards, guidelines, and economic aspects, patients should be considered individually and taken seriously with their concerns and demands, even when patient choices may deviate from the best possible and most

efficient treatment pathway. Interviewees saw a lack of attention to and consciousness of this holistic approach in system-level healthcare management, with some regulations explicitly contradicting it, particularly reimbursement incentives. An interviewee argued for the individualisation of care in these terms:

GP-centred care was classified as a possibility to promote person-related care, as this form of care allows the patient to be treated holistically over a longer period of time and guided through the system. Interviewees also argued that consideration of the psychosocial level and the structural inclusion of family and relatives into patient treatment was supportive of PCC, i.e. of delivering person-related care.

Participation and self-management

Interviewees saw PCC in the context of empowered and participating patients but rarely mentioned system-level activities in connection with this dimension of PCC. In long-term outpatient care, systematic paradigm shifts in the conceptualisation of patient care were described as being underway, from a problem-oriented to a skill-oriented view of care with the current forms of remuneration not yet caught up with this general trend. At the same time, statements by interviewees from the outpatient acute care setting show that possibilities of self-management in primary care, such as self-managed coagulation control, have not been considered yet.

Interviewees also mentioned the 'Patient Rights Law', setting the legal foundation of patients' rights, and the 'Coalition for Patient Safety' (in German: 'Aktionsbündnis Patientensicherheit') as supporting PCC at the system level by aiming to inform patients and to promote patient empowerment and participation. The free choice of physicians currently available to patients was also seen as promoting PCC, as it credits patients with the competence to decide for themselves and change providers in case of dissatisfaction.

Appendix Table 5: Decision makers' understanding of patient needs and resources

Patient needs & resources	Quotes
Access to care	'On the other hand, it is also important for the patient to be able to go to a specialist quickly. Right? That he does not have to drive far for an eternity or wait very long for a physician's appointment'. 'Well, there I would find optimal patient care, that an appointment can be found quickly for an initial consultation, where it can be clarified what is present, what problems exist, what would have to be done, which treatment would be useful. And if it could take place promptly'.
Transition & information sharing	'In the case of a chronic disease, I wish that I had a continuous care team, which I know, which knows me. Where I know, so to speak, when there are changes in medication or in my state of health, that I do not have to start over again and again for an eternity, but that there is also previous knowledge. That people know my story. And that one can act well and quickly in order to have the best possible attitude or change in the therapy'. 'Well, on the one hand there are certainly the patients who simply do not leave the treatment with a therapeutic setting. But who need long-term care. And there I would say they are well cared for, if they are well connected. So, if it is not only the therapist that they can turn to, but that there are social workers, that there are physicians, occupational therapists perhaps, contact points'.
Person-related care	'Because a human being is, of course, something other than a car. If my car isn't running, I take it to the repair shop and it stays there until it runs again, right? (smiling) That's not so easy to do with a human being. [...] That has something to do with patient centring, individualisation of the therapy goals. [...] And then that will certainly be progressive, too, in recording these results and reimbursing them accordingly. That's a little revolution in that sense'. 'The same is when I can do a TAVI on 90-year-olds today, i.e. a cardiac catheter examination, you don't have to operate any more, you can do it via a catheter, so to speak, but then the patients with 90 require more care, they are delirious and demented afterwards. [...] Then I've managed to do something great with machines, but the quality of life and the independence and autonomy are gone. If I don't have the resources to take care of these over 90-year-olds afterwards. And I think people just think too briefly. […] afterwards the human being falls by the wayside and stands alone. And there, I think, it is somehow a break in the system'.
Participation & self-management	'[…] I think the safest way is that the patient, as long as he can, takes care of himself, demands things, that he is strengthened in his role, in his profession, to demand things. And not to be turned away. Yes? For that, he needs to be […] well informed, what are his rights, what are his duties? What are his entitlements? What is paid? So to have good information, to give him support, which is already available today, about the patient rights law and also support, APS, prepare for a physician discussion […]'. 'This is, after all, a recurring theme in the discussion about the extent to which patients are given the opportunity to decide for themselves which physician they go to. From my point of view, I think it makes sense that there is a free choice of physicians. So that a patient can also change doctors if he is dissatisfied'.