

**A systematic review of the validity and reliability of patient-reported experience measures**

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## **A systematic review of the validity and reliability of patient reported experience measures**

### **Abstract**

*Objectives:* To identify PREMs, assess their validity and reliability, and assess any bias in the study design of PREM validity and reliability testing.

*Data sources/study setting:* Articles reporting on PREM development and testing sourced from Medline, CINAHL and Scopus databases up to the 13th of March 2018.

*Study design:* Systematic review.

*Data collection/extraction methods:* Critical appraisal of PREM study design was undertaken using the Appraisal tool for Cross-Sectional Studies (AXIS). Critical appraisal of PREM validity and reliability was undertaken using a revised version of the COSMIN checklist.

*Principal findings:* Eighty-eight PREMs were identified, spanning across four main healthcare contexts. PREM validity and reliability was supported by appropriate study designs. Internal consistency (n=58, 65.2%), structural validity (n=49, 55.1%) and content validity (n=34, 38.2%) were the most frequently undertaken validity and reliability tests.

*Conclusions:* Careful consideration should be given when selecting PREMs, particularly as 7 of the 10 validity and reliability criteria were not undertaken in  $\geq 50\%$  of the PREMs. Testing PREM responsiveness should be prioritised for the application of PREMs where the end-user is measuring change over time. Assessing measurement error/agreement of PREMs is important to understand the clinical relevancy of PREM scores used in a healthcare evaluation capacity.

*Keywords:* Validity; reliability; survey research and questionnaire design; systematic reviews/meta-analyses; health care organisation and systems

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## Introduction

Patient-reported experience measures (PREMs) are tools that capture ‘what’ happened during an episode of care, and ‘how’ it happened from the perspective of the patient<sup>1-3</sup>. PREMs differ from patient-reported outcome measures (PROMs), which aim to measure patients’ health status<sup>4</sup>, and the more subjective patient satisfaction measures, which are an indication of how well a patient’s expectations were met<sup>5</sup>; a benchmark which is criticised for being too heavily influenced by past healthcare encounters<sup>6</sup>.

PREMs are gaining attention as an indicator of healthcare quality and can provide information regarding the patient-centeredness of existing services as well as areas for potential improvement regarding healthcare delivery<sup>7</sup>. The purpose of employing PREMs is consistent with the Institute of Medicine’s (IOM) definition of healthcare quality; defined as care that is patient-centred, effective, efficient, timely and equitable<sup>8</sup>. In recent years, PREMs have been used to inform pay-for-performance (P4P) and benchmarking schemes, adjunct with other healthcare quality domains, including: clinical quality/effectiveness, health information technology, and resource use<sup>9,10</sup>. Such schemes see healthcare services financially rewarded for their performance across these domains of healthcare quality, as opposed to the traditional fee-for-service payment system, which may inadvertently promote low-value care<sup>10,11</sup>.

While there is evident merit behind utilising PREMs in healthcare quality evaluations, there remains some conjecture regarding their use. Manary and colleagues<sup>12</sup> identify three main limitations expressed by critics of PREMs. Firstly, patient-reported experience is largely seen as congruent with terms such as ‘patient satisfaction’ and ‘patient expectation’, both of which are subjective terms that can be

reflective of judgements on the *adequacy* of healthcare and not the *quality*<sup>12-14</sup>. Secondly, PREMs may be confounded by factors not directly related to the quality of healthcare experienced by the patient, such as health outcomes<sup>12</sup>. And finally, PREMs can be a reflection of patients' preconceived healthcare 'ideals' or expectations and not their actual care experience<sup>12</sup>. All three limitations are indicative of a blurring of concept boundaries and inappropriate interchanging of concepts. Whilst this is not unique to PREMs, it does suggest a low level of concept maturity regarding patient-reported experiences<sup>15</sup> and consequently, is an area of research that warrants greater attention.

Despite these limitations, PREMs have gained international recognition as an indicator of healthcare quality. This is largely because: (i) they enable patients to comprehensively reflect on the interpersonal aspects of their care experience<sup>16</sup>, (ii) they can be utilised as a common measure for public reporting, benchmarking of institutions/centres and healthcare plans<sup>10</sup>; and (iii) they can provide patient-level information that is useful in driving service quality improvement strategies<sup>17,18</sup>.

Understanding the validity and reliability of PREMs is integral to the appropriate selection of instruments for quality assessment of healthcare services, in conjunction with other aspects, such as the clinical relevance of an instrument and the domains of patient-reported experience that the PREM covers. Validity refers to the ability of an instrument to measure what it intends to measure, and reliability refers to the ability of an instrument to produce consistent results under similar circumstances, as well as to discriminate between the performance of two different providers<sup>19,20</sup>. It is important to assess these properties in order to understand the risk of bias that may arise in employing certain instruments<sup>21</sup> and whether instruments are suitable for capturing patient-reported experience data.

Whilst two previously published systematic reviews have examined the psychometric testing of PREMs; one related to PREMs for in-patients<sup>16</sup>, and the other for emergency care service provision<sup>22</sup>, there has been no comprehensive examination of the tools available across a range of healthcare contexts. The aim of this systematic review is to identify PREMs, assess their validity and reliability, and assess any bias in the study design of PREM validity and reliability testing, irrespective of the healthcare context PREMs are designed to be used in.

## **Objectives**

1. To identify existing tools for measuring patient-reported experiences in healthcare, irrespective of the context.
2. To critically appraise bias in the study design employed in PREM validity and reliability testing, and
3. To critically appraise the results of validity and reliability testing undertaken for these PREMs.

## **Methods**

In conducting this systematic review, the authors conformed to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) statement<sup>23</sup>. This review was registered with PROSPERO (registration number: CRD42018089935).

### *Search strategy and eligibility criteria*

The databases searched were MEDLINE (Ovid), CINAHL Plus with full text (EBSCOhost) and Scopus (Elsevier). No date restriction was applied to the search strategy; records were searched up to the 13th of March 2018. Patient 'satisfaction'

was included in search terms in order to not to limit our results as there is a blurring of these terms and some PREMs may be labelled as satisfaction measures.

Articles were included in the systematic review if they met all the following criteria:

- Described the development and evaluation of PREMs
- Published in English
- Full-text published in peer-reviewed journals
- Labelled as a satisfaction questionnaire, but framed around measuring patients' experiences (e.g. the Surgical In-Patient Satisfaction – SIPs – instrument<sup>24</sup>)

Articles were excluded if they met any of the following criteria:

- Instruments labelled as a satisfaction questionnaire which were (i) framed around measuring patient levels of satisfaction, (ii) inclusive of a global satisfaction question or visual analogue scale, and (iii) developed based on satisfaction frameworks or content analyses
- Patient expectation questionnaires
- Quality of care questionnaires
- Patient participation questionnaires
- Related to patient experiences of a specific treatment or intervention (e.g. insulin devices, hearing aids, food services, anaesthesia, medication/pharmaceutical dispensary etc.) or specific programme (i.e. education programmes)
- Measuring emotional care received by patients (e.g. empathy)
- Studies where PREMs were completed entirely by proxy (completed by populations *not* receiving the care); if proxy-reported data was only a

proportion of data collected (patient-reported data also reported), then the study was still included

- Quality improvement initiatives
- Patient attitude scales
- Checklists
- Patient experience questionnaires comprised of a single domain; or
- PREMs superseded by a more up-to-date version of the same PREM with corresponding updated validity and reliability testing

The full search strategy for each database are provided in Supplementary file 1. All references were imported into EndNote (Version 8, Clarivate Analytics) and duplicates were removed. Two reviewers independently screened paper titles and abstracts for inclusion. Where the title and abstract was not informative enough to make a decision, the full-text article was reviewed. Figure 1 depicts the PRISMA flow diagram of this process. The two reviewers handled disagreements regarding article inclusion or exclusion. Where a decision could not be made, a third reviewer adjudicated the final decision. Reference list hand-searching was also employed for the identification of PREMs not identified through database searching, and updates for PREMs originally identified through the database searching.

[Insert Figure 1 about here]

#### *Data extraction*

Descriptive data was independently extracted from the included articles by two reviewers into a standardised excel extraction form (refer to Supplementary file 2). Discrepancies in the extracted data were discussed between the two reviewers, or adjudicated by a third if necessary. If there was insufficient information in the full-



text article regarding the validity and reliability testing undertaken, the article was excluded.

### *Critical appraisal*

To critically appraise bias in the study design employed in PREM validity and reliability testing, the Appraisal tool for Cross-Sectional Studies (AXIS)<sup>25</sup> was used. This is a 20-item appraisal tool developed in response to the increase in cross-sectional studies informing evidence-based medicine and the consequent importance of ensuring that these studies are of high quality and low bias<sup>25</sup>. The purpose of employing the AXIS tool in the present systematic review was to ensure that the results of a PREM's validity and reliability testing were supported by an appropriate study design, and thus able to be interpreted as a robust representation of how valid and/or reliable that PREM is. The AXIS assesses the quality of cross-sectional studies based on the following criteria: clarity of aims/objectives and target population; appropriate study design and sampling framework; justification for the sample size; measures taken to address non-responders and the potential for response bias; risk factors/outcome variables measured in the study; clarity of methods and statistical approach; appropriate result presentation, including internal consistency; justified discussion points and conclusion; discussion of limitations; and identification of ethical approval and any conflicts of interest<sup>25</sup>.

The scoring system conforms to a 'yes', 'no' or 'do not know/comment' design. PREMs were categorised into quartiles: >15 AXIS criteria met, 10-15 AXIS criteria met, 5-9 AXIS criteria met; ≤4 AXIS criteria met. The AXIS tool was used to appraise the most recent publication for each PREM as this was also reflective of the most recent version of the PREM that had undergone validity and reliability testing.

To assess the validity and reliability testing undertaken for PREMs included in this review, we employed a revised version of the COSMIN checklist (COnsensus-based Standards for the selection of health status Measurement INstruments) published in a recent systematic review of quality in shared decision making (SDM) tools<sup>19</sup>. This criteria is comprised of 10 psychometric measurement properties and sub-properties, including: internal consistency; reliability; measurement error/agreement; validity (inclusive of content validity, construct validity [structural validity, hypothesis testing and cross-cultural validity] and criterion validity); responsiveness and Item-Response Theory (IRT). Appendix 1 provides definitions for each of these measurement properties and identifies the appraisal parameters used to assess these properties<sup>262626</sup>.

Reporting of these measurement properties conforms to the following: '+' (meets criteria), '-' (does not meet criteria), or '?' (unclear or missing information). These scores were numerically coded and PREMs were ranked within their corresponding context(s) (refer to Supplementary file 4). Where more than one article was identified for the validity and reliability testing of a PREM, all articles were used to critically appraise the PREM. If the same criteria was assessed in separate studies for a given PREM and provided conflicting results (e.g. a '+' and a '-' score), then the more favourable result was recorded.

Appraisals with both tools was undertaken by one author. A sample of the revised COSMIN checklist appraisal data was cross-checked with a second reviewer. A Kappa measure was used to assess the level of inter-rater agreement. A Kappa value of 0.5 depicted moderate agreement, >0.7 good agreement and >0.8 very good agreement<sup>27</sup>.

## Results

A total of 88 PREMs were identified through the systematic literature search. Greater than one third of these instruments were contextually designed for inpatient care services (36.4%), 23.9% for primary care services and 12.5% for outpatient care services. Table 1 depicts the other contexts and conditions covered by the PREMs. Roughly 20% of instruments were developed in the UK, while other countries included the USA (19.3%), Norway (14.8%) and the Netherlands (13.6%). The most common mode of PREM administration was postal (45.7%), followed by face-to-face (33.1%), telephone (13.6%) and electronic (7.6%). The earliest PREMs detected through the systematic search were developed in 1993<sup>28,29</sup>. The median number of items per PREM was 27 (IQR 21-35; range: 4-82) and the median number of domains was 5 (IQR 4-7; distribution: 2-13). Extracted data can be identified in Supplementary file 2.

[Insert table 1 about here]

A proxy, not the recipient of care, completed PREMs on the patients' behalf in 11.4% of the PREMs. This was typically only for a small portion (10-12%) of any given study's population. Over 40% of the PREMs were developed and tested in languages other than English. Few papers discuss formal translation processes being undertaken for PREMs.

### *AXIS critical appraisal*

Table 2 identifies that 63 (70.5%) of the papers reporting on PREMs met >15 AXIS criteria. Over a quarter of studies met 10-15 criteria (28.4%), and 1.1% (n=1) met 5-9 criteria. No PREM met  $\leq 4$  AXIS criteria. The median number of 'yes' scores was 16 (IQR 15-17). The lowest scoring of all PREMs answered 'yes' to only 5 of the

20 AXIS questions<sup>30</sup>. The highest scoring PREM answered 'yes' to all questions<sup>31</sup>. Supplementary file 3 presents the AXIS results for all PREMs from highest to lowest number of AXIS criteria met.

[Insert table 2 about here]

Appendix 2 identifies that all studies we assessed as presenting clear study aims and utilising appropriate study designs to answer their research questions (Q1 and Q2). Greater than 95% of PREMs appropriately sampled participants to be representative of the target population under investigation (Q5). Over 95% of the studies reported that there was no conflict of interest related to a funding source and the interpretation of results (Q19). Questions 13 (potential for response rate bias), 14 (description of non-responders) and 20 (attainment of ethical approval or participant consent) were the criteria least frequently met by PREM papers.

#### *Revised COSMIN checklist validity and reliability appraisal*

Supplementary file 4 details the validity and reliability testing undertaken for the PREMs according to the revised COMSIN checklist. PREMs are ranked within their specified contexts according to the number of positive results obtained for the validity and reliability tests. Inter-rater reliability between two assessors for a portion of the COSMIN checklist appraisals was  $\kappa=0.761$ , indicative of good agreement.

[Insert table 3 about here]

Some validity and reliability tests were undertaken more often than others (Table 3). The three psychometric tests most commonly meeting '+' criteria were internal consistency (n=58, 65.9%), structural validity (n=49, 55.7%), and content validity (n=33, 37.5%). Seven of the 10 revised COSMIN checklist criteria were not undertaken in  $\geq 50\%$  of the PREMs: (i) reliability (n=44, 50.0%), (ii) hypotheses testing

(n=53, 60.2%), (iii) cross-cultural validity (n=65, 73.9%), (iv) criterion validity (n=79, 89.8%), (v) responsiveness (82, 93.2%), (vi) item response theory (n=84, 95.5%), and (vii) measurement error/agreement (n=86, 97.8%). None of the studies undertook testing for all 10 validity and reliability criteria.

## **Discussion**

The purpose of this systematic review was three-fold; to identify and describe peer-reviewed PREMs, irrespective of their contextual basis; to critically appraise PREM validity and reliability; and to critically appraise any bias in the study design of PREM validity and reliability testing. It is integral to understand whether PREMs have been subject to rigorous validity and reliability testing as this reflects whether an instrument is able to appropriately capture patient-reported experiences of healthcare. In turn, it is also important to ensure that the results of PREM validity and reliability testing is underpinned by a rigorous study design so that readers can be assured that the validity and reliability results are a robust representation of how valid and/or reliable that PREM is. To our knowledge, this is the first systematic review to examine PREMs across a range of healthcare contexts and settings.

This systematic review identified a total of 88 PREMs. Interestingly, roughly 20% of the identified PREMs were developed from 2015 onwards, and a quarter of all PREMs received some form of additional validity and reliability testing in this time frame as well. Given that 1993 was the earliest PREM development year identified through the search strategy, this indicates a significant increase in the desire for instruments that measure patient experiences.

Generally, the PREMs identified in this systematic review reflect a heavy emphasis on measuring singular events of healthcare. The Institute of Medicine's

(IOM) report on crossing the quality chasm identified that despite a significant increase in chronic and complex conditions, healthcare systems are still devoted to acute episodes of care<sup>32</sup>. Overwhelmingly, this sentiment still reigns true today, despite efforts to promote greater integration and coordination of care across and within healthcare services, as well as patient-centric, high quality healthcare<sup>8,33</sup>. For example, this systematic review identified only one peer-reviewed PREM targeting chronic disease holistically (as opposed to a singular disease focus) and two PREMs focusing on the integration of care. Most PREMs related to short-term care episodes, largely in the hospital setting; though there are PREMs (e.g. the CG-CAHPS<sup>34</sup> and health plan CAHPS<sup>35</sup>) that examine patient experiences of care delivered over 6 to 12-month periods. By developing and utilising PREMs that maintain a singular event, unidimensional focus of healthcare, we are inhibiting our ability to strive for international healthcare goals related to reducing healthcare fragmentation, and optimising continuity, coordination and quality within and between services. Consequently, future PREM development should aim to capture patient experiences of the continuity and coordination within and between their healthcare services and providers in order to mirror international shifts toward greater healthcare integration.

Encouragingly, nearly all PREM evaluation papers met  $\geq 10$  AXIS criteria (98.9%). Furthermore, all papers possessed appropriate study designs for their stated aims, and >95% of papers demonstrated appropriate sampling of participants to be representative of the target population under investigation. One PREM<sup>30</sup> however, met only 5 out of 20 AXIS criteria, implying that this PREM should undergo further evaluative testing prior to use in patient experience evaluations. Generally, the results of the AXIS critical appraisal indicate that the study designs underpinning PREM validity and reliability testing were sound.

