

Supplementary file 2: Summary of the barriers and enablers to implementing clinical practice guidelines

Category	No. of reviews	Sub-categories	Barriers	No. of reviews	Enablers
Political, social and culture factors	5		<ul style="list-style-type: none"> Limited health care networks [35,38] and poor inter-professional communication pathways [28, 30,38] Inconsistency between the CPGs contents/ recommendations and the public's views [35,37] Language barriers in multiethnic countries [28,37] Immigrant patients: Lack of culturally based materials and awareness of patients' cultural background [37] Policy barriers: too many state and federal regulations [35] Socially and politically conservative [35] Socioeconomic and political factors influence the resources distribution (Health system model) [37] Lack of coordination among different healthcare levels such as specialists and PCPs [37] 	1	<ul style="list-style-type: none"> Developing supportive policy like congruent federal guidelines, making the practice as routine, and setting HIV testing as a requirement for college enrolment [35] Providing more (HIV) literature and specific training to public [35] Cooperation between the State or national health department and community organizations and clinics [35]
Institutional environment and resources factors	9		<ul style="list-style-type: none"> Time constraints/ heavy workload/ PCPs shortage [27, 28,30,31, 32,35,37,38] Financial burden: increased expenditure [35] like cost of certain devices [28] and inadequate ongoing funding [31, 38] Limited availability of medicines, specialists, allied health professionals and some certain equipment [27, 30, 31,37] and devices [28] Lack of development, implementation and dissemination strategies/plan for relevant guidelines [28, 31, 35] Limited resources or environmental constraints [30,31, 35,37] Referral: difficulties with referring to specialists [27,35], and lack of referral resources [37] Limited technical support for CPGs implementation [38]; unfriendly used software for disease management [30] Administrative barriers: lack of administrative support/staff and administrative hassles associated with CPG implementation [35,37] Limited services for specific patient-groups or needs [31,35] Reluctant to make organisation changes such as "integration" to promote multi-professional approach [38] Organizational restructure and services decentralization [29] Prioritizes the disease treatment instead of PP&HP, few resources allocated to PP&HP [37] 	10	<ul style="list-style-type: none"> Technical improvement [30]: technical systems such as the payment system [27], electronic health records [28], electronic disease management plan [28], electronic patient educational materials ([28]), and flexible booking system [37], integrated systems of promoting collaboration and clear communication between PCPs and other professionals (e.g., specialists, distant health professionals [30,36]) Proving financial support such as federal funding for staff for the practice implementation [35] Establishing clearly and easily accessible health networks like multidiscipline corporations [29], referral pathways/network [30,35] and/or follow-up [35,37] Integrating the recommended practice (HIV testing) into current clinic workflow [28,35] without interfering with delivery of other current health care services [35] Developing clearly CPGs implementation strategies by involving PCPs to promote the advancement and dissemination of guidelines [28] Organisations' readiness for change like physical changes in daily practice (e.g., co-location of all the involved healthcare providers) and positive staff attitude to change [38]

			<ul style="list-style-type: none"> Challenges interpreting and using laboratory measures to support the implementation [30] Variations in practice operations [30] 		<ul style="list-style-type: none"> Institutional changes: address issues such as staff shortage, bed shortage and resources shortage, and providing leadership support, [28]. Engagement between evidence-based practice researchers and implementation organization to offer 'ongoing support' to practices [34] Promote access to more resources such as laboratories, specialists, relevant support service, patient education resources [30] A clear leadership structure: capable senior physician taking the role of championing the service to other colleagues [35,38] Increasing capable healthcare providers and managers [38] Effective inter-professional communication via standardised care pathways [38]
Guideline related-factors	9		<ul style="list-style-type: none"> Perceived limited applicability of the CPGs in real-world practice [28, 32, 33, 34] Lack of clarity or specificity of CPGs [27,30] Inappropriate for some specific group of patients like those with comorbidities [30,33] Guideline recommendations are inconsistent with the currently used medical heuristics [28,34] Perceived limited credibility of the CPGs [28,32] CPGs change too frequently [30] Lack of evidence based and clear guidelines [31] Inconsistent guidelines [35] Difficult procedures for implementation [35] Negative aspects of available CPGs (depersonalize, not adapted to local services, lack of consistency, unethical) [37] CPGs restrict clinical judgment and challenge professionals' autonomy [32] 	4	<ul style="list-style-type: none"> Tailored (asthma management) guidelines based on patients' needs [28] Involving physicians into guideline development [28] Evidence/recommendations that are easy to use, cost-effective and time-saving [29] Developing locally (context specific) drafted CPGs to overcome their uncertainty about CPGs [33] Guidelines are compatible with their current practice [32]
Healthcare provider related-factors	10	Knowledge and skills (n=10)	<ul style="list-style-type: none"> Lack of training, knowledge and/or skills about the CPGs or the recommended practice in CPGs [27, 31, 32,35,37] Unfamiliar with CPGs content [30, 31, 33] or development processes [32] Poor communication/language skills of PCPs contributing to unsatisfied conversations between GPs and patients [27,31] Use medical language (e.g., using jargon) to communicate with patients [27,38] Limited continuing education opportunities/provisions for PCPs [31] Influence of dated medical training regarding the CPGs [28, 30,33] Feel under-prepared regarding knowledge about osteoarthritis treatment [27] Lack of knowledge for referral [37] Lack of knowledge about risk evaluation, motivational interview, communicative skills, and counselling [37] 	6	<ul style="list-style-type: none"> Provision of timely education and training to PCPs [28,30,33,35,36] Development of good communication skills [27] Professional development of the PCPs such as maintaining existing skills, developing new skills and knowledge [29] Effective communication between patients and PCPs including negotiation and persuasion [28] Establish rapport and trust relationships between primary care professional and patient [29,30,35]
		Professional role and	<ul style="list-style-type: none"> Lack of clear delineation about the role, identity, and responsibility of PCPs for CPGs implementation [30,31,32,34,37] 	3	<ul style="list-style-type: none"> Promoting a well-organized practice and a clear clarification about the role of PCPs in the disease management [30]