Unlike the recent systematic review of hospital-related PREMs<sup>16</sup> where all instruments presented some form of validity and reliability testing, we identified two PREMs (CQI-PC and GS-PEQ) that did not present any testing in accordance with the revised COSMIN checklist<sup>36,37</sup>. This was either a consequence of not having done the testing, not presenting clear enough information to be scored '+' or '-', or not having published this information in the peer-reviewed literature. Evidently, both the CQI-PC and GS-PEQ instruments require further validity and reliability testing before being used in patient experience evaluations.

The most frequently undertaken reliability and validity criteria that also received positive results included internal consistency (a measure of reliability), structural validity and content validity. This ultimately indicates that most PREMs measure the concept which they set out to measure, and do so consistently. Responsiveness – an instruments ability to detect changes overtime<sup>19</sup> – was not evident for greater than 90% of PREMs. While some of the identified PREMs appear to have been developed for a once-off purpose, and thus exhibiting the ability to detect changes in patient experiences overtime is not a property of significant importance, it was surprising to identify that responsiveness was not evident in most of the CAHPS suite of surveys. Most CAHPS surveys are employed annually on a nation-wide scale, such as the HCAHPS, which has been used in this capacity since 2002 in US hospital reimbursement and benchmarking schemes<sup>38,39</sup>. However, only the CAHPS PCMH scored positively for responsiveness. The GPPS PREM also scored positively. This is the UK National General Practitioner Patient Survey which has been undertaken annually since 2007<sup>40</sup>. It is important to note though, that this information may be presented outside of the peer-reviewed literature, and consequently, what was captured in this systematic review may be an under-

representation of all testing undertaken for these measures. The lack of testing for instrument responsiveness is consistent with previous systematic reviews<sup>16,22</sup> that both identify that responsiveness was not undertaken by any of the PREMs that they assessed. Evidently, testing responsiveness should be prioritised for instruments that are to be utilised on an annual or repeated basis.

The least prevalent property assessed using the COSMIN checklist was measurement error/agreement. Measurement error, in accordance with the revised COSMIN checklist, assesses whether the minimally important change (MIC) – the smallest measured change in participant experience scores that implies practicable importance<sup>41</sup> – is greater than or equal to the smallest detectable change (SDC) in participants scores, or outside of the limits of agreement (LOA) (a technique used when comparing a new measuring technique to what is already practiced<sup>42</sup>). Thus in the clinical context, the MIC enables researchers to define a threshold of clinical relevancy. That is to say, a score above that threshold (as defined by the MIC) demonstrates that the intervention/ program/ service was clinically relevant and responsive to improving the patient experience. Given that the patient experience of healthcare is internationally recognised as a key determinant of healthcare quality<sup>32,43</sup>, and there is evidence to support the relationship between patient experience data and healthcare quality<sup>44,45</sup>, the clinical relevancy of improving patient experiences is likely to have implications for resource allocation and decision making in optimising the quality of healthcare provided to patients. As such, assessing PREM measurement error/agreement should be undertaken, particularly in instances where PREM scores are being used to inform decision making and funding.



None of the PREMs were tested for all of the revised COSMIN checklist criteria. There are several reasons that this may be the case. For example, criterion validity was only undertaken in roughly 10% of the PREMs as some authors recognised that there simply is no gold standard PREM available as a comparator in their given context<sup>46,47</sup>. Another reason could be inconsistencies in psychometric reporting guidelines and journal guidance regarding what constitutes adequate validity and reliability testing. A previous systematic review<sup>48</sup> examined the quality of survey reporting guidelines. The authors identified that there is generally a lack of validated reporting guidelines for survey instruments. Furthermore, the review highlights that only a small portion of medical journals, where papers such as those included in this review may be published, provide guidance for the reporting of survey quality<sup>48</sup>. This indicates an area of research generally that warrants greater attention as this is not just a limitation that impacts upon the quality of PREMs, but a wide-range of instruments.

### *Limitations*

One major limitation of the current study was that grey sources of literature were not considered in the identification of PREMs. Consequently, we may have missed PREMs that otherwise would have fit the inclusion criteria. Furthermore, there were PREMs that we excluded because they had not yet published their supporting validity and reliability results. This was the case for the UK Renal Registry Patient-Reported Experience Measure (UKRR-PREM) who had published their instrument<sup>49</sup>, but were still in the process of developing psychometric evaluation publications at the time that this review was undertaken. However, the selection of PREMs that were published in peer-reviewed journals was to maximise the quality of the instruments evaluated.

A limitation of the AXIS appraisal tool is that a summative score cannot be derived to interpret the overall quality of the study being assessed<sup>25</sup> (i.e. whether a study is deemed poor, moderate or high quality). However, assessment of risk of bias imposed by a study design is standard practice in the appraisal of studies for systematic reviews<sup>50</sup>. For this study, PREMs were categorised into quartiles according to the proportion of AXIS criteria met, with full details of each PREM assessment provided in Supplementary file 3 to enable readers to make an informed decision about PREMs that they may use in their own patient experience evaluations and research.

The revised COSMIN checklist also possessed some important limitations. Firstly, the revised version of the COSMIN checklist was used instead of the original checklist<sup>51</sup> as it was more user-friendly to use given the large proportion of PREMs included in this systematic review. Secondly, the parameters of measure for the validity and reliability testing comprising the checklist are very prescriptive. For example, the 'structural validity' criteria stated that factors identified through exploratory factor analysis (EFA) had to explain at least 50% of the variance<sup>19</sup>. Yet other parameters such as a significant Bartlett's test of Sphericity ( $p < 0.05$ ), the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (acceptability typically regarded as  $> 0.6$ ) or factor loading  $> 0.4$  (acceptable strength of loading on a factor)<sup>52,53</sup> can also be used to assess the quality of EFA. As such, this limited the authors' ability to assess the reliability and validity of the instruments where tests other than those prescribed in the checklist were undertaken. Thirdly, the checklist fails to attribute rigor to the multi-domain design of the included PREMs in measuring the same construct, which may positively impact upon how well the PREM captures a broad array of the attributes of a patient-reported experience<sup>54</sup>. Fourthly, the

COSMIN fails to capture the importance of floor and ceiling effects, as well as the percentage of missing data. These were commonly reported statistics among the included PREMs and demonstrate (i) the ability of the instrument to discern meaningful differences between patients reporting extremes of low and high experience scores; and (ii) the burden and feasibility of completing the instrument<sup>55</sup>. Fifthly, the revised COSMIN checklist fails to provide a summative score indicative of whether overall, a PREM is or is not valid and reliable. Moreover, whether some tests of validity and reliability are more relevant or suitable than other tests to the overall validity and reliability of a PREM remains unknown. Further, it is unclear whether all tests ultimately need to be undertaken in order for a PREM to be labelled as a valid and reliable measure. Thus, in order to assist the reader to make an informed choice in their PREM selection, Supplementary file 4 ranks the PREMs within their specified contexts, according to the number of '+' scores obtained. Despite these limitations, the COSMIN checklist is currently the most comprehensive psychometric quality criteria for developing outcome measurement instruments, and evaluating the method of development for these instruments<sup>56</sup>. Furthermore, the checklist has been applied to other similar systematic reviews<sup>16,22</sup> and was the most appropriate means of systematically measuring the psychometric rigor of the included PREMs.

## **Conclusion**

PREMs are internationally recognised instruments for measuring the quality of healthcare services from the patients perspective. The construct of patient-reported experience appears to still be evolving, and though this systematic review identified PREMs across a range of contexts, PREMs remain largely designed to assess singular events of healthcare. The key messages of this systematic review are that

whilst the testing of PREM validity and reliability has generally been undertaken in the context of appropriate study designs, there is large variability in both the number and type of validity and reliability testing undertaken for the PREMs identified. As such, it is important that PREM users are aware of the validity and reliability already undertaken for the PREM they have selected, and whether they themselves should undertake more robust testing. Further, the selection of PREMs for research and evaluation purposes should also be considerate of other important selection criteria such as whether a disease/condition or setting-specific measure is more appropriate than a generic measure, and whether a PREM designed in the researcher's country is more appropriate than one designed in a different country, potentially with a different healthcare system in mind.

## References

1. Tremblay D, Roberge D, Berbiche D. Determinants of patient-reported experience of cancer services responsiveness. *BMC Health Serv Res.* 2015;15:425.
2. Schembri S. Experiencing health care service quality: through patients' eyes. *Aust Health Rev.* 2015;39(1):109-116.
3. Ahmed F, Burt J, Roland M. Measuring patient experience: concepts and methods. *Patient.* 2014;7(3):235-241.
4. Kingsley C, Patel S. Patient-reported outcome measures and patient-reported experience measures. *Bja Educ.* 2017;17(4):8.
5. Agency for Healthcare Research and Quality. What Is Patient Experience? 2017; <https://www.ahrq.gov/cahps/about-cahps/patient-experience/index.html>. Accessed 18th July, 2018.
6. Black N, Jenkinson C. Measuring patients' experiences and outcomes. *BMJ.* 2009;339:b2495.
7. Milleson M, Macri J. *Will the Affordable Care Act Move Patient-Centeredness to Centre Stage?* Timely Analysis of Immediate Health Policy Issues: Robert Wood Johnson Foundation and Urban Institute;2012.
8. Beattie M, Shepherd A, Howieson B. Do the Institute of Medicine's (IOM's) dimensions of quality capture the current meaning of quality in healthcare? - An integrative review. *J Res Nurs.* 2012;18(4):7.
9. European Observatory on Health Systems and Policies. *Pay for Performance in Health Care: Implications for health systems performance and accountability.* England: World Health Organisation (WHO);2014.

10. Integrated Healthcare Association (IHA). *Value Based Pay for Performance in California: Using Alternative Payment Models to Promote Health Care Quality and Affordability*. USA: California: IHA;2017.
11. Committee on the Learning Health Care System in America. *Best Care at Lower Cost: The Path to Continuously Learning Health Care in America*. Washington (DC): National Academies Press (US): Institute of Medicine; 2013.
12. Manary MP, Boulding W, Staelin R, Glickman SW. The patient experience and health outcomes. *N Engl J Med*. 2013;368(3):3.
13. Devkaran S. Patient experience is not patient satisfaction: Understanding the fundamental differences. Paper presented at: ISQUA Webinar2014; online.
14. Shale S. Patient experience as an indicator of clinical quality in emergency care. *Clin Gov*. 2013;18(4):8.
15. Morse JM, Mitcham C, Hupcey JE, Tason MC. Criteria for concept evaluation. *J Adv Nurs*. 1996;24(2):6.
16. Beattie M, Murphy DJ, Atherton I, Lauder W. Instruments to measure patient experience of healthcare quality in hospitals: a systematic review. *Syst Rev*. 2015;4:21.
17. Verma R. *Overview: What are PROMs and PREMs?* NSW: NSW Agency for Clinical Innovation (ACI);n.d.
18. Weldring T, Smith SM. Patient-Reported Outcomes (PROs) and Patient-Reported Outcome Measures (PROMs). *Health Serv Insights*. 2013;6:61-68.
19. Gartner FR, Bomhof-Roordink H, Smith IP, Scholl I, Stiggelbout AM, Pieterse AH. The quality of instruments to assess the process of shared decision making: A systematic review. *PLoS One*. 2018;13(2).

20. Scholle SH, Roski J, Adams JL, et al. Benchmarking physician performance: reliability of individual and composite measures. *Am J Manag Care*. 2008;14(12):833-838.
21. Terwee CB, Prinsen CA, Ricci Garotti MG, Suman A, de Vet HC, Mokkink LB. The quality of systematic reviews of health-related outcome measurement instruments. *Qual Life Res*. 2016;25(4):767-779.
22. Male L, Noble A, Atkinson J, Marson T. Measuring patient experience: a systematic review to evaluate psychometric properties of patient reported experience measures (PREMs) for emergency care service provision. *Int J Qual Health Care*. 2017;29(3):13.
23. Moher D, Liberati A, Tetzlaff J, Altman DG, Group P. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *PLoS Med*. 2009;6(7).
24. Bower WF, Cheung CS, Wong EM, Lee PY, van Hasselt CA. Surgical patient satisfaction in Hong Kong: Validation of a new instrument. *Surg Pract*. 2009;13(4):94-101.
25. Downes MJ, Brennan ML, Williams HC, Dean RS. Development of a critical appraisal tool to assess the quality of cross-sectional studies (AXIS). *BMJ Open*. 2016;6(12).
26. Koo TK, Li MY. A Guideline of Selecting and Reporting Intraclass Correlation Coefficients for Reliability Research. *J Chiropr Med*. 2016;15(2):155-163.
27. Pallant J. PART FIVE - Statistical techniques to compare groups. In: Pallant J, ed. *SPSS Survival Manual: A Step by Step Guide to Data Analysis Using SPSS*. 4th ed. England: Berkshire: Open University Press McGraw-Hill Education; 2010:25.

28. Black N, Sanderson C. Day surgery: development of a questionnaire for eliciting patients' experiences. *Qual Health Care*. 1993;2(3):5.
29. Laferriere R. Client satisfaction with home health care nursing. *J Community Health Nurs*. 1993;10(2):67-76.
30. Tian CJ, Tian Y, Zhang L. An evaluation scale of medical services quality based on "patients' experience". *J Huazhong Univ Sci Technolog Med Sci*. 2014;34(2):9.
31. Skudal KE, Garratt AM, Eriksson B, Leinonen T, Simonsen J, Bjertnaes OA. The Nordic Patient Experiences Questionnaire (NORPEQ): cross-national comparison of data quality, internal consistency and validity in four Nordic countries. *BMJ Open*. 2012;2(3):11.
32. Institute of Medicine (IOM). *Crossing the Quality Chasm: A New Health System for the 21st Century*. Washington (DC): IOM;2001. 0309072808.
33. The Commonwealth Fund. What is being done to promote delivery system integration and care coordination? 2018; <http://international.commonwealthfund.org/features/integration/>. Accessed 11/04, 2018.
34. Solomon LS, Hays RD, Zaslavsky AM, Ding L, Cleary PD. Psychometric properties of a group-level Consumer Assessment of Health Plans Study (CAHPS) instrument. *Med Care*. 2005;43(1):53-60.
35. Hays RD, Shaul JA, Williams VS, et al. Psychometric properties of the CAHPS 1.0 survey measures. Consumer Assessment of Health Plans Study. *Med Care*. 1999;37(3 Suppl):MS22-31.



36. Claessen SJ, Francke AL, Sixma HJ, de Veer AJ, Deliens L. Measuring patients' experiences with palliative care: the Consumer Quality Index Palliative Care. *BMJ Support Palliat Care*. 2012;2(4):6.
37. Sjetne IS, Bjertnaes OA, Olsen RV, Iversen HH, Bukholm G. The Generic Short Patient Experiences Questionnaire (GS-PEQ): Identification of core items from a survey in Norway. *BMC Health Serv Res*. 2011;11:11.
38. Centers for Medicare and Medicaid Services (CMS), Medicare Learning Network. *Hospital Value-Based Purchasing*. Internet: U.S. Department of Health & Human Services (HHS);2017.
39. Agency for Healthcare Research and Quality. About CAHPS. 2018; <https://www.ahrq.gov/cahps/about-cahps/index.html>. Accessed 21 Sept, 2018.
40. Ipsos MORI. GP Patient Survey. 2018; <https://www.gp-patient.co.uk/faq>. Accessed 21 Sept, 2018.
41. Coster MC, Nilsson A, Brudin L, Bremander A. Minimally important change, measurement error, and responsiveness for the Self-Reported Foot and Ankle Score. *Acta Orthop*. 2017;88(3):300-304.
42. Myles PS, Cui J. Using the Bland-Altman method to measure agreement with repeated measures. *Br J Anaesth*. 2007;99(3):309-311.
43. NHS Greater Preston CCG. Quality and Clinical Effectiveness. 2018; <https://www.greaterprestonccg.nhs.uk/quality-and-clinical-effectiveness/>. Accessed 8th May, 2018.
44. Anhang Price R, Elliott MN, Zaslavsky AM, et al. Examining the role of patient experience surveys in measuring health care quality. *Med Care Res Rev*. 2014;71(5):522-554.

45. Doyle C, Lennox L, Bell D. A systematic review of evidence on the links between patient experience and clinical safety and effectiveness. *BMJ Open*. 2013;3(1).
46. Wensing M, Mainz J, Grol R. A standardised instrument for patient evaluations of general practice care in Europe. *Eur J Gen Pract*. 2000;6(3):82-87.
47. Bamm EL, Rosenbaum P, Stratford P. Validation of the measure of processes of care for adults: a measure of client-centred care. *Int J Qual Health Care*. 2010;22(4):302-309.
48. Bennett C, Khangura S, Brehaut JC, et al. Reporting Guidelines for Survey Research: An Analysis of Published Guidance and Reporting Practices. *PLoS Med*. 2011;8(8).
49. Renal Association: UK Renal Registry (UKRR), British Kidney Patient Association, NHS. *Patient Experience of Kidney Care: A Report on the Pilot to Test Patient Reported Experience Measures (PREM) in Renal Units in England 2016*. UK: UKRR and British Kidney Patient Association;2016.
50. Higgins JPT, Green S. Assessing risk of bias in included studies. In: Julian PT Higgins, Altman DG, eds. *Cochrane Handbook for Systematic Reviews of Interventions*. Sussex, England: John Wiley & Sons Ltd; 2008:187-235.
51. Mokkink LB, de Vet HCW, Prinsen CAC, et al. COSMIN Risk of Bias checklist for systematic reviews of Patient-Reported Outcome Measures. *Qual Life Res*. 2018;27(5):1171-1179.
52. Chaboyer W, Harbeck E, Bucknall T, et al. Initial psychometric testing and validation of the patient participation in pressure injury prevention scale. *J Adv Nurs*. 2017;73(9):11.

53. Williams B, Onsman A, Brown T. Exploratory factor analysis: A five-step guide for novices. *Australasian Journal of Paramedicine*. 2010;8(3):13.
54. Bollen K, Lennox R. Conventional Wisdom on Measurement - a Structural Equation Perspective. *Psychol Bull*. 1991;110(2):305-314.
55. Lim CR, Harris K, Dawson J, Beard DJ, Fitzpatrick R, Price AJ. Floor and ceiling effects in the OHS: an analysis of the NHS PROMs data set. *BMJ Open*. 2015;5(7):e007765.
56. Prinsen CAC, Mokkink LB, Bouter LM, et al. COSMIN guideline for systematic reviews of patient-reported outcome measures. *Qual Life Res*. 2018.
57. Sawicki GS, Garvey KC, Toomey SL, et al. Development and Validation of the Adolescent Assessment of Preparation for Transition: A Novel Patient Experience Measure. *J Adolesc Health*. 2015;57(3):6.
58. Day C, Michelson D, Hassan I. Child and adolescent service experience (ChASE): measuring service quality and therapeutic process. *Br J Clin Psychol*. 2011;50(4):13.
59. Webster TR, Mantopoulos J, Jackson E, et al. A brief questionnaire for assessing patient healthcare experiences in low-income settings. *Int J Qual Health Care*. 2011;23(3):11.
60. Kertesz SG, Pollio DE, Jones RN, et al. Development of the primary care quality-homeless (PCQ-H) instrument: A practical survey of homeless patients' experiences in primary care. *Med Care*. 2014;52(8):9.
61. Bjertnaes O, Iversen HH, Kjollesdal J. PIPEQ-OS--an instrument for on-site measurements of the experiences of inpatients at psychiatric institutions. *BMC Psychiatry*. 2015;15:9.

62. Bruyneel L, Van Houdt S, Coeckelberghs E, et al. Patient experiences with care across various types of mental health care: Questionnaire development, measurement invariance, and patients' reports. *Int J Methods Psychiatr Res.* 2018;27(1):12.
63. Dinger U, Schauenburg H, Ehrental JC, Nicolai J, Mander J, Sammet I. Inpatient and Day-Clinic Experience Scale (IDES) - a Psychometric Evaluation. *Z Psychosom Med Psychother.* 2015;61(4):327-341.
64. Eisen SV, Shaul JA, Clarridge B, Nelson D, Spink J, Cleary PD. Development of a consumer survey for behavioral health services. *Psychiatr Serv.* 1999;50(6):793-798.
65. Eisen SV, Shaul JA, Leff HS, Stringfellow V, Clarridge BR, Cleary PD. Toward a national consumer survey: evaluation of the CABHS and MHSIP instruments. *J Behav Health Serv Res.* 2001;28(3):347-369.
66. Evans J, Rose D, Flach C, et al. VOICE: developing a new measure of service users' perceptions of inpatient care, using a participatory methodology. *J Ment Health.* 2012;21(1):5.
67. Garratt A, Bjorngaard JH, Dahle KA, Bjertnaes OA, Saunes IS, Ruud T. The Psychiatric Out-Patient Experiences Questionnaire (POPEQ): data quality, reliability and validity in patients attending 90 Norwegian clinics. *Nord J Psychiatry.* 2006;60(2):8.
68. Jormfeldt H, Svensson B, Arvidsson B, Hansson L. Dimensions and reliability of a questionnaire for the evaluation of subjective experiences of health among patients in mental health services. *Issues Ment Health Nurs.* 2008;29(1):12.

69. Mavaddat N, Lester HE, Tait L. Development of a patient Experience Questionnaire for primary care mental health. *Tidsskrift for den Norske Laegeforening*. 2009;18(2):147-152.
70. Oades LG, Law J, Marshall SL. Development of a consumer constructed scale to evaluate mental health service provision. *J Eval Clin Pract*. 2011;17(6):1102-1107.
71. Olsen RV, Garratt AM, Iversen HH, Bjertnaes OA. Rasch analysis of the Psychiatric Out-Patient Experiences Questionnaire (POPEQ). *BMC Health Serv Res*. 2010;10:9.
72. Schroder A, Larsson BW, Ahlstrom G. Quality in psychiatric care: an instrument evaluating patients' expectations and experiences. *Int J Health Care Qual Assur*. 2007;20(2-3):20.
73. Schroder A, Larsson BW, Ahlstrom G, Lundqvist LO. Psychometric properties of the instrument quality in psychiatric care and descriptions of quality of care among in-patients. *Int J Health Care Qual Assur*. 2010;23(6):17.
74. Fernstrom KM, Shippee ND, Jones AL, Britt HR. Development and validation of a new patient experience tool in patients with serious illness. *BMC Palliat Care*. 2016;15(1):99.
75. Harley C, Adams J, Booth L, Selby P, Brown J, Velikova G. Patient experiences of continuity of cancer care: Development of a new medical care questionnaire (MCQ) for oncology outpatients. *Value Health*. 2009;12(8):1180-1186.
76. Iversen HH, Holmboe O, Bjertnæs ØA. The Cancer Patient Experiences Questionnaire (CPEQ): Reliability and construct validity following a national survey to assess hospital cancer care from the patient perspective. *BMJ Open*. 2012;2(5):15.

77. van der Veer SN, Jager KJ, Visserman E, et al. Development and validation of the Consumer Quality index instrument to measure the experience and priority of chronic dialysis patients. *Nephrol Dial Transplant*. 2012;27(8):8.
78. Weidmer BA, Cleary PD, Keller S, et al. Development and evaluation of the CAHPS (Consumer Assessment of Healthcare Providers and Systems) survey for in-center hemodialysis patients. *Am J Kidney Dis*. 2014;64(5):753-760.
79. Wood KS, Cronley ML. Then and Now: Examining How Consumer Communication and Attitudes of Direct-to-Consumer Pharmaceutical Advertising Have Changed in the Last Decade. *Health Commun*. 2014;29(8):814-825.
80. Bosworth A, Cox M, O'Brien A, et al. Development and Validation of a Patient Reported Experience Measure (PREM) for Patients with Rheumatoid Arthritis (RA) and other Rheumatic Conditions. *Curr Rheumatol Rev*. 2015;11(1):1.
81. Grotle M, Garratt A, Lochting I, et al. Development of the rehabilitation patient experiences questionnaire: data quality, reliability and validity in patients with rheumatic diseases. *J Rehabil Med*. 2009;41(7):6.
82. Zuidgeest M, Sixma H, Rademakers J. Measuring patients' experiences with rheumatic care: the consumer quality index rheumatoid arthritis. *Rheumatol Int*. 2009;30(2):9.
83. Haugum M, Iversen HH, Bjertnaes O, Lindahl AK. Patient experiences questionnaire for interdisciplinary treatment for substance dependence (PEQ-ITSD): reliability and validity following a national survey in Norway. *BMC Psychiatry*. 2017;17(1):11.

84. Bobrovitz N, Santana MJ, Ball CG, Kortbeek J, Stelfox HT. The development and testing of a survey to measure patient and family experiences with injury care. *J Trauma Acute Care Surg.* 2012;73(5):1332-1339.
85. Bobrovitz N, Santana MJ, Kline T, Kortbeek J, Stelfox HT. The use of cognitive interviews to revise the Quality of Trauma Care Patient-Reported Experience Measure (QTAC-PREM). *Qual Life Res.* 2015;24(8):1911-1919.
86. Bobrovitz N, Santana MJ, Kline T, et al. Multicenter validation of the quality of trauma care patient-reported experience measure (QTAC-PREM). *J Trauma Acute Care Surg.* 2016;80(1):8.
87. Rattray J, Johnston M, Wildsmith JAW. The intensive care experience: development of the ICE questionnaire. *J Adv Nurs.* 2004;47(1):64-73.
88. Mira JJ, Nuño-Solinís R, Guilabert-Mora M, et al. Development and validation of an instrument for assessing patient experience of chronic illness care. *Int J Integr Care.* 2016;16(3):13.
89. Homa K, Sabadosa KA, Nelson EC, Rogers WH, Marshall BC. Development and validation of a cystic fibrosis patient and family member experience of care survey. *Qual Manag Health Care.* 2013;22(2):100-116.
90. Scheerhagen M, van Stel HF, Birnie E, Franx A, Bonsel GJ. Measuring client experiences in maternity care under change: development of a questionnaire based on the WHO Responsiveness model. *PLoS One.* 2015;10(2).
91. Scheerhagen M, van Stel HF, Tholhuijsen DJC, Birnie E, Franx A, Bonsel GJ. Applicability of the ReproQ client experiences questionnaire for quality improvement in maternity care. *PeerJ.* 2016;4:21.

92. van der Eijk M, Faber MJ, Ummels I, Aarts JWM, Munneke M, Bloem BR. Patient-centeredness in PD care: Development and validation of a patient experience questionnaire. *Parkinsonism Relat Disord.* 2012;18(9):6.
93. Bruyneel L, Tambuyzer E, Coeckelberghs E, et al. New Instrument to Measure Hospital Patient Experiences in Flanders. *Int J Environ Res Public Health.* 2017;14(11):14.
94. Casellas F, Ginard D, Vera I, Torrejon A, Geteccu. Development and testing of a new instrument to measure patient satisfaction with health care in inflammatory bowel disease: the CACHE questionnaire. *Inflamm Bowel Dis.* 2013;19(3):559-568.
95. Cheung CS, Bower WF, Kwok SC, van Hasselt CA. Contributors to surgical in-patient satisfaction--development and reliability of a targeted instrument. *Asian J Surg.* 2009;32(3):143-150.
96. González N, Quintana JM, Bilbao A, et al. Development and validation of an in-patient satisfaction questionnaire. *Int J Qual Health Care.* 2005;17(6):465-472.
97. Jenkinson C, Coulter A, Bruster S. The picker patient experience questionnaire: Development and validation using data from in-patient surveys in five countries. *Int J Qual Health Care.* 2002;14(5):6.
98. Jenkinson C, Coulter A, Bruster S, Richards N. The coronary heart disease in-patient experience questionnaire (I-PEQ (CHD)): Results from the survey of National Health Service patients. *Qual Life Res.* 2002;11(8):7.
99. Kneebone, II, Hull SL, McGurk R, Cropley M. Reliability and validity of the neurorehabilitation experience questionnaire for inpatients. *Neurorehabil Neural Repair.* 2012;26(7):834-841.



100. Labarère J, Fourny M, Jean-Phillippe V, Marin-Pache S, Patrice F. Refinement and validation of a French in-patient experience questionnaire. *Int J Health Care Qual Assur.* 2004;17(1):17-25.
101. Labarere J, Francois P, Auquier P, Robert C, Fourny M. Development of a French inpatient satisfaction questionnaire. *Int J Qual Health Care.* 2001;13(2):99-108.
102. Oltedal S, Bjertnæs Ø, Bjørnsdottir M, Freil M, Sachs M. The NORPEQ patient experiences questionnaire: Data quality, internal consistency and validity following a Norwegian inpatient survey. *Scand J Public Health.* 2007;35(5):8.
103. Pettersen KI, Veenstra M, Guldvog B, Kolstad A. The Patient Experiences Questionnaire: development, validity and reliability. *Int J Qual Health Care.* 2004;16(6):11.
104. Sullivan PJ, Harris ML, Doyle C, Bell D. Assessment of the validity of the English National Health Service Adult In-Patient Survey for use within individual specialties. *BMJ Qual Saf.* 2013;22(8):690-696.
105. Van Cranenburgh OD, Krol MW, Hendriks MCP, et al. Consumer Quality Index Chronic Skin Disease (CQI-CSD): A new instrument to measure quality of care from the patient's perspective. *Br J Dermatol.* 2015;173(4):1032-1040.
106. Wong EL, Coulter A, Cheung AW, Yam CH, Yeoh EK, Griffiths S. Item generation in the development of an inpatient experience questionnaire: a qualitative study. *BMC Health Serv Res.* 2013;13.
107. Wong EL, Coulter A, Cheung AW, Yam CH, Yeoh EK, Griffiths S. Validation of inpatient experience questionnaire. *Int J Qual Health Care.* 2013;25(4):9.

108. Wong ELY, Coulter A, Hewitson P, et al. Patient experience and satisfaction with inpatient service: Development of short form survey instrument measuring the core aspect of inpatient experience. *PLoS One*. 2014;10(4):12.
109. Medina-Mirapeix F, del Baño-Aledo ME, Martínez-Payá JJ, Lillo-Navarro MC, Escolar-Reina P. Development and validity of the questionnaire of patients' experiences in postacute outpatient physical therapy settings. *Phys Ther*. 2015;95(5):11.
110. Stubbe JH, Gelsema T, Delnoij DM. The Consumer Quality Index Hip Knee Questionnaire measuring patients' experiences with quality of care after a total hip or knee arthroplasty. *BMC Health Serv Res*. 2007;7:12.
111. Bjertnaes OA, Lyngstad I, Malterud K, Garratt A. The Norwegian EUROPEP questionnaire for patient evaluation of general practice: data quality, reliability and construct validity. *Fam Pract*. 2011;28(3):342-349.
112. Campbell J, Smith P, Nissen S, Bower P, Elliott M, Roland M. The GP Patient Survey for use in primary care in the National Health Service in the UK – development and psychometric characteristics. *BMC Fam Pract*. 2009;10:10.
113. Campbell JL, Dickens A, Richards SH, Pound P, Greco M, Bower P. Capturing users' experience of UK out-of-hours primary medical care: piloting and psychometric properties of the Out-of-hours Patient Questionnaire. *Tidsskrift for den Norske Laegeforening*. 2007;16(6):462-468.
114. Chanter C, Ashmore S, Mandair S. Improving the patient experience in general practice with the General Practice Assessment Questionnaire (GPAQ). *Qual Prim Care*. 2005;13(4):225-232.

115. Desborough J, Banfield M, Parker R. A tool to evaluate patients' experiences of nursing care in Australian general practice: development of the Patient Enablement and Satisfaction Survey. *Aust J Prim Health*. 2014;20(2):7.
116. Drain M. Quality improvement in primary care and the importance of patient perceptions. *J Ambul Care Manage*. 2001;24(2):17.
117. Dyer N, Sorra JS, Smith SA, Cleary PD, Hays RD. Psychometric properties of the Consumer Assessment of Healthcare Providers and Systems (CAHPS(R)) Clinician and Group Adult Visit Survey. *Med Care*. 2012;50 Suppl:S28-34.
118. Garratt A, Danielsen K, Forland O, Hunskaar S. The Patient Experiences Questionnaire for Out-of-Hours Care (PEQ-OHC): data quality, reliability, and validity. *Scand J Prim Health Care*. 2010;28(2):7.
119. Greco M, Powell R, Sweeney K. The Improving Practice Questionnaire (IPQ): a practical tool for general practices seeking patient views. *Educ Prim Care*. 2003;14(4):9.
120. Greco M, Sweeney K, Brownlea A, McGovern J. The practice accreditation and improvement survey (PAIS). What patients think. *Aust Fam Physician*. 2001;30(11):5.
121. Holmboe O, Iversen HH, Danielsen K, Bjertnaes O. The Norwegian patient experiences with GP questionnaire (PEQ-GP): Reliability and construct validity following a national survey. *BMJ Open*. 2017;7(9):10.
122. Jenkinson C, Coulter A, Gyll R, Lindstrom P, Avner L, Hoglund E. Measuring the experiences of health care for patients with musculoskeletal disorders (MSD): development of the Picker MSD questionnaire. *Scand J Caring Sci*. 2002;16(3):329-333.

123. McInnes DK, Brown JA, Hays RD, et al. Development and evaluation of CAHPS questions to assess the impact of health information technology on patient experiences with ambulatory care. *Med Care*. 2012;50 Suppl:S11-19.
124. Mead N, Bower P, Roland M. The General Practice Assessment Questionnaire (GPAQ) - development and psychometric characteristics. *BMC Fam Pract*. 2008;9:1.
125. Milano M, Mola E, Collecchia G, et al. Validation of the Italian version of the EUROPEP instrument for patient evaluation of general practice care. *Eur J Gen Pract*. 2007;13(2):3.
126. Paddison C, Elliott M, Parker R, et al. Should measures of patient experience in primary care be adjusted for case mix? Evidence from the English General Practice Patient Survey. *BMJ Qual Saf*. 2012;21(8):634-640.
127. Safran DG, Karp M, Coltin K, et al. Measuring patients' experiences with individual primary care physicians. Results of a statewide demonstration project. *J Gen Intern Med*. 2006;21(1):9.
128. Scholle SH, Vuong O, Ding L, et al. Development of and field test results for the CAHPS PCMH Survey. *Med Care*. 2012;50(11):S2-10.
129. Setodji CM, Elliott MN, Abel G, Burt J, Roland M, Campbell J. Evaluating Differential Item Functioning in the English General Practice Patient Survey: Comparison of South Asian and White British Subgroups. *Med Care*. 2015;53(9):809-817.
130. Steine S, Finset A, Laerum E. A new, brief questionnaire (PEQ) developed in primary health care for measuring patients' experience of interaction, emotion and consultation outcome. *Fam Pract*. 2001;18(4):410-418.