		identity (n=5)	<ul style="list-style-type: none"> PCPs' role for disease management is misunderstood or underestimated by other healthcare professionals [30] 		<ul style="list-style-type: none"> Spent more time on patients' initial visit [35] Ensure ownership, flexibility, and autonomy of PCPs to adapt the innovation [29]
		Beliefs about capabilities (n=3)	<ul style="list-style-type: none"> Lack of self-efficacy [28] Challenging nature of CKD management [30] Lack of self-confidence in their capacities and experiences to deal with health issue [37] Unaware of patients' experiences and needs when giving advice [27] 	2	<ul style="list-style-type: none"> Peer learning and support [38] Providing enough training to staff on the CPGs [38] to improve their confidence to deliver the intervention [37,38] Categorize their patients based on patients' socioeconomic or psychological parameters and use some recommended treatments for some specific group of patients [27] Awareness of patients' characteristics such as patients' coping behaviours, expectations and experiences, fears and anxieties, and cultural background [32, 35, 37]
		Beliefs about consequences (n=3)	<ul style="list-style-type: none"> Doubts about treatment effectiveness [27,37] Negative attitudes towards the disease progress and management even if using the guideline recommendations [27] Lack of outcome expectancy [28] 	1	<ul style="list-style-type: none"> Clinicians accept and have positive attitudes toward programs and guidelines [35]
		Emotion/motivation (n=6)	<ul style="list-style-type: none"> Clinical inertia of the PCPs [28] personal stress due to the guideline [38] Feel overloaded with the volume of guidelines [32], the information in CPGs and experienced 'guideline fatigue' [33] Negative emotions (e.g., frustration) around patients' compliance to care plan [27,31] Professionals' low motivation/interests of implementing PP&HP [37] 		
Patient related-factors	8	Motivations and adherence (n=5)	<ul style="list-style-type: none"> Lack of interest and poor adherence of patients for advice and care plans [27,28,30,31,37] 	5	<ul style="list-style-type: none"> Provision of timely education and training to patients [27,28, 35,36] Providing appropriate material that is easy to be introduced to patients [38] Improved patient's expectations and their self-management capability via early education [27] patients' increased interests [35] Reduced stigma for patients [38] Alignment between CPGs recommendations, healthcare professional views, and patient views [34]
		Knowledge/literacy (n=4)	<ul style="list-style-type: none"> Lack of education, knowledge and skills about the disease [28,31,35] Patients' low literacy and health literacy make it difficult to educate patients [30,35] Language barriers: cannot report (asthmatic) symptoms accurately [28] 		
		Expectations (n=4)	<ul style="list-style-type: none"> Dissonant patient expectations/goals with disease management [27,28,32] Patients' expectation, beliefs, preferences and values of disease management [34] 		
		Beliefs about consequences (n=3)	<ul style="list-style-type: none"> Misconceptions about the disease consequence: underestimate the disease consequence [30]; overestimate the disease consequence ([34]); underestimate the disease (HIV) risk [35] Fear of negative results [35] 		

		Personal characteristics (n=3)	<ul style="list-style-type: none"> • Patients' socioeconomic characteristics: [31,35]: age (motivation increases with age), psychological comorbidity [37], and medical and level of self-empowerment capacity [31] • Negative emotions [31] • Competing health needs and priorities [35] 		
		Attitudes/views towards CPGs (n=1)	<ul style="list-style-type: none"> • Differences views on disease conditions between patients/parents/caregivers and PCPs [28] • Negative attitudes towards CPGs as the patients and/or caregivers were experienced for asthma management [28] 		
Behavioural regulation and reinforcement	3		<ul style="list-style-type: none"> • Lack of remuneration for tasks [30] • Lack of rewards and incentivization [34] • Lack of financial incentives for the healthcare practice or the professional [37] 	4	<ul style="list-style-type: none"> • Regular supervision schedule and feedbacks [38] • Implementation of appropriate types of follow up [38] • Audit and feedback [28,36] • Using provider reminder systems [36,37] • "Remuneration for quality improvement initiatives" [28] • Financial incentives [37]

Notes: PCP: primary care providers; CPG: clinical practice guideline; CKD: chronic kidney disease; GP: general practitioner.