131. Stucky BD, Hays RD, Edelen MO, Gurvey J, Brown JA. Possibilities for Shortening the CAHPS Clinician and Group Survey. *Med Care*. 2016;54(1):32-37.
132. Vedsted P, Sokolowski I, Heje HN. Data quality and confirmatory factor analysis of the Danish EUROPEP questionnaire on patient evaluation of general practice. *Scand J Prim Health Care*. 2008;26(3):174-180.
133. Hays RD, Berman LJ, Kanter MH, et al. Evaluating the psychometric properties of the CAHPS Patient-centered Medical Home survey. *Clin Ther*. 2014;36(5):689-696.e681.
134. Chien TW, Wang WC, Lin SB, Lin CY, Guo HR, Su SB. KIDMAP, a web based system for gathering patients' feedback on their doctors. *BMC Med Res Methodol*. 2009;9:10.
135. Garratt A, Bjertnæs ØA, Krogstad U, Gulbrandsen P. The OutPatient Experiences Questionnaire (OPEQ): data quality, reliability, and validity in patients attending 52 Norwegian hospitals. *Tidsskrift for den Norske Laegeforening*. 2005;14:5.
136. Hu Y, Zhang Z, Xie J, Wang G. The Outpatient Experience Questionnaire of comprehensive public hospital in China: development, validity and reliability. *Int J Qual Health Care*. 2017;29(1):7.
137. Loblaw DA, Bezjak A, Bunston T, Loblaw DA, Bezjak A, Bunston T. Development and testing of a visit-specific patient satisfaction questionnaire: the Princess Margaret Hospital Satisfaction With Doctor Questionnaire. *J Clin Oncol*. 1999;17(6):1931-1938.

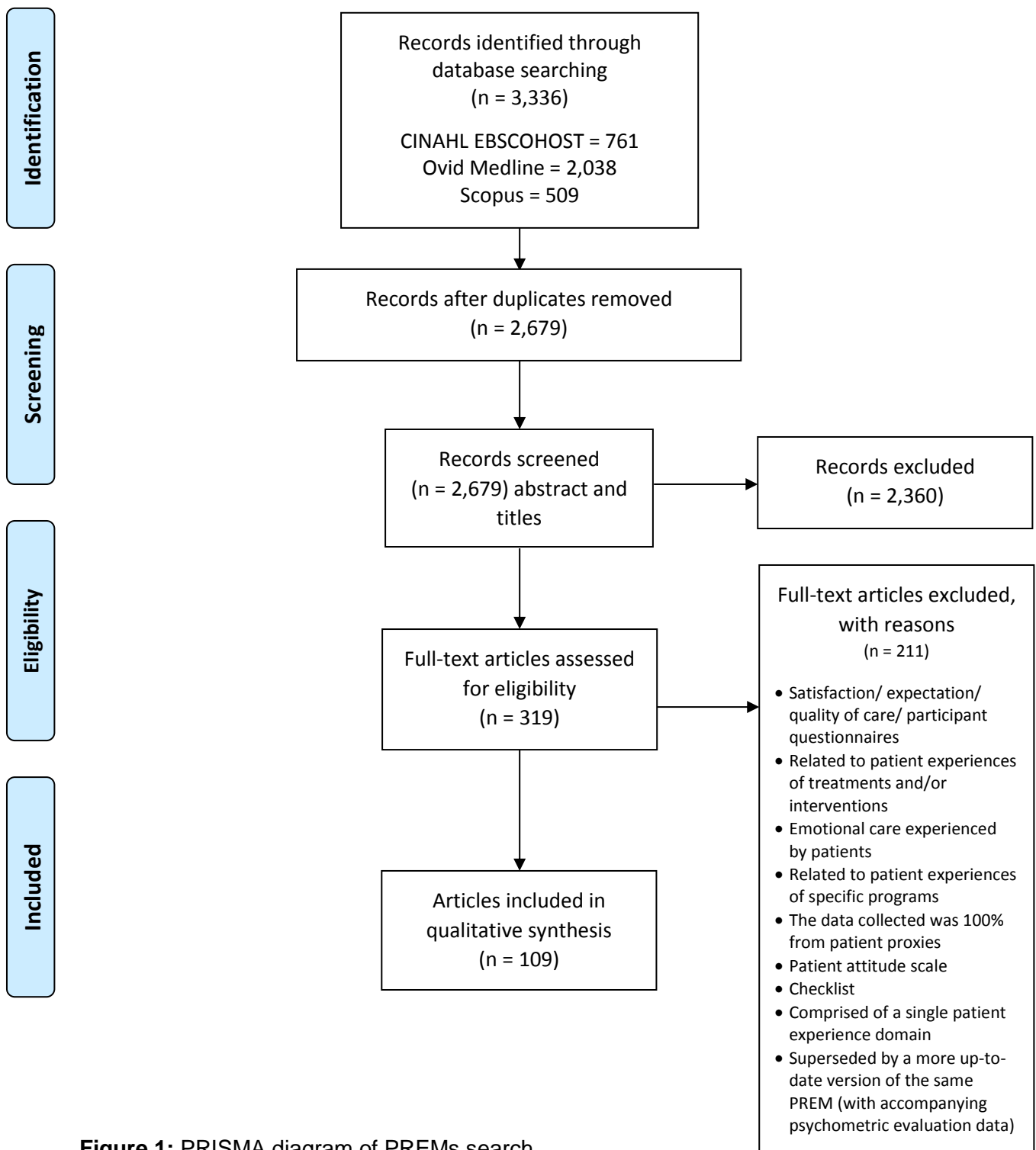
138. Loblaw DA, Bezjak A, Singh PM, et al. Psychometric refinement of an outpatient, visit-specific satisfaction with doctor questionnaire. *Psychooncology*. 2004;13(4):223-234.
139. Bos N, Sizmur S, Graham C, Van Stel HF. The accident and emergency department questionnaire: A measure for patients' experiences in the accident and emergency department. *BMJ Qual Saf*. 2013;22(2):8.
140. Bos N, Sturms LM, Schrijvers AJ, van Stel HF. The Consumer Quality index (CQ-index) in an accident and emergency department: development and first evaluation. *BMC Health Serv Res*. 2012;12:284.
141. Bos N, Sturms LM, Stellato RK, Schrijvers AJ, van Stel HF. The Consumer Quality Index in an accident and emergency department: internal consistency, validity and discriminative capacity. *Health Expect*. 2015;18(5):13.
142. O'Cathain A, Knowles E, Nicholl J. Measuring patients' experiences and views of the emergency and urgent care system: Psychometric testing of the urgent care system questionnaire. *BMJ Qual Saf*. 2011;20(2):7.
143. Keller S, Martin GC, Ewensen CT, Mitton RH. The development and testing of a survey instrument for benchmarking dental plan performance: Using insured patients' experiences as a gauge of dental care quality. *J Am Dent Assoc*. 2009;140(2):9.
144. Narayanan A, Greco M. The Dental Practice Questionnaire: a patient feedback tool for improving the quality of dental practices. *Aust Dent J*. 2014;59(3):15.
145. Noest S, Ludt S, Klingenberg A, et al. Involving patients in detecting quality gaps in a fragmented healthcare system: development of a questionnaire for Patients' Experiences Across Health Care Sectors (PEACS). *Int J Qual Health Care*. 2014;26(3):10.

146. Walker KO, Stewart AL, Grumbach K. Development of a survey instrument to measure patient experience of integrated care. *BMC Health Serv Res.* 2016;16(1):11.
147. Benson T, Potts HWW. Short generic patient experience questionnaire: HowRwe development and validation. *BMC Health Serv Res.* 2014;14(1).
148. Hendriks SH, Rutgers J, van Dijk PR, et al. Validation of the howRu and howRwe questionnaires at the individual patient level. *BMC Health Serv Res.* 2015;15:8.
149. Malott DL, Fulton BR, Rigamonti D, Myers S. Psychometric testing of a measure of patient experience in Saudi Arabia and the United Arab Emirates. *J Surv Stat Methodol.* 2017;5(3):11.
150. Hargraves JL, Hays RD, Cleary PD. Psychometric properties of the Consumer Assessment of Health Plans Study (CAHPS) 2.0 adult core survey. *Health Serv Res.* 2003;38(6 Pt 1):1509-1527.
151. Hays RD, Martino S, Brown JA, et al. Evaluation of a Care Coordination Measure for the Consumer Assessment of Healthcare Providers and Systems (CAHPS) Medicare survey. *Med Care Res Rev.* 2014;71(2):192-202.
152. Martino SC, Elliott MN, Cleary PD, et al. Psychometric properties of an instrument to assess Medicare beneficiaries' prescription drug plan experiences. *Health Care Financ Rev.* 2009;30(3):41-53.
153. Carle AC, Weech-Maldonado R. Does the Consumer Assessment of Healthcare Providers and Systems Cultural Competence Survey provide equivalent measurement across English and Spanish versions? *Med Care.* 2012;50(9 Suppl 2):S37-41.

154. Stern RJ, Fernandez A, Jacobs EA, et al. Advances in measuring culturally competent care: a confirmatory factor analysis of CAHPS-CC in a safety-net population. *Med Care*. 2012;50(9 Suppl 2):S49-55.
155. Weech-Maldonado R, Carle A, Weidmer B, Hurtado M, Ngo-Metzger Q, Hays RD. The Consumer Assessment of Healthcare Providers and Systems (CAHPS) cultural competence (CC) item set. *Med Care*. 2012;50(9 Suppl 2):S22-31.
156. Arah OA, ten Asbroek AH, Delnoij DM, et al. Psychometric properties of the Dutch version of the Hospital-level Consumer Assessment of Health Plans Survey instrument. *Health Serv Res*. 2006;41(1):284-301.
157. Dockins J, Abuzahrieh R, Stack M. Arabic translation and adaptation of the hospital consumer assessment of healthcare providers and systems (HCAHPS) patient satisfaction survey instrument. *J Health Hum Serv Adm*. 2015;37(4):518-536.
158. Elliott MN, Edwards C, Angeles J, Hambarsoomians K, Hays RD. Patterns of unit and item nonresponse in the CAHPS Hospital Survey. *Health Serv Res*. 2005;40(6 Pt 2):2096-2119.
159. Goldstein E, Farquhar M, Crofton C, Darby C, Garfinkel S. Measuring hospital care from the patients' perspective: an overview of the CAHPS Hospital Survey development process. *Health Serv Res*. 2005;40(6 Pt 2):1977-1995.
160. Keller S, O'Malley AJ, Hays RD, et al. Methods used to streamline the CAHPS Hospital Survey. *Health Serv Res*. 2005;40(6 Pt 2):21.
161. Levine RE, Fowler FJ, Jr., Brown JA. Role of cognitive testing in the development of the CAHPS Hospital Survey. *Health Serv Res*. 2005;40(6 Pt 2):20.



162. O'Malley AJ, Zaslavsky AM, Hays RD, Hepner KA, Keller S, Cleary PD. Exploratory factor analyses of the CAHPS Hospital Pilot Survey responses across and within medical, surgical, and obstetric services. *Health Serv Res.* 2005;40(6 Pt 2):2078-2095.
163. Squires A, Bruyneel L, Aiken LH, et al. Cross-cultural evaluation of the relevance of the HCAHPS survey in five European countries. *Int J Qual Health Care.* 2012;24(5):470-475.
164. Weidmer BA, Brach C, Slaughter ME, Hays RD. Development of items to assess patients' health literacy experiences at hospitals for the Consumer Assessment of Healthcare Providers and Systems (CAHPS) Hospital Survey. *Med Care.* 2012;50(9 Suppl 2):S12-21.
165. Westbrook KW, Babakus E, Grant CC. Measuring patient-perceived hospital service quality: validity and managerial usefulness of HCAHPS scales. *Health Mark Q.* 2014;31(2):97-114.
166. Edward GM, Lemaire LC, Preckel B, et al. Patient Experiences with the Preoperative Assessment Clinic (PEPAC): validation of an instrument to measure patient experiences. *Br J Anaesth.* 2007;99(5):7.
167. Stubbe JH, Brouwer W, Delnoij DMJ. Patients' experiences with quality of hospital care: The Consumer Quality Index Cataract Questionnaire. *BMC Ophthalmol.* 2007;7:10.



**Figure 1:** PRISMA diagram of PREMs search

**Table 1: PREMs identified by individual, condition, setting and country-specific context**

<b>Context*</b>	<b>Number of PREMs (%)</b>
<i>Individual-specific</i>	
<b>Child/adolescent care</b> 57,58	2 (2.3%)
<b>Low-income</b> 59	2 (2.3%)
<b>Homeless</b> 60	1 (1.1%)
<b>Not individual-specific</b>	83 (94.3%)
<i>Condition-specific</i>	
<b>Mental health</b> 61-73	10 (11.4%)
<b>Palliative care/cancer</b> 36,74-76	5 (5.7%)
<b>Renal (including dialysis)</b> 77-79	3 (3.4%)
<b>Rheumatoid arthritis</b> 80-82	3 (3.4%)
<b>Substance dependence</b> 64,65,83	2 (2.3%)
<b>Trauma</b> 84-87	2 (2.3%)
<b>Chronic disease</b> 88	1 (1.1%)
<b>Cystic fibrosis</b> 89	1 (1.1%)
<b>Maternity</b> 90,91	1 (1.1%)
<b>Parkinson's Disease</b> 92	1 (1.1%)
<b>Not condition-specific</b>	59 (67.1%)
<i>Setting</i>	
<b>Inpatient services</b> 28,30,31,59,61,63,66,72,73,76,81,93-108	32 (36.4%)
<b>Day surgery</b> <sup>28</sup>	1 (1.1%)
<b>Rehabilitation</b> <sup>81,99</sup>	2 (2.3%)
<b>Pre-operative</b> <sup>109</sup>	1 (1.1%)
<b>Post-operative</b> <sup>47,110</sup>	3 (3.4%)
<b>Primary care services</b> 34,46,60,69,88,111-132	21 (23.9%)
<b>Medical home</b> <sup>133</sup>	1 (1.1%)
<b>Out-of-hours care</b> <sup>113,118</sup>	2 (2.3%)
<b>Home care</b> <sup>29</sup>	1 (1.1%)
<b>Outpatient services</b> 59,67,68,71,75,76,109,134-138	11 (12.5%)
<b>Accident and emergency department services</b> 139-142	3 (3.4%)
<b>Dental services</b> 143,144	2 (2.3%)
<b>Integrated care services</b> 145,146	2 (2.3%)
<b>Not specified</b> 35,37,147-155	5 (5.7%)

<b>Not setting-specific</b>	<b>Country</b>	<b>1 (1.1%)</b>
<b>UK</b> 28,58,66,69,75,80,87,98,99,104,112-114,119,122,124,126,129,139,142,147,148		18 (20.5%)
<b>USA</b> 29,34,35,57,60,64,65,74,78,79,89,116,117,123,127,131,133,143,146,150-165		17 (19.4%)
<b>Norway</b> 31,37,61,67,71,76,81,83,102,103,118,121,130,135		13 (14.8%)
<b>Netherlands</b> 36,62,77,82,90-93,105,140,141,166,167		13 (14.8%)
<b>Australia</b> 70,115,120,144		4 (4.5%)
<b>Spain</b> 88,94,96,109		4 (4.5%)
<b>Canada</b> 47,84-86,137,138		3 (3.4%)
<b>Hong Kong</b> 24,95,106-108		3 (3.4%)
<b>Sweden</b> 68,72,73,122		3 (3.4%)
<b>China</b> 30,136		2 (2.3%)
<b>Ethiopia</b> 59		2 (2.3%)
<b>Germany</b> 63,145		2 (2.3%)
<b>Europe#</b> 46,111,125,132		1 (1.1%)
<b>France</b> 100		1 (1.1%)
<b>Saudi Arabia/ UAE</b> 149		1 (1.1%)
<b>Taiwan</b> 134		1 (1.1%)
<b>Total</b>		88 (100%)

\*Some tools were embedded across contexts; #One study was conducted across 14 countries in

Europe; PREM = patient-reported experience measure; UK = United Kingdom; USA = United States of America; UAE = United Arab Emirates

**Table 2: PREMs categorised according to proportion of AXIS criteria met**

Total AXIS score	PREM	n(%)
>15 AXIS criteria met	NORPEQ <sup>31</sup> ; AEDQ <sup>139</sup> ; CACHE <sup>94</sup> ; CAHPS HIT <sup>123</sup> ; CQI-CSD <sup>105</sup> ; CQI-Hip Knee <sup>110</sup> ; MPOC-A <sup>47</sup> ; OPEQ <sup>135</sup> ; OPEQ-China <sup>136</sup> ; PEPAP-Q <sup>109</sup> ; POPEQ <sup>71</sup> ; QTAC-PREM <sup>86</sup> ; SF-HKIEQ <sup>108</sup> ; AIPS <sup>104</sup> ; CAHPS Dental plan <sup>143</sup> ; CQI A&E <sup>141</sup> ; CSS <sup>29</sup> ; EUROPEP <sup>125</sup> ; González, Quintana, Bilbao, Escobar, Aizpuru, Thompson, Esteban, San Sebastián, De la Sierra <sup>96</sup> ; OPQ <sup>113</sup> ; PCQ-PD <sup>92</sup> ; PEACS 1.0 <sup>145</sup> ; PEQ-GP <sup>121</sup> ; PEQ-ITSD <sup>83</sup> ; PEQ-OHC <sup>118</sup> ; PFQ <sup>134</sup> ; PIPEQ-OS <sup>61</sup> ; QPC <sup>73</sup> ; Re-PEQ <sup>81</sup> ; VOICE <sup>66</sup> ; ADAPT <sup>57</sup> ; Bruyneel, Van Houdt, Coeckelberghs, Sermeus, Tambuyzer, Cosemans, Peeters, Van den Broeck, Weeghmans, Vanhaecht <sup>62</sup> ; CABHS <sup>65</sup> ; CAHPS CC <sup>155</sup> ; CAHPS PCMH <sup>133</sup> ; CPEQ <sup>\$</sup> <sup>76</sup> ; CPEQ <sup>%</sup> <sup>76</sup> ; CQI-Cataract <sup>167</sup> ; CQI-RA <sup>82</sup> ; GPAQ <sup>124</sup> ; GPPS <sup>112</sup> ; I-PAHC <sup>£</sup> <sup>59</sup> ; LifeCourse <sup>74</sup> ; MCQ <sup>75</sup> ; O-PAHC <sup>¤</sup> <sup>59</sup> ; PEPAC <sup>166</sup> ; PEQ MH <sup>69</sup> ; ReproQ <sup>91</sup> ; Walker, Stewart, Grumbach <sup>146</sup> ; Bruyneel, Tambuyzer, Coeckelberghs, De Wachter, Sermeus, De Ridder, Ramaekers, Weeghmans, Vanhaecht <sup>93</sup> ; CAHPS Health Plan <sup>151</sup> ; CEO-MHS <sup>70</sup> ; ChASE <sup>58</sup> ; Homa, Sadosky, Nelson, Rogers, Marshall <sup>89</sup> ; ICEQ <sup>87</sup> ; IDES <sup>63</sup> ; IEXPAC <sup>88</sup> ; Labarère, Fourny, Jean-Phillippe, Marin-Pache, Patrice <sup>100</sup> ; NREQ <sup>99</sup> ; PSQ MD <sup>138</sup> ; Steine, Finset, Laerum <sup>130</sup> ; UCSQ <sup>142</sup>	62 (70.5%)
10-15 criteria met	ACES <sup>127</sup> ; Black, Sanderson <sup>28</sup> ; CAHPS C&G <sup>131</sup> ; CQI-CHD <sup>77</sup> ; CQI-PHHD <sup>77</sup> ; GS-PEQ <sup>37</sup> ; HKIEQ <sup>107</sup> ; HQ <sup>68</sup> ; I-PEQ CHD <sup>98</sup> ; IPQ <sup>119</sup> ; PAIS <sup>120</sup> ; PCQ-H <sup>60</sup> ; PEQ <sup>103</sup> ; PESS <sup>115</sup> ; SIPS <sup>24</sup> ; CAHPS ICH <sup>78</sup> ; DPQ <sup>144</sup> ; Drain <sup>116</sup> ; HCAHPS <sup>157</sup> ; howRwe <sup>148</sup> ; Malott, Fulton, Rigamonti, Myers <sup>149</sup> ; PREM RA and Other <sup>80</sup> ; Picker MSD <sup>122</sup> ; PPE-15 <sup>97</sup> ; CQI-PC <sup>36</sup>	25 (28.4%)
5-9 criteria met	PEES-50 <sup>30</sup>	1 (1.1%)
≤4 criteria met	nil	0 (0%)

AXIS = Appraisal tool for Cross-Sectional Studies; PREM = Patient-Reported Experience Measure;

<sup>§</sup>Out-patient version of CPEQ; <sup>%</sup>In-patient version of CPEQ; <sup>£</sup>Reports I-PAHC; <sup>¤</sup>Reports O-PAHC

**Table 3: Psychometric quality of PREMs according to the Revised COSMIN checklist**

<b>Psychometric quality criteria</b>	<b>Criteria met <i>n</i>(%)</b>	<b>Criteria not met <i>n</i>(%)</b>	<b>Unknown or unclear information <i>n</i>(%)</b>
Internal consistency	58 (65.9%)	18 (20.5%)	12 (13.6%)
Reliability	18 (20.5%)	26 (29.5%)	44 (50.0%)
Measurement error/agreement	1 (1.1%)	1 (1.1%)	86 (97.8%)
Content validity	33 (37.5%)	0 (0%)	55 (62.5%)
Construct validity			
Structural validity	49 (55.7%)	6 (6.8%)	33 (37.5%)
Hypotheses testing	21 (23.9%)	14 (15.9%)	53 (60.2%)
Cross-cultural validity	13 (14.8%)	10 (11.4%)	65 (73.8%)
Criterion validity	3 (3.4%)	6 (6.8%)	79 (89.8%)
Responsiveness	4 (4.5%)	2 (2.3%)	82 (93.2%)
IRT	3 (3.4 %)	1 (1.1%)	84 (95.5%)

PREM = patient-reported experience measure; COSMIN = COnsensus Standards for the selection of health Measurement INstruments; IRT = Item Response Theory

## Supplementary File 1:

### CINAHL (EBSCOhost) search strategy

<i>n</i>	Search terms	Results
1	TI (patient* OR consumer*) N (satisfaction OR experience* OR opinion* OR perspective*)	6
2	TX "patient satisfaction"	62,555
3	S1 OR S2	62,560
4	TI ( (Questionnaire* OR Instrument* OR measure* ) OR TX ( ("Health*care surveys" OR "health*care questionnaires" ) OR MH patient reported outcome measures	75,329
5	S3 and S4	2,000
6	TX validity or reliability or repeatability	221,060
7	S5 AND S6	761

### Scopus (Elsevier) search strategy

((patient\* OR consumer\*) W/2 (satisfaction OR experience\* OR opinion\* OR perspective\*)) AND (questionnaire\* OR instrument\* OR measure\*) AND (validity OR reliability OR repeatability)

Total = 509

### Medline (Ovid) search strategy

(((((Patient\* or Consumer\*) adj (satisfaction or Experience\* or Opinion\* or Perspective\*))).m\_titl. or exp Patient Satisfaction/) and ((Questionnaire\* or Instrument\* or measure\*).m\_titl. or (Health care surveys/ or questionnaires/))) or exp Patient Reported Outcome Measures/) and (validity or reliability or repeatability).mp.

Total = 2,038

## Supplementary File 2 – Extracted PREM data

n	Instrument descriptor	Context	Country of development	Original development author	Updated psychometric analysis author	Administration method	Number of items	Number of domains	Domain descriptors <sup>‰</sup>
1	Accident and Emergency Department Questionnaire (AEDQ)	Accident and emergency department services	UK	Bos et al, 2013	Bos et al, 2013	Postal	23	6	1. Waiting 2. Doctors and nurses 3. Your care and treatment 4. Hygiene 5. Information before discharge 6. Overall
2	Ambulatory Care Experience Survey (ACES)	Primary care	USA	Safran et al, 2006	Safran et al, 2006	Postal and telephone	34	11	1. Organizational access 2. Visit-based continuity 3. Integration of care 4. Clinical Team 5. Office staff 6. Communication 7. Whole-person orientation 8. Health promotion 9. Interpersonal treatment 10. Patient trust 11. Relationship duration
3	Adolescent Assessment of Preparation for Transition (ADAPT)	Child/ adolescent	USA	Sawicki et al, 2015	Sawicki et al, 2015	Postal	26	3	1. Counselling on transition self-management 2. Counselling on prescription medication 3. Transfer Planning
4	Consumer Assessment of Healthcare Providers and Systems (CAHPS) –	Dental, health plan	USA	Keller et al, 2009	Keller et al, 2009	Postal and electronic	23	4	1. Dental staff and clinic 2. Getting care and getting care quickly 3. Dental plan 4. Overall ratings of different aspects of care



	dental plan survey								
5	Consumer Assessment of Healthcare Providers and Systems (CAHPS) – Hospital survey (HCAHPS)*	Inpatient care	USA	Goldstein et al, 2005	Elliot et al, 2005; Keller et al, 2005; Levine et al, 2005; O'Malley et al, 2005; Arah et al, 2006; Squires et al, 2012; Weidmer et al, 2012; Westbrook et al, 2014; Dockins et al, 2015	Postal and telephone	27	10	<ol style="list-style-type: none"> <li>1. Communication with nurses</li> <li>2. Communication with doctors</li> <li>3. Responsiveness of hospital staff</li> <li>4. Pain management</li> <li>5. Communication about medicines</li> <li>6. Discharge information</li> <li>7. Cleanliness of hospital environment</li> <li>8. Quietness of hospital environment</li> <li>9. Overall hospital rating</li> <li>10. Recommend the hospital</li> </ol>
6	Consumer Assessment of Healthcare Providers and Systems (CAHPS) – Patient-Centered Medical Homes survey (CAHPS PCMH) Adult version <sup>‡</sup>	Primary care, Medical homes	USA	Scholle et al, 2012	Scholle et al, 2012 <sup>†</sup> and Hays et al, 2014	Postal, telephone and electronic	25	7	<ol style="list-style-type: none"> <li>1. Access to care</li> <li>2. Communication with providers</li> <li>3. Office staff courtesy and respect</li> <li>4. Shared decision-making about medicine</li> <li>5. Self-management support</li> <li>6. Behavioural/whole person (attention to mental health issues)</li> <li>7. Care coordination</li> </ol>
7	Consumer Assessment of Healthcare Providers and Systems (CAHPS) – Health plan survey <sup>†¶</sup> (Referred to as Medicare	Health plan	USA	Hays et al, 1999	Hargraves et al, 2003; Martino et al, 2009; Hays et al, 2014	Postal and telephone	43	5	<ol style="list-style-type: none"> <li>1. Communication</li> <li>2. Getting care quickly</li> <li>3. Getting needed care</li> <li>4. Customer service</li> <li>5. Care coordination</li> </ol>

	CAHPS survey 2007 onwards)								
8	Consumer Assessment of Healthcare Providers and Systems (CAHPS) – Clinician and group survey (CAHPS C&G)	Primary care	USA	Solomon et al, 2005	Dyer et al, 2012; Stucky et al, 2016	Postal and telephone	13	3	1. Communication 2. Access 3. Office staff
9	Consumer Assessment of Healthcare Providers and Systems (CAHPS) – Cultural competence (CAHPS-CC) <sup>§</sup>	Cultural competence	USA	Weech-Maldonado et al, 2012	Weech-Maldonado et al, 2012; Stern et al, 2012; Carle & Weech-Maldonado, 2012	Postal and telephone	26	8	1. Doctor communication – positive behaviours 2. Doctor communication – negative behaviours 3. Trust 4. Equitable treatment 5. Doctor communication – health promotion 6. Doctor communication – alternative medicines 7. Shared decision making 8. Access to interpreter services
10	Consumer Assessment of Healthcare Providers and Systems (CAHPS) – impact of health information technology (CAHPS-HIT)	Primary care, Health information technology	USA	McInnes et al, 2012	McInnes et al, 2012	Postal and electronic	28	7	1. Access to care 2. Doctor communication 3. Office staff 4. Shared decision making 5. Doctor use of computer 6. Questions answered by email 7. Provider's website

11	Consumer Assessment of Healthcare Providers and Systems (CAHPS) – In-Center Haemodialysis (ICH) Survey	Renal (dialysis)	USA	Weidmer et al, 2014	Weidmer et al, 2014; Wood et al, 2014	Postal and telephone	32	3	<ol style="list-style-type: none"> <li>1. Nephrologists' communication and caring</li> <li>2. Quality of dialysis centre care and operations</li> <li>3. Providing information to patients</li> </ol>
12	Consumer Assessment of Behavioural Health Services instrument (CABHS)	Mental health, substance dependence, health plans	USA	Eisen et al, 1999	Eisen et al, 2001	Postal and telephone	54	6	<ol style="list-style-type: none"> <li>1. Access to care</li> <li>2. Getting care quickly</li> <li>3. Consumer-provider relationship</li> <li>4. Information given by clinicians</li> <li>5. Health plan administrative burden</li> <li>6. Wait for care</li> </ol>
13	Child and adolescent service experience (ChASE)	Child/adolescent	UK	Day et al, 2011	Day et al, 2011	Face-to-face, postal or telephone	13	3	<ol style="list-style-type: none"> <li>1. Relationship</li> <li>2. Privacy</li> <li>3. Session activity</li> </ol>
14	Consumer Quality Index (CQI) – In-centre Haemodialysis (CQI-CHD) <sup>§</sup>	Renal (dialysis)	Netherlands	Van der Veer et al, 2012	Van der Veer et al, 2012	Postal	42	10	<ol style="list-style-type: none"> <li>1. Nephrologist's care and communication</li> <li>2. Nurses' care and communication</li> <li>3. Social worker's care and communication</li> <li>4. Dietitian's care and communication</li> <li>5. Communication and cooperation between care providers</li> <li>6. Organisation of care delivery</li> <li>7. Medical tests</li> <li>8. Information in general</li> <li>9. Information on patient federation</li> <li>10. Environment during dialysis sessions</li> </ol>

15	Consumer Quality Index (CQI) – Peritoneal dialysis and home haemodialysis (CQI-PHHD) <sup>§</sup>	Renal (dialysis)	Netherlands	Van der Veer et al, 2012	Van der Veer et al, 2012	Postal	31	9	<ol style="list-style-type: none"> <li>1. Nephrologist's care and communication</li> <li>2. Nurses' care and communication</li> <li>3. Social worker's care and communication</li> <li>4. Dietitian's care and communication</li> <li>5. Communication and cooperation between care providers</li> <li>6. Organisation of care delivery</li> <li>7. Medical tests</li> <li>8. Information in general</li> <li>9. Information on patient federation</li> </ol>
16	Consumer Quality Index (CQI) – Accident and Emergency department (CQI-A&E) <sup>§</sup>	Accident and emergency department services	Netherlands	Bos et al, 2012	Bos et al, 2012 and Bos et al, 2015	Postal	26	7	<ol style="list-style-type: none"> <li>1. Information before treatment</li> <li>2. Timeliness</li> <li>3. Attitude of healthcare professionals</li> <li>4. Professionalism of received care</li> <li>5. Information during treatment</li> <li>6. Environment and facilities</li> <li>7. Discharge management</li> </ol>
17	Consumer Quality Index (CQI) – Palliative Care (CQI-PC) <sup>§</sup>	Palliative care	Netherlands	Claessen et al, 2012	Claessen et al, 2012	Postal	32	7	<ol style="list-style-type: none"> <li>1. Care for physical well-being</li> <li>2. Care for psychosocial well-being</li> <li>3. Care for spiritual well-being</li> <li>4. Respecting independence</li> <li>5. Respecting privacy</li> <li>6. Information</li> <li>7. Expertise of caregivers</li> </ol>

18	Consumer Quality Index (CQI) – Cataract <sup>§</sup>	Post-operative, Cataract surgery	Netherlands	Stubbe et al, 2007	Stubbe et al, 2007	Postal	14	3	<ol style="list-style-type: none"> <li>1. Communication with ophthalmologist</li> <li>2. Communication with nurses</li> <li>3. Communication about medications</li> </ol>
19	Consumer Quality Index (CQI) – Hip Knee Questionnaire <sup>§</sup>	Post-operative, Hip surgery Knee surgery	Netherlands	Stubbe et al, 2007	Stubbe et al, 2007	Postal	64	5	<ol style="list-style-type: none"> <li>1. Communication with nurses</li> <li>2. Communication with doctors</li> <li>3. Communication with GP</li> <li>4. Communication about new medication</li> <li>5. Pain control</li> </ol>
20	Consumer Quality Index (CQI) – Chronic Skin Disease (CSD) <sup>§</sup>	Dermatological conditions, Inpatient care	Netherlands	Van Cranenburgh et al, 2015	Van Cranenburgh et al, 2015	Postal and electronic	51	12	<ol style="list-style-type: none"> <li>1. Healthcare provided by general practitioners</li> <li>2. Accessibility of the healthcare facility</li> <li>3. Waiting times</li> <li>4. Facilities</li> <li>5. Information about the process of care</li> <li>6. Healthcare provided by physician</li> <li>7. Healthcare provided by nurses</li> <li>8. Cooperation of healthcare providers</li> <li>9. Information from your healthcare providers</li> <li>10. Patient participation</li> <li>11. Safety</li> <li>12. Global rating</li> </ol>
21	Consumer Quality Index (CQI) – Rheumatoid Arthritis (RA) <sup>§</sup>	Rheumatoid arthritis	Netherlands	Zuidegeest et al, 2009	Zuidegeest et al, 2009	Postal	124 (55 of which are experience questions)	13	<ol style="list-style-type: none"> <li>1. Conduct caregiver during control of care</li> <li>2. Competence caregiver control of care</li> <li>3. Remaining items control of care</li> <li>4. Competence medication giver</li> </ol>

									<ul style="list-style-type: none"> <li>5. Conduct specialised nurse</li> <li>6. Competence specialised nurse</li> <li>7. Conduct therapist</li> <li>8. Remaining items therapist</li> <li>9. Conduct psychological care</li> <li>10. Conduct occupational physician</li> <li>11. Cooperation</li> <li>12. Remaining items cooperation</li> <li>13. Conduct rheumatologist</li> </ul>
22	Dental Practice Questionnaire (DPQ)	Dental	Australia	Narayanan et al, 2014	Narayanan et al, 2014	Face-to-face	27	3	<ul style="list-style-type: none"> <li>1. Access to the practice</li> <li>2. Interpersonal and communication skills of the dentist</li> <li>3. Services provided at the practice</li> </ul>
23	General Practice Assessment Questionnaire (GPAQ)	Primary care	UK	Chanter et al, 2005; Mead et al 2008	Mead et al, 2008	Face-to-face or postal	19	5	<ul style="list-style-type: none"> <li>1. Access</li> <li>2. Receptionist</li> <li>3. Continuity of care</li> <li>4. Communication</li> <li>5. Enablement</li> </ul>
24	Generic Short Patient Experiences Questionnaire (GS-PEQ) <sup>§</sup>	Generic	Norway	Sjetne et al, 2011	Sjetne et al, 2011 <sup>¶</sup>	Face-to-face or postal	10	7	<ul style="list-style-type: none"> <li>1. Outcome</li> <li>2. Clinician services</li> <li>3. User involvement</li> <li>4. Incorrect treatment</li> <li>5. Information</li> <li>6. Organisation</li> <li>7. Accessibility</li> </ul>
25	Hong Kong Inpatient Experience Questionnaire (HKIEQ) <sup>§</sup>	Inpatient care	Hong Kong	Wong et al, 2013(a)	Wong et al, 2013(b)	Face-to-face or telephone	80 (but 62 covering hospital care and overall impression)	9 (for the hospital care and overall impression questions)	<ul style="list-style-type: none"> <li>1. Access, choice coordination</li> <li>2. Communication and information</li> <li>3. Privacy</li> <li>4. Involvement in decisions</li> <li>5. Physical comfort and pain relief</li> </ul>

									6. Environment and facilities 7. Involvement of family and friends 8. Support for self-care 9. Overall of healthcare professionals and feedback handling
26	Short form of the Hong Kong Inpatient Experience Questionnaire (SF-HKIEQ) <sup>§</sup>	Inpatient care	Hong Kong	Wong et al, 2014	Wong et al, 2014	Face-to-face or telephone	18	4	1. Hospital staff 2. Patient care and treatment 3. Information on leaving the hospital 4. Overall impression
27	howRwe Questionnaire	Generic	UK	Benson & Potts, 2014	Benson & Potts, 2014; Hendricks et al, 2015	Face-to-face or telephone	4	4	1. Promptness 2. Communication 3. Personal relationship 4. General satisfaction
28	Intensive Care Experience Questionnaire (ICEQ)	Trauma	UK	Rattray et al, 2004	Rattray et al, 2004	Face-to-face	24	4	1. Awareness of surroundings 2. Frightening experiences 3. Recall of experience 4. Satisfaction with care
29	Instrument for Assessing Patient Experience of Chronic Illness Care (IEXPAC) <sup>§</sup>	Primary care, Chronic disease	Spain	Mira et al, 2016	Mira et al, 2016	Face-to-face	11	3	1. Productive interactions 2. New relational model 3. Patient self-management
30	Instrument to assess patients' experiences with their primary care providers	Primary care	USA	Drain, 2001	Drain, 2001	Postal	29	5	1. Access to care 2. Office visit 3. Care provider 4. Personal issues 5. Overall assessment
31	Coronary Heart Disease In-patient Experience Questionnaire (I-PEQ (CHD))	Inpatient care	UK	Jenkinson et al, 2002	Jenkinson et al, 2002	Postal	37	6	1. Hospital environment 2. Information and communication 3. Patient involvement 4. Co-ordination of care 5. Discharge and transition 6. Pain

32	Improving Practice Questionnaire (IPQ)	Primary care	UK	Greco et al, 2003	Greco et al, 2003	Face-to-face	27	4	1. About the practice 2. About your visit to the doctor 3. About the staff 4. Finally
33	The Nordic Patient Experiences Questionnaire (NORPEQ) <sup>§</sup>	Inpatient care	Norway	Oltedal et al, 2007	Skudal et al, 2012	Postal	8	3	1. Patient experience 2. General satisfaction 3. Incorrect treatment
34	EUROPEP <sup>§</sup>	Primary care	Europe <sup>€</sup>	Wensing et al, 2000	Milano et al, 2007; Vedsted et al, 2008; Bjertnaes et al, 2011	Postal	23	2 <sup>€</sup>	1. Clinical behaviour 2. Organisation of care
35	French In-patient Experience Questionnaire <sup>§</sup>	Inpatient care	France	Labarere et al, 2001	Labarere et al, 2004	Postal	29	7	1. Medical information 2. Nursing care 3. Living arrangements 4. Discharge management 5. Coordination 6. Physician care 7. Convenience
36	Patient Enablement and Satisfaction Survey (PESS)	Primary care	Australia	Desborough et al, 2014	Desborough et al, 2014 <sup>¶</sup>	Face-to-face	21	8	1. Affective support 2. Health information 3. Decisional control 4. Professional/technical competencies 5. Access to health care 6. Time 7. Professionalism 8. Overall satisfaction
37	OutPatient Experiences Questionnaire (OPEQ) <sup>§</sup>	Outpatient care	Norway	Garatt et al, 2005	Garatt et al, 2005	Postal	24	6	1. Clinical access 2. Communication 3. Organisation 4. Hospital standards 5. Information 6. Pre-visit communication
38	Out-of-hours Patient Questionnaire (OPQ)	Primary care, Out-of-hours	UK	Campbell et al, 2007	Campbell et al, 2007	Postal	56	8	1. Making contact 2. Outcome of call 3. Consultation 4. Home visit



									5. Treatment centre visit 6. Telephone advice 7. Overall satisfaction outcomes 8. Demographics
39	Patient Assessment of Healthcare for In-patient Care (I-PAHC) <sup>§</sup>	Inpatient care, Low income	Ethiopia	Webster et al, 2011	Webster et al, 2011	Face-to-face	12	5	1. Communication with nurses 2. Communication with doctors 3. Physical environment 4. Pain management 5. Medication communication
40	Patient Assessment of Healthcare for Out-patient Care (O-PAHC) <sup>§</sup>	Outpatient care, Low income	Ethiopia	Webster et al, 2011	Webster et al, 2011	Face-to-face	13	4	1. Communication with nurses 2. Communication with doctors 3. Physical environment 4. Medication communication
41	Practice Accreditation and Improvement Survey (PAIS)	Primary care	Australia	Greco et al, 2001	Greco et al, 2001	Face-to-face	27	4	1. Doctors' interpersonal skills 2. Access 3. Availability 4. Patient information
42	Questionnaire for Patients' Experiences Across Health Care Sectors (PEACS 1.0) <sup>§</sup>	Integrated care	Germany	Noest et al, 2014	Noest et al, 2014	Face-to-face	59	9	1. Preliminary care 2. Shared decision-making at indication 3. Patient education and information 4. Nursing staff 5. Accessible physicians 6. Pain therapy 7. Institutional treatment and transition 8. Information at discharge and follow-up 9. Outcome
43	Primary Care Quality – Homeless Survey (PCQ-H)	Primary care, homeless	USA	Kertesz et al 2014	Kertesz et al 2014	Face-to-face	33	4	1. Patient-clinician relationship 2. Cooperation 3. Access/ coordination

									4. Homeless-specific needs
44	Patients' Experience-based Evaluation Scale (PEES-50) <sup>§</sup>	Inpatient care	China	Tian et al, 2014	Tian et al, 2014	Face-to-face	50	6	1. Tangibility 2. Reliability 3. Responsiveness 4. Assurance 5. Empathy 6. Continuity
45	Patient Experience of Integrated Care Instrument	Integrated care	USA	Walker et al, 2016	Walker et al, 2016	Telephone	21	5	1. Coordination within and between care teams 2. Navigation: arranged appointments and visits 3. Communication between specialist and primary care doctor 4. Coordination with community resources 5. Communication between primary care doctor and specialist
46	Patient Experiences with Preoperative Assessment Clinic (PEPAC) <sup>d</sup>	Pre-operative services	Netherlands	Edward et al, 2007	Edward et al, 2007	Postal	56	6	1. Reception 2. Waiting 3. The nurse 4. The anaesthetist 5. Other questions 6. Overall appraisal
47	Questionnaire of Patients' Experience in Post-acute Outpatient Physical Therapy Setting (PEPAP-Q) <sup>§</sup>	Outpatient	Spain	Medina-Mirapeix et al, 2015	Medina-Mirapeix et al, 2015	Face-to-face	23	7	1. Emotional support 2. Providing information and education 3. Duration of attendance 4. Interruptions during delivery of care 5. Waiting times in the sequence of treatment 6. Sensitivity to patients' changes 7. Patient safety
48	Patient Experiences Questionnaire (PEQ) – for	Inpatient care	Norway	Petterson et al, 2004	Petterson et al, 2004	Postal	35	10	1. Information future complaints 2. Nursing services 3. Communication

	hospital patients <sup>§</sup>								4. Information examinations 5. Contact with next-of-kin 6. Doctor services 7. Hospital and equipment 8. Information medication 9. Organization 10. General satisfaction
49	Patient Experiences Questionnaire for Out-of-Hours care (PEQ-OHC) <sup>§</sup>	Primary care, Out-of-hours	Norway	Garratt et al, 2010	Garratt et al, 2010 <sup>¶</sup>	Postal	24	4	1. Telephone contact 2. Doctor contact 3. Nurse contact 4. Organization
50	Picker Patient Experience Questionnaire - 15 (PPE-15)	Inpatient care	UK	Jenkinson et al, 2002	Jenkinson et al, 2002	Postal	15	8	1. Information and education 2. Coordination of care 3. Physical comfort 4. Emotional support 5. Respect for patient preferences 6. Involvement of family and friends 7. Continuity and transition 8. Overall impression
51	Picker Institute Patient Feedback Questionnaire (PFQ)	Outpatient care	Taiwan	Picker Institute (date unknown)	Chien et al, 2009	Face-to-face	21	5	1. Interpersonal skills 2. Communication 3. Patient engagement and enablement 4. Overall satisfaction 5. Technical competence
52	Psychiatric Inpatient Patient Experience Questionnaire – on site (PIPEQ-OS) <sup>§</sup>	Inpatient care, Mental health	Norway	Bjertnaes et al, 2015	Bjertnaes et al, 2015	Postal	21	3	1. Structure and facilities 2. Patient-centred interactions 3. Outcomes

53	Psychiatric Out-Patient Experiences Questionnaire (POPEQ) <sup>§</sup>	Outpatient care, Mental health	Norway	Garratt et al, 2006	Garratt et al, 2006 Olsen et al, 2010	Postal	11	3	1. Outcomes 2. Clinician interaction 3. Information
54	Quality in Psychiatric Care Instrument (QPC) <sup>§</sup>	Inpatient care, Mental health	Sweden	Schroder et al, 2007	Schroder et al, 2010	Face-to-face	30	6	1. Encounter 2. Participation 3. Support 4. Discharge 5. Secluded environment 6. Secure environment
55	Quality of Trauma Care Patient-Reported Experience Measure (QTAC-PREM)	Trauma	Canada	Bobrovitz et al, 2012	Bobrovitz et al, 2012; Bobrovitz et al, 2015; Bobrovitz et al, 2016 <sup>¶</sup>	Face-to-face, postal and telephone	46 (acute care component) 27 (post-acute care component)	9	1. Timeliness 2. Skills and qualities of caregivers 3. Safety 4. Equality 5. Information and communication 6. Coordinated and comprehensive 7. Patient- and family-centred care 8. End-of-life care 9. Overall satisfaction
56	Questionnaire for Patients Experiences in Day Surgery	Inpatient care, Day surgery	UK	Black & Sanderson, 1993	Black & Sanderson, 1993	Postal	28	5	1. Before admission 2. Admission 3. After discharge 4. Overall 5. Personal
57	ReproQ <sup>§</sup>	Maternity care	Netherlands	Scheerhagen et al, 2015	Scheerhagen et al, 2015 Scheerhagen et al, 2016	Electronic	30 (antepartum component) 36 (postpartum component)	8	1. Dignity 2. Autonomy 3. Confidentiality 4. Communication 5. Prompt attention 6. Social consideration 7. Basic amenities 8. Choice and continuity
58	Urgent Care System	Accident and emergency	UK	O'Cathain et al, 2011	O'Cathain et al, 2011 <sup>¶</sup>	Postal or telephone	57	3	1. Progress through the system 2. Entry into the system

	Questionnaire (UCSQ)	department services							3. Patient convenience
59	UK National GP Patient Survey (GPPS)	Primary care	UK	Campbell et al, 2009	Campbell et al, 2009; Paddison et al, 2012; Setodji et al, 2015	Postal	66	12	<ol style="list-style-type: none"> <li>1. About your GP surgery or health centre</li> <li>2. Getting through on the phone</li> <li>3. Seeing a doctor</li> <li>4. Waiting time in the GP surgery or health centre</li> <li>5. Seeing the doctor you prefer</li> <li>6. Opening hours</li> <li>7. Seeing a doctor in the GP surgery or health centre</li> <li>8. Seeing a practice nurse in the GP surgery or health centre</li> <li>9. Care planning</li> <li>10. Your overall satisfaction</li> <li>11. Out of hours care</li> <li>12. Some questions about yourself</li> </ol>
60	Views on Inpatient Care (VOICE)	Inpatient care, Mental health	UK	Evans et al, 2012	Evans et al, 2012	Face-to-face	19	7	<ol style="list-style-type: none"> <li>1. Admission</li> <li>2. Care and treatment</li> <li>3. Medication</li> <li>4. Staff</li> <li>5. Therapy and activities</li> <li>6. Environment</li> <li>7. Diversity</li> </ol>
61	Flemish Patient Survey <sup>s</sup>	Inpatient care	Netherlands	Bruyneel et al, 2017	Bruyneel et al, 2017	Face-to-face	27	8	<ol style="list-style-type: none"> <li>1. Preparing for hospital stay</li> <li>2. Information and communication</li> <li>3. Coordination</li> <li>4. Respect</li> <li>5. Privacy</li> <li>6. Safe care</li> <li>7. Pain management</li> <li>8. Participation</li> </ol>

62	Outpatient Experience Questionnaire (OPEQ) – China <sup>§</sup>	Outpatient care	China	Hu et al, 2017	Hu et al, 2017	Face-to-face	28	6	<ol style="list-style-type: none"> <li>1. Physical environment and convenience</li> <li>2. Doctor-patient communication</li> <li>3. Health information</li> <li>4. Medical expenses</li> <li>5. Short-time outcome</li> <li>6. General satisfaction</li> </ol>
63	Patient Experience Questionnaire across 7 types of Residential and Ambulatory Mental Health Care Services <sup>§</sup>	In-patient care, Out-patient care, Mental health	Netherlands	Bruyneel et al, 2018	Bruyneel et al, 2018	Electronic	35	9	<ol style="list-style-type: none"> <li>1. Information about mental health problems and treatment</li> <li>2. Participation</li> <li>3. Therapeutic relationship</li> <li>4. Personalised care</li> <li>5. Organisation of care and collaboration between professionals</li> <li>6. Safe care</li> <li>7. Patient rights</li> <li>8. Result and evaluation of care</li> <li>9. Discharge management and aftercare</li> </ol>
64	Norwegian Patient Experiences with GP Questionnaire (PEQ-GP) <sup>§</sup>	Primary care	Norway	Holmboe et al, 2017	Holmboe et al, 2017 <sup>¶</sup>	Postal or electronic	30	5	<ol style="list-style-type: none"> <li>1. GP</li> <li>2. Auxiliary staff</li> <li>3. Accessibility</li> <li>4. Enablement</li> <li>5. Cooperation</li> </ol>
65	Patient Experience Questionnaire for Interdisciplinary Treatment for Substance Dependence (PEQ-ITSD)	In-patient, Substance dependence  *In-patient in this instance includes hospital status as well as residential substance abuse	Norway	Haugum et al, 2017	Haugum et al, 2017	Face-to-face	36	3	<ol style="list-style-type: none"> <li>1. Milieu (social environment)</li> <li>2. Treatment and personnel</li> <li>3. Outcome</li> </ol>

		treatment facilities and both public and privately funded institutions.							
66	Patient Experience Saudi Arabia and the United Arab Emirates (UAE) <sup>§</sup>	Generic	Saudi Arabia/ United Arab Emirates (UAE)	Malott et al, 2017	Malott et al, 2017	Telephone or electronic	31	5	1. Admission 2. Food and accommodations 3. Nursing 4. Personal aspects of care 5. Physician
67	Patient Reported Experience Measure (PREM) for Patient with Rheumatoid Arthritis (RA) and other Rheumatic Conditions	Rheumatoid arthritis	UK	Bosworth et al, 2015	Bosworth et al, 2015	Face-to-face	22	8	1. Needs and preferences 2. Coordination of care 3. Information about care 4. Daily living 5. Emotional support 6. Family and friends 7. Access to care 8. Overall experience
68	Rehabilitation Patient Experiences Questionnaire (Re-PEQ) <sup>§</sup>	Inpatient, Rehabilitation, Rheumatoid arthritis	Norway	Grotle et al, 2009	Grotle et al, 2009	Face-to-face	18	4	1. Rehabilitation care and organisation 2. Information and communication 3. Availability of staff 4. Social environment
69	Cancer Patient Experiences Questionnaire (CPEQ)  Inpatient version	Inpatient care, Palliative care/cancer	Norway	Iversen et al, 2012	Iversen et al, 2012	Postal	37	7	1. Nurse contact 2. Doctor contact 3. Information 4. Organization 5. Patient safety 6. Next of kin 7. Hospital standard
70	Cancer Patient Experiences Questionnaire (CPEQ)	Outpatient care, Palliative care/cancer	Norway	Iversen et al, 2012	Iversen et al, 2012	Postal	32	6	1. Nurse contact 2. Doctor contact 3. Information 4. Organization 5. Patient safety 6. Next of kin

	Outpatient version								
71	Health Questionnaire (HQ) <sup>§</sup>	Outpatient, Mental health	Sweden	Jormfeldt et al, 2008	Jormfeldt et al, 2008	Face-to-face	22	3	1. Autonomy 2. Social involvement 3. Comprehensibility
72	Patient-centeredness in Parkinson's Disease care (PCQ-PD) <sup>§</sup>	Parkinson's Disease	Netherlands	Van der Eijk et al, 2012	Van der Eijk et al, 2012	Postal	82	6	1. Involvement in decision making 2. Provision of tailored information 3. Accessibility of healthcare 4. Empathy and PD expertise 5. Continuity and collaboration of professionals 6. Emotional support
73	AIPS	Inpatient care	UK	Sullivan et al, 2013	Sullivan et al, 2013	Face-to-face	13	4	1. Involvement 2. Doctors 3. Nurses 4. Cleanliness
74	Brief patient experience questionnaire (PEQ) developed in primary care for measuring patients' experiences of interaction, emotion and consultation outcome	Primary care	Norway	Steine et al, 2001	Steine et al, 2001	Postal, face-to-face	25	5	1. Communication 2. Emotions 3. Outcome 4. Barriers 5. Auxiliary staff
75	Instrument to Measure Patient Satisfaction With Health Care in Inflammatory Bowel Disease (CACHE) <sup>§</sup>	Inpatient care, Inflammatory bowel disease	Spain	Casellas et al, 2013	Casellas et al, 2013	Face-to-face	31	6	1. Staff care 2. Clinical care 3. Centre facilities 4. Patient information 5. Accessibility 6. Patient support
76	Consumer Evaluation of	Mental health	Australia	Oades et al, 2011	Oades et al, 2011	Face-to-face	26	2	1. Empowerment 2. Dehumanisation



	Mental Health Services (CEO-MHS)								
77	Cystic Fibrosis Patient and Family Member Experience of Care Survey <sup>¶</sup>	Cystic fibrosis	USA	Homa et al, 2013	Homa et al, 2013	Postal, face-to-face or electronic	50	3	1. Access to care 2. Health team care 3. Self-care
78	Client satisfaction survey (CSS)	Home care	USA	Reeder & Chen, 1990	Laferriere, R, 1993	Postal	35	4	1. Technical quality of care 2. Communication 3. Personal Relationships between Client and Provider 4. Delivery of Services
79	Inpatient and Day-Clinic Experience Scale (IDES) <sup>§</sup>	Inpatient care, Mental health	Germany	Dinger et al, 2015	Dinger et al, 2015	Face-to-face	25	7	1. Bond with individual therapist 2. Bond with therapeutic team 3. Group cohesion 4. Self-efficacy/self-view 5. Agreement on task and goals 6. Self-disclosure 7. Critical attitude
80	In-patient satisfaction questionnaire <sup>§</sup>	Inpatient care	Spain	Gonzalez et al, 2005	Gonzalez et al, 2005	Postal	34	6	1. Medical care 2. Nursing care 3. Comfort 4. Visiting 5. Privacy 6. Cleanliness
81	Patient experience tool in patients with serious illness (LifeCourse)	Palliative care/cancer	USA	Fernstorm et al, 2016	Fernstorm et al, 2016	Face-to-face	22	3	1. Care team 2. Communication 3. Care goals
82	Medical Care Questionnaire (MCQ) for Oncology Outpatients	Outpatient care, Palliative care/cancer	UK	Harley et al, 2009	Harley et al, 2009	Postal or face-to-face	15	3	1. Coordination of medical information and doctor's accumulated knowledge about patient 2. Preferences to see usual doctor

									3. Communication with doctor
83	Measure of processes of care for adults (MPOC-A) <sup>¶</sup>	Post-operative, Hip surgery Knee surgery	Canada	Bamm et al, 2010	Bamm et al, 2010	Postal	34	5	1. Enabling and partnership 2. Providing general information 3. Providing specific information 4. Coordinated and comprehensive care 5. Respectful and supportive care
84	Neuro-rehabilitation Experience Questionnaire for Inpatients (NREQ)	Inpatient care, Rehabilitation	UK	Kneebone et al, 2012	Kneebone et al, 2012	Postal or face-to-face	17	4	1. Ownership 2. Personal value 3. Holistic approach 4. Therapeutic atmosphere
85	Patient experience questionnaire (PEQ) for primary care mental health (primary care MH)	Primary care, Mental health	UK	Mavaddat et al, 2009	Mavaddat et al, 2009	Postal	20	2	1. Attributes of the GP 2. Experience with practice in general
86	Picker musculoskeletal disorders (MSD) questionnaire	Primary care, Musculoskeletal disorders	Sweden	Jenkinson et al, 2002	Jenkinson et al, 2002	Postal	16	6	1. Information and education 2. Respect for patients' preferences 3. Emotional support 4. Coordination of care 5. Continuity and transition 6. Overall impression
87	Surgical inpatient satisfaction instrument (SIPS) <sup>§</sup>	Inpatient care	Hong Kong	Cheung et al, 2009	Cheung et al, 2009; Bower et al, 2009	Face-to-face	39	7	1. Information transfer 2. Nursing care 3. Interaction with Doctors 4. Professional care 5. Ancillary services 6. Environment 7. Negative experiences

88	Visit-specific satisfaction with doctor questionnaire (PSQ-MD)	Outpatient care	Canada	Loblaw et al, 1999	Loblaw et al, 2004	Postal or face-to-face	29	2	1. Physician disengagement 2. Perceived support
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PREM = patient-reported experience measure

\*Data on the number of items, domains and domain descriptors are based on the 2013 version of this measurement<sup>(57)</sup>

‡A child version of this PREM was developed but it was a proxy measure and completed by a parent or guardian<sup>(76)</sup>

†The health plan survey refers to the performance of Medicaid and commercial health plans

¶Proxy results included (PREM completed by a carer or family member/guardian)

§Developed and/or evaluated in a language other than English

%Domains based on the most recent publication identified in the database searching

€Inclusive of: Austria, Belgium, Denmark, Finland, France, Germany, Iceland, Israel, Italy, Netherlands, Norway, Portugal, UK, Slovenia, Spain, Sweden, Switzerland

ⓈThe Danish version of the EUROPEP had 5 domains: Doctor-patient relationship, Medical care, Information and support, Organisation of services, and Accessibility.

### Supplementary File 3

#### PREM results for AXIS appraisal

PREM acronym or author name	Intro		Methods					Results					Discussion			Other					Total
	1	2	3	4	5	6	7	8	9	10	11	12	13*	14	15	16	17	18	19*	20	
<b>High Quality studies</b>																					
NORPEQ	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	20
AEDQ	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	19
CACHE	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	19
CAHPS HIT	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	N	Y	19
CQI-CSD	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	19
CQI-Hip Knee	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	N	19
MPOC-A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	DK	Y	19
OPEQ	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	19
OPEQ-China	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	N	Y	19
PEPAP-Q	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	N	Y	19
POPEQ	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	N	Y	19
QTAC-PREM	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y	Y	Y	N	Y	19
SF-HKIEQ	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	N	Y	19
AIPS	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	N	DK	18

CAHPS Dental Plan	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	Y	Y	N	N	Y	Y	Y	Y	N	Y	18
CQI A&E	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	18
CSS	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	DK	Y	18
EUROPEP	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	N	Y	18
Gonzalez et al (in-patient)	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	DK	18
OPQ	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	18
PCQ-PD	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y	Y	Y	DK	Y	18
PEACS 1.0	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y	Y	Y	DK	Y	18
PEQ-GP	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	18
PEQ-ITSD	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	N	N	18
PEQ-OHC	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	18
PFQ	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	DK	N	Y	Y	Y	Y	N	Y	18
PIPEQ-OS	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	N	N	18
QPC	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	DK	Y	18
Re-PEQ	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	DK	Y	18
VOICE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	18
ADAPT	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	17
Bruyneel et al (Flemish)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	DK	N	DK	Y	Y	Y	N	Y	17

CABHS	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	DK	DK	17
CAHPS CC	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	DK	17
CAHPS PCMH	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	DK	N	Y	Y	Y	Y	Y	N	17
CPEQ <sup>§</sup>	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	N	Y	17
CPEQ <sup>%</sup>	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	N	Y	17
CQI-Cataract	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	N	N	N	17
CQI-RA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	DK	N	17
GPAQ	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	N	N	N	17
GPSS	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	N	DK	17
I-PAHC <sup>£</sup>	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	Y	Y	Y	DK	Y	17
LifeCourse	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	17
MCQ	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	DK	Y	17
O-PAHC <sup>²</sup>	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	Y	Y	Y	DK	Y	17
PEPAC	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y	Y	Y	DK	N	17
PEQ MH	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	17
ReproQ	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	DK	Y	Y	Y	N	Y	17
Walker et al (IC)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	N	Y	17
Bruyneel et al (MH)	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	DK	DK	DK	Y	Y	Y	N	Y	16

CAHPS Health Plan	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	DK	DK	16
CEO-MHS	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	DK	N	Y	Y	Y	Y	DK	Y	16
ChASE	Y	Y	DK	Y	Y	Y	Y	Y	Y	Y	Y	Y	DK	N	Y	Y	Y	Y	DK	Y	16
Homa et al (CF-specific)	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	16
ICEQ	Y	Y	Y	Y	Y	DK	Y	Y	Y	Y	Y	Y	DK	N	Y	Y	Y	Y	DK	Y	16
IDES	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	DK	N	Y	Y	Y	Y	DK	Y	16
IEXPAC	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	N	N	Y	Y	Y	DK	Y	16
Labarère et al (French in-patient)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	N	DK	N	16
NREQ	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	DK	N	Y	Y	Y	Y	N	Y	16
PSQ MD	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	DK	Y	16
Stein et al (brief PEQ)	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	N	Y	Y	Y	N	DK	Y	16
USCQ	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y	Y	N	Y	N	Y	16
<b>Moderate Quality studies</b>																					
ACES	Y	Y	Y	Y	Y	Y	DK	Y	Y	Y	Y	Y	N	Y	DK	Y	Y	Y	Y	N	15
Black & Sanderson (day surgery)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	DK	Y	Y	Y	DK	N	15
CAHPS C&G	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	DK	15
CQI-CHD <sup>‡</sup>	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	N	Y	Y	Y	N	N	15
CQI-PHD <sup>§</sup>	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	N	Y	Y	Y	N	N	15

GS-PEQ	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	DK	Y	Y	DK	Y	Y	Y	DK	N	15
HKIEQ	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N	Y	DK	Y	15
HQ	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	N	DK	Y	15
I-PEQ CHD	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	Y	DK	Y	DK	N	15
IPQ	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	DK	Y	Y	N	DK	N	15
PAIS	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	DK	DK	Y	Y	Y	N	DK	DK	15
PCQ-H	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	DK	N	Y	N	Y	Y	N	Y	15
PEQ	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	DK	N	N	Y	Y	Y	DK	Y	15
PESS	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	N	DK	Y	Y	Y	N	Y	15
SIPS	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	DK	N	DK	Y	Y	Y	DK	Y	15
CAHPS ICH	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	DK	N	Y	N	DK	Y	N	N	14
DPQ	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	DK	Y	Y	Y	DK	N	14
Drain, M. (primary care)	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	DK	N	Y	Y	Y	N	DK	N	14
HCAHPS	Y	Y	Y	Y	Y	Y	N	Y	Y	N/A	Y	Y	Y	N	N	N	Y	Y	Y	DK	DK	14
howRwe	Y	Y	N	Y	DK	DK	DK	Y	Y	Y	Y	Y	Y	N	DK	Y	Y	Y	Y	DK	Y	14
Malott et al (Saudi/UAE)	Y	Y	Y	Y	Y	Y	DK	Y	Y	Y	Y	Y	N	Y	N	Y	Y	Y	Y	DK	N	14
PREM RA and Other	Y	Y	Y	Y	Y	Y	DK	N	Y	DK	Y	Y	Y	DK	DK	Y	Y	N	Y	N	Y	14
Picker MSD	Y	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	N	DK	DK	13



PPE-15	Y	Y	Y	Y	Y	Y	Y	N	Y	N/A	Y	Y	DK	N	Y	Y	Y	N	DK	N	13
CQI-PC	Y	Y	N	Y	Y	Y	N	N	N	N	N	Y	DK	Y	DK	DK	Y	N	N	Y	10
<b>Low Quality studies</b>																					
PEES-50	Y	Y	N	Y	Y	N	N	DK	DK	N	N	N	DK	N	DK	N	N	N	N	N	5

PREM = patient-reported experience measure; AXIS = Appraisal tool for Cross-Sectional Studies; Y = Yes; N = No; DK = Do not know (this was counted as N in the 'Total' column); N/A = Not applicable (items not included in 'Total' count); \*Reverse coding required for this question (therefore a N is a positive score);  
<sup>‡</sup>Reports the In-Centre Haemodialysis version of the instrument; <sup>§</sup>reports the Peritoneal and Home Dialysis version of the instrument; <sup>‡</sup>Reports I-PAHC;  
<sup>‡</sup>Reports O-PAHC; <sup>§</sup>Out-patient version of CPEQ; <sup>‡</sup>In-patient version of CPEQ; MH = mental health PREM; IC = Integrated care PREM

## Supplementary File 4

### PREM results for the Revised COSMIN checklist (Gärtner et al, 2018)

PREM acronym or author name	Internal consistency	Reliability	Measurement error/agreement	Content validity	Construct validity				Responsiveness	IRT	Total '+' score	Total '?' score	Total '-' score	% of tests successfully undertaken#
					Structural validity	Hypotheses testing	Cross-cultural validity	Criterion validity						
<b>Setting</b>														
<b>Inpatient care</b>														
HCAHPS	+	+	?	+	+	+	+	-	?	?	6	2	1	86%
PIPEQ-OS	+	+	?	?	+	+	?	?	?	?	4	6	0	100%
NREQ	+	+	?	+	?	?	+	?	?	?	4	6	0	100%
SIPS	?	+	?	+	?	?	+	?	?	+	4	6	0	100%
SF-HKIEQ	+	?	?	+	?	?	?	+	?	?	3	7	0	100%
VOICE	+	+	?	?	?	?	?	+	?	?	3	7	0	100%
CACHE	+	?	?	+	+	?	?	?	?	?	3	7	0	100%
Gonzalez et al (in-patient)	+	?	?	+	+	?	?	?	?	?	3	7	0	100%
NORPEQ	+	+	?	?	?	-	+	?	?	?	3	6	1	75%
Bruyneel et al (Flemish)	?	?	?	+	+	?	?	?	?	?	2	8	0	100%
Bruyneel et al (MH)	?	?	?	+	+	?	?	?	?	?	2	8	0	100%
CQI-CSD	+	?	?	+	?	?	?	?	?	?	2	8	0	100%
PEES-50	+	?	?	+	?	?	?	?	?	?	2	8	0	100%
I-PEQ CHD	-	?	?	?	+	+	?	?	?	?	2	7	1	67%
Labarère et al (French in-patient)	-	?	?	?	+	+	?	?	?	?	2	7	1	67%
QPC	+	?	?	?	+	?	-	?	?	?	2	7	1	67%
Re-PEQ	+	?	?	?	+	-	?	?	?	?	2	7	1	67%

IDES	+	-	?	?	+	-	?	?	?	?	<b>2</b>	6	2	50%
PPE-15	+	?	?	?	?	?	?	?	?	?	<b>1</b>	9	0	100%
HKIEQ	-	?	?	?	+	?	?	?	?	?	<b>1</b>	8	1	50%
I-PAHC <sup>c</sup>	-	?	?	?	?	?	+	?	?	?	<b>1</b>	8	1	50%
CPEQ%	-	-	?	?	?*	+	?	?	?	?	<b>1</b>	7	2	33%
AIPS	+	-	?	?	?	?	?	-	?	?	<b>1</b>	7	3	25%
PEQ	-	-	?	?	+	-	?	?	?	?	<b>1</b>	6	3	25%
Black & Sanderson (day surgery)	?	-	?	?	?	?	?	?	?	?	<b>0</b>	9	1	0%
<b>Outpatient care</b>														
POPEQ	+	+	?	?	+	?	+	?	?	+	<b>5</b>	5	0	100%
OPEQ-China	+	?	?	+	+	?	?	?	+	?	<b>4</b>	6	0	100%
MCQ	+	?	?	+	+	?	?	?	?	?	<b>3</b>	7	0	100%
OPEQ	+	-	?	?	+	+	?	?	?	?	<b>3</b>	6	1	75%
PFQ	+	?	?	?	?	?	-	?	?	+	<b>2</b>	7	1	67%
PSQ-MD	+	+	?	?	-	?	?	-	?	?	<b>2</b>	6	2	50%
PEPAP-Q	+	-	?	?	+	-	-	?	?	?	<b>2</b>	5	3	40%
CPEQ <sup>s</sup>	-	-	?	?	?*	+	?	?	?	?	<b>1</b>	7	2	33%
HQ	-	-	?	?	+	?	?	?	?	?	<b>1</b>	7	2	33%
O-PAHC <sup>a</sup>	-	?	?	?	?	?	-	?	?	?	<b>0</b>	8	2	0%
<b>Primary care</b>														
CAHPS PCMH	+	+	?	+	?	+	?	?	+	?	<b>5</b>	5	0	100%
EUROPEP	+	+	?	+	+	+	?	?	?	?	<b>5</b>	5	0	100%
Drain, M. (primary care)	+	?	?	+	+	+	?	?	?	?	<b>4</b>	6	0	100%
PEQ primary care MH	+	+	?	+	+	?	?	?	?	?	<b>4</b>	6	0	100%
PEQ-OHC	+	?	?	+	+	+	?	?	?	?	<b>4</b>	6	0	100%
Stein et al (brief PEQ)	+	?	?	+	+	+	?	?	?	?	<b>4</b>	6	0	100%
GPPS	+	?	?	+	+	?	+	?	?	-	<b>4</b>	5	1	80%

CAHPS HIT	+	-	?	+	?	+	?	?	?	?	<b>3</b>	6	1	75%
PAIS	+	-	?	?	+	+	?	?	?	?	<b>3</b>	6	1	75%
PEQ-GP	+	-	?	?	+	+	?	?	?	?	<b>3</b>	6	1	75%
GPAQ	+	?	?	?	+	?	?	?	?	?	<b>2</b>	8	0	100%
PCQ-H	+	?	?	+	?	?	-	?	?	?	<b>2</b>	7	1	67%
OPQ	+	-	?	?	+	-	?	?	?	?	<b>2</b>	6	2	50%
AEDQ	-	-	?	?	+	?	?	?	?	?	<b>1</b>	7	2	33%
IPQ	?	-	?	?	+	?	?	?	?	?	<b>1</b>	8	1	50%
IEXPAC	-	?	?	?	+	-	?	?	?	?	<b>1</b>	7	2	33%
PESS	?	?	?	+	?	?	?	?	?	?	<b>1</b>	9	0	100%
<b>Accident and emergency department services</b>														
CQI A&E	-	-	?	?	+	?	+	?	-	?	<b>2</b>	5	3	40%
UCSQ	+	?	?	?	+	?	?	?	?	?	<b>2</b>	8	0	100%
ACES	?	+	?	?	?	?	?	?	?	?	<b>1</b>	9	0	100%
<b>Pre-operative care</b>														
PEPAC	-	?	?	+	+	-	?	?	?	?	<b>2</b>	6	2	50%
<b>Post-operative care</b>														
MPOC-A	+	+	?	?	?	+	?	?	?	?	<b>3</b>	7	0	100%
CQI-Cataract	+	?	?	?	+	?	?	?	?	?	<b>2</b>	8	0	100%
CQI-Hip Knee	+	-	?	?	+	?	?	?	?	?	<b>2</b>	7	1	67%
<b>Dental care</b>														
CAHPS Dental Plan	+	?	?	?	+	?	-	?	?	?	<b>2</b>	7	1	67%
DPQ	?	?	?	?	?	?	+	?	?	?	<b>1</b>	9	0	100%
<b>Integrated care</b>														
PEACS 1.0	?	-	?	?	+	?	-	-	?	?	<b>1</b>	6	3	25%
Walker et al (IC)	-	?	?	?	-	-	+	?	?	?	<b>1</b>	6	3	25%
<b>Home care</b>														
CSS	+	?	?	+	?	?	?	?	?	?	<b>2</b>	8	0	100%
<b>Rehabilitation</b>														
NREQ	+	+	?	+	?	?	+	?	?	?	<b>4</b>	6	0	100%
Re-PEQ	+	?	?	?	+	-	?	?	?	?	<b>2</b>	7	1	67%
<b>No setting specified</b>														

CAHPS C&G	+	+	?	+	+	+	+	?	?	?	6	4	0	100%
CAHPS Health Plan	+	+	?	+	+	+	?	?	?	?	5	5	0	100%
CAHPS CC	+	?	?	?	+	?	+	?	?	?	3	7	0	100%
Malott et al (Saudi/UAE)	+	?	?	?	+	?	?	?	+	?	3	7	0	100%
ReproQ	?	+	+	?	?	+	?	?	?	?	3	7	0	100%
CABHS	+	?	?	+	+	?	?	-	?	?	3	6	1	75%
CAHPS HIT	+	-	?	+	?	+	?	?	?	?	3	6	1	75%
CAHPS ICH	+	+	?	+	-	-	?	?	?	?	3	5	2	60%
ChASE	+	-	?	+	+	?	?	?	-	?	3	5	2	60%
ADAPT	+	?	?	?	-	+	-	?	?	?	2	6	2	50%
QTAC-PREM	-	-	?	?	+	+	?	-	?	?	2	5	3	40%
CQI-RA	+	?	?	?	?	?	?	?	?	?	1	9	0	100%
ICEQ	+	?	?	?	?	?	?	?	?	?	1	9	0	100%
PREM RA and Other	+	?	?	?	?	?	?	?	?	?	1	9	0	100%
howRwe	+	-	-	?	?	?	?	?	?	?	1	7	2	33%
CQI-PHHD <sup>§</sup>	-	-	?	?	+	-	-	?	?	?	1	5	4	20%
CQI-CHD <sup>¶</sup>	-	-	?	?	-	-	-	?	?	?	0	5	5	0%
CQI-PC	?	?	?	?	?	?	?	?	?	?	0	10	0	0%
GS-PEQ	?	?	?	?	?	?	?	?	?	?	0	10	0	0%
PCQ-PD	-	?	?	?	?	?	?	?	?	?	0	9	1	0%
<b>Condition</b>														
<b>Mental health</b>														
POPEQ	+	+	?	?	+	?	+	?	?	+	5	5	0	100%
PEQ														
primary care MH	+	+	?	+	+	?	?	?	?	?	4	6	0	100%
PIPEQ-OS	+	+	?	?	+	+	?	?	?	?	4	6	0	100%
VOICE	+	+	?	?	?	?	?	+	?	?	3	7	0	100%
CABHS	+	?	?	+	+	?	?	-	?	?	3	6	1	75%
Bruyneel et al (MH)	?	?	?	+	+	?	?	?	?	?	2	8	0	100%
CEO-MHS	+	?	?	+	-	?	?	?	?	?	2	7	1	67%

QPC	+	?	?	?	+	?	-	?	?	?	?	2	7	1	67%
HQ	-	-	?	?	+	?	?	?	?	?	?	1	7	2	33%
<b>Chronic disease</b>															
IEXPAC	-	?	?	?	+	-	?	?	?	?	?	1	7	2	33%
<b>Cystic Fibrosis</b>															
Homa et al (CF)	+	-	?	+	?	-	?	?	?	?	?	2	6	2	50%
<b>Inflammatory Bowel Disease (IBD)</b>															
CACHE	+	?	?	+	+	?	?	?	?	?	?	3	7	0	100%
<b>Maternity care</b>															
ReproQ	?	+	+	?	?	+	?	?	?	?	?	3	7	0	100%
<b>Musculoskeletal disorders (MSD)</b>															
Picker MSD	+	?	?	+	?	?	?	?	?	?	?	2	8	0	100%
<b>Palliative care/cancer care</b>															
MCQ	+	?	?	+	+	?	?	?	?	?	?	3	7	0	100%
LifeCourse	+	-	?	+	+	?	?	?	?	?	?	3	6	1	75%
CPEQ%	-	-	?	?	?*	+	?	?	?	?	?	1	7	2	33%
CPEQ§	-	-	?	?	?*	+	?	?	?	?	?	1	7	2	33%
CQI-PC	?	?	?	?	?	?	?	?	?	?	?	0	10	0	0%
<b>Parkinson's Disease</b>															
PCQ-PD	-	?	?	?	?	?	?	?	?	?	?	0	9	1	0%
<b>Renal (including dialysis)</b>															
CAHPS ICH	+	+	?	+	-	-	?	?	?	?	?	3	5	2	60%
CQI-PHHD§	-	-	?	?	+	-	-	?	?	?	?	1	5	4	20%
CQI-CHD*	-	-	?	?	-	-	-	?	?	?	?	0	5	5	0%
<b>Rheumatoid arthritis</b>															
Re-PEQ	+	?	?	?	+	-	?	?	?	?	?	2	7	1	67%
CQI-RA	+	?	?	?	?	?	?	?	?	?	?	1	9	0	100%
PREM RA and Other	+	?	?	?	?	?	?	?	?	?	?	1	9	0	100%
<b>Substance dependence</b>															
PEQ-ITSD	+	+	?	?	+	-	?	?	?	?	?	3	6	1	75%
<b>Dermatological conditions</b>															
CQI-CSD	+	?	?	+	?	?	?	?	?	?	?	2	8	0	100%
<b>Trauma</b>															
QTAC-PREM	-	-	?	?	+	+	?	-	?	?	?	2	5	3	40%

Bobrovitz et al	?	?	?	+	?	?	?	?	?	?	?	1	9	0	100%
ICEQ	+	?	?	?	?	?	?	?	?	?	?	1	9	0	100%
<b>Individual</b>															
<b>Children/adolescents</b>															
ChASE	+	-	?	+	+	?	?	?	-	?	?	3	5	2	60%
ADAPT	+	?	?	?	-	+	-	?	?	?	?	2	6	2	50%
<b>Homeless</b>															
PCQ-H	+	?	?	+	?	?	-	?	?	?	?	2	7	1	67%
<b>Low income</b>															
I-PAHC <sup>£</sup>	-	?	?	?	?	?	+	?	?	?	?	1	8	1	50%
O-PAHC <sup>¤</sup>	-	?	?	?	?	?	-	?	?	?	?	0	8	2	0%

PREM = patient-reported experience measure; COSMIN = COnsensus Standards for the selection of health Measurement INstruments; + = Meets test criteria; ? = Not able to score; - = Does not meet criteria; \*Reports the In-Centre Haemodialysis version of the instrument; §reports the Peritoneal and Home Dialysis version of the instrument; £Reports I-PAHC; ¤Reports O-PAHC; §Out-patient version of CPEQ; %In-patient version of CPEQ; \*EFA scored +, but CFA scored -; #Based on the following equation: (+)/(+ and -) = %; MH = Mental health PREM; IC = Integrated care PREM.

**Appendix 1 – Measurement property definitions and appraisal parameters for the revised COSMIN checklist (Gartner, Bomhof-Roordink, Smith et al., 2018)**

Measurement property	Definition	How the property is appraised
<b>Internal Consistency</b>	The degree of inter-correlation between a scale or sub-scale. Do they measure the same construct?	+ Cronbach alpha(s) scores $\geq 0.70$ ? Unable to score due to missing or unclear information – Criteria for '+' not met
<b>Reliability</b>	The ability of the measure to produce similar results in similar conditions (i.e. similar patient population).	+ ICC* agreement/ weighted Kappa $\geq 0.70$ OR ICC consistency/ ICC without approach stated/ Pearson's $r \geq 0.80$ OR unweighted Kappa/ Kappa without approach stated $\geq 0.80$ ? Unable to score due to missing or unclear information – Criteria for '+' not met
<b>Measurement error/ agreement</b>	Otherwise referred to as absolute measure error, this is the degree to which the scores on repeated measures are close to each other.	+ MIC $\geq$ SDC OR MIC outside the LOA OR convincing arguments that agreement is acceptable ? Unable to score due to missing or unclear information – Criteria for '+' not met
<b>Validity</b>	<i>How well the measure measures what it is intended to measure.</i>	
<b>Content validity</b>	Whether the tool provides an adequate reflection of the construct being measured.	+ Target group/ expert panel considered all items to be relevant and the item set was considered complete ? Unable to score due to missing or unclear information – Criteria for '+' not met
<b>Construct validity</b>		
Structural validity	Whether the scores of the tool adequately reflect the dimensionality of the construct being measured.	+ <b>Exploratory Factor Analysis (EFA)</b> The chosen factors explain $\geq 50\%$ of the variance OR chosen factors explain $< 50\%$ of the variance but the factor choice is justified by the authors + <b>Confirmatory Factor Analysis (CFA)</b> CFI/TLI/GFI $> 0.90$ , RMSEA/SRMR $< 0.08$ and the results confirm the original factor structure (or changes are slight and justified by the authors) ? Unable to score due to missing or unclear information – Criteria for '+' not met
Hypotheses testing	The consistency of the tools' scores in comparison to the hypotheses. Is the null hypotheses rejected as a consequence of the results from using the tool?	+ $\geq 75\%$ of the results are in accordance with the authors hypotheses; if calculated, the correlation with an instrument measuring the same construct $\geq 0.50$ ; and if calculated, correlations between related constructs are higher than with unrelated constructs



		? Unable to score due to missing or unclear information – Criteria for '+' not met
Cross-cultural validity	Is the performance of the tool consistent irrespective of the cultural context that it is employed in?	+ The original factor is confirmed and/or no important DIF is found ? Unable to score due to missing or unclear information – Criteria for '+' not met
Criterion validity	Whether the scores of the tool adequately reflect a 'gold standard'.	+ Correlations with chosen 'gold standard' comparator instrument $\geq 0.70$ OR AUC $\geq 0.80$ OR specificity and sensitivity $\geq 0.80$ ? Unable to score due to missing or unclear information – Criteria for '+' not met
<b>Responsiveness</b>	The tools' ability to detect changes over time for the construct being measured.	+ Correlations of change scores with the 'gold standard' comparator instrument (or equivalently measuring the same construct) $\geq 0.40$ OR at least 75% of the results are in accordance with the hypotheses, and correlations of change scores with the 'gold standard' comparator instrument (or equivalently measuring the same construct) are higher than with unrelated constructs (if calculated) ? Unable to score due to missing or unclear information – Criteria for '+' not met
<b>Item Response Theory (IRT)</b>	Maximisation of instrument homogeneity by reducing the number of items, but still maintaining sufficient information to describe the construct in question.	+ Evidence of Rasch model fit based on: standardised item person fit residuals between -2.5 and 2.5 OR Infit and outfit mean squares $\geq 0.5$ and $\leq 1.5$ OR Z-standardised values $> -2$ and $< 2$ OR no evidence for violation of monotonicity ? Unable to score due to missing or unclear information – Criteria for '+' not met

COSMIN = COnsensus Standards for the selection of health Measurement INstruments; ICC = Intraclass correlation coefficient; MIC = Minimal important change; SDC = Smallest detectable change; LOA = Limits of agreement; EFA = Exploratory factor analysis; CFA = Confirmatory factor analysis; CFI = Comparative fit index; TLI = Tucker-Lewis index; GFI = Goodness-of-fit index; RMSEA = Root mean square error of approximation; SRMR = Standardised root mean square residual; DIF = Differential item functioning; AUC = Area under the curve; \*ICC can refer to test-retest, interrater reliability and intrarater reliability (Koo & Li, 2016)

## Appendix 2 – Proportion of PREMs meeting individual AXIS criteria

Q	AXIS criteria	N(%) meeting criteria
<i>Introduction</i>		
1	Were the aims/objectives of the study clear?	88 (100%)
<i>Methods</i>		
2	Was the study design appropriate for the stated aim(s)?	88 (100%)
3	Was the sample size justified?	77 (87.5%)
4	Was the target/reference population clearly defined? (Is it clear who the research was about?)	88 (100%)
5	Was the sample frame taken from an appropriate population base so that it closely represented the target/reference population under investigation?	85 (96.6%)
6	Was the selection process likely to select subjects/participants that were representative of the target/reference population under investigation?	83 (94.3%)
7	Were measures undertaken to address and categorise non-responders?	61 (94.3%)
8	Were the risk factor and outcome variables measured appropriate to the aims of the study?	84 (95.5%)
9	Were the risk factor and outcome variables measured correctly using instruments/measurements that had been trialled, piloted or published previously?	84 (95.5%)
10	Is it clear what was used to determine statistical significance and/or precision estimates? (e.g. p-values, confidence intervals)	82 (96.5%)*
11	Were the methods (including statistical methods) sufficiently described to enable them to be repeated?	86 (97.7%)
<i>Results</i>		
12	Were the basic data adequately described?	81 (92.0%)
13	Does the response rate raise concerns about non-response bias?#	59 (62%)
14	If appropriate, was information about non-responders described?	23 (26.1%)
15	Were the results internally consistent?	58 (65.9%)
16	Were the results presented for all the analyses described in the methods?	84 (95.5%)
<i>Discussion</i>		
17	Were the authors' discussion and conclusions justified by the results?	82 (93.2%)
18	Were the limitations of the study discussed?	73 (83%)
<i>Other</i>		
19	Were there any funding sources or conflicts of interest that may affect the authors' interpretation of the results?#	84 (95.5%)
20	Was ethical approval or consent of participants attained?	55 (62.5%)

AXIS = Appraisal tool for Cross-Sectional Studies; \*This question was not applicable for 3 PREMs;

#These questions were reverse coded (a 'No' answer to these questions meant that the criteria was met)