

## The use of the Primary Care Assessment Tool (PCAT): an integrative review and proposed update

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**Abstract** *This study proposes an integrative review of the literature based on articles and publications on the use of the Primary Care Assessment Tool (PCAT) as a tool for evaluating these services, discussing the results found in Brazil and in other countries of the world, from the initial matrix conceived by Professor Barbara Starfield's team and proposing updates for the Brazilian version. We identified 124 studies, of which 42 were selected after full reading and according to the established inclusion criteria. Of this subtotal, 17 (40.5%) were Brazilian studies. There is a need to update items of each tool's attribute, in particular "access – first contact", including new forms of doctor-patient communication such as: email, mobile application messages, use of videoconference software for communication and even use of telemedicine, among others. PCAT's use, application and calculation of scores is simple, which makes it useful and suitable for use in the local management of services, especially in its short version.*

**Key words** *Primary Health Care, Health evaluation, Health care, Health services, Outcome assessment*

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## Introduction

In the late 1990s and early 2000s, tools were developed in several countries to assess the quality of Primary Health Care through the experience of users, professionals and/or managers in the daily services. Among these resources are the Components of Primary Care Instrument (CPCI)<sup>1</sup>, Primary Care Assessment Survey (PCAS)<sup>2</sup>, EUROPEP questionnaire<sup>3</sup>, Primary Care Assessment Tool (PCAT)<sup>4</sup>, Interpersonal Processes of Care<sup>5</sup> and Qualicopc<sup>6</sup>. PCATool was proposed and validated in the USA by Cassidy *et al.*<sup>7</sup>, led by Professor Barbara Starfield, as a psychometric scale that covers scores for all PHC attributes, as well as two summary measures. Authors compared two national PHC models with samples conducted by phone and e-mail interviews, calculating statistics called “scores” for each of the characteristics that formed a search group of items: (i) extension of affiliation with a service; (ii) first contact access – use; (iii) first contact access – accessibility; (iv) longitudinality; (v) coordination – integration of care; (vi) comprehensiveness – available services, (vii) comprehensiveness – services provided; (viii) family orientation, (ix) community orientation. Initially, the attribute “coordination” contemplated only the perspective of the integration of care, leaving aside the measurement of information systems. This tool has a version for adult and children users, health professionals and managers.

In Brazil, Harzheim *et al.*<sup>8</sup> were the first to adapt the PCATool – children’s version, analyzing their validity and reliability by means of a cross-sectional study in the city of Porto Alegre, performing reverse translation, adaptation, pre-test, construct validity, internal consistency and reliability analysis. Oliveira<sup>9</sup> and Trindade<sup>10</sup> used the same databases of Porto Alegre to develop comparative evaluations between different health care models, associating with the quality of management of hypertension in adults. Simultaneously, in Petrópolis, a highland city in the state of Rio de Janeiro, Macinko *et al.*<sup>11</sup> compared facilities with family health teams x facilities with traditional care, validating a version for adult users with small differences in the composition of the items and in the response scale. In 2010, some of these versions were endorsed by the Ministry of Health with the publication of a Manual of said tool<sup>12</sup>. Subsequently, a team of researchers linked to the Epidemiology Graduate Program, Faculty of Medicine, Federal University of Rio Grande do Sul (UFRGS) validated the versions for adult

users<sup>13</sup>, professionals<sup>14</sup> and the short versions for adults<sup>15</sup> and children<sup>16</sup>.

Since then, several Brazilian authors have started to use PCATool as a resource for the evaluation of Primary Health Care from the perspective of users responsible for children, adolescents and also adult users, in municipalities and cities of different population sizes, combining and complementing, sometimes, with clinical outcomes and use of other questionnaires / protocols in the health area and adapting the local culture to its items. At the global level, researchers from several countries worked on the adaptation and validation of PCATool versions appropriate to their social and health contexts, with increasing use of the tool in several parts of the world.

This study aims to present an integrative review of papers, theses and dissertations available on the internet on the use of PCAT as a tool for evaluating primary health care services through users’ perceptions, discussing the results found in Brazil and in the versions adapted and validated in other countries, from the initial matrix conceived by professor Barbara Starfield’s team, as well as to propose updates for the Brazilian version.

## Methodology

The integrative literature review synthesizes information over a specific period on a specific topic. Its main advantage over the revision of the traditional bibliography is that there is a strict method in the selection of papers, with well-defined inclusion and exclusion criteria, period, pre-established languages, bibliographic databases of public domain used and, sometimes, book repositories or theses and dissertations consulted. Its elaboration presupposes detailing to the reader all these choice criteria.

For the review, we consulted Pubmed databases of the National Library of Medicine of the United States, Lilacs (Latin American and Caribbean Literature in Health Sciences), SciELO (Scientific Electronic Library Online), as well as the institutional repositories of scientific production The Sergio Arouca National School of Public Health / Oswaldo Cruz Foundation (ENSP/Fiocruz), the Federal University of Rio Grande do Sul (UFRGS) and the University of São Paulo (USP), as well as research reports with random samples of users, available on the internet. We selected studies published between January 1, 2000 and June 1, 2016. For the search, keywords used

were 'PCATool' and associations between "PCAT" and "Primary Care Assessment".

The collection identified 124 papers on the subject. However, after reading them, 42 were selected according to the inclusion criteria: articles published in the period; languages: English, Portuguese and Spanish; types of study: cross-sectional study with results from samples of children or adults users. In a second reading, we searched for publications that listed more than one Primary Health Care attribute and PCAT scores, both for the essential and the derivative characteristics, totaling the same 42 studies. At the end of literature review, scores whose articles were not shown on a scale of 0 to 10 were transformed into this metric in order to standardize the analysis of the observed results. The included studies were characterized by author (s), country / region / city, target audience, data collection period and PCAT calculated scores.

## Results

Chart 1 shows the distribution of the 42 national and international studies, all with a cross-sectional design and with the respective attribute scores, retrieved in databases or repositories. Of this total, 17 (40.5%) are from Brazil, four each from Canada and China, three from Argentina, two each from the United States and Hong Kong and one each from South Africa, Colombia, South Korea, Spain, Japan, Paraguay, New Zealand, Thailand, Tibet and Uruguay (Figure 1).

The geographic distribution of the works shows concentration of studies in the American and Asian continents. The target audience consisted mostly of adults and/or children living in urban areas of cities of countries studied. Only one was conducted in rural cities. Of the 42 surveys, 35 (83.3%) had a cross-sectional study design. Two were before-and-after type and six more were tool validation in the country or region. Among the works geared to the evaluation of services from population samples, the study developed in the city of Rio de Janeiro using PCAT user version<sup>17</sup> was the one with the largest sample recorded in a single city in the world, both for children ( $n = 3,145$ ) and for adults ( $n = 3,530$ ).

## Discussion

As can be seen in Figure 1, PCAT is a tool for assessing PHC services used in various locations worldwide. In order to meet the objectives of measuring different realms of PHC in services with heterogeneous characteristics, it was adapted and validated in different regions, always achieving acceptable psychometric properties<sup>4,8,17-21</sup>. This gives PCAT an advantageous international comparability feature.

Within the observed period, Brazil was the country that most published studies evaluating services using PCAT. Studies showed as essential scores of PHC – first contact access, longitudinality, comprehensiveness and coordination of care – low values ranging from 3.86 in Ilhéus, Bahia, to 7.37 in the city of Rio de Janeiro. Regarding the general score, which includes the already described family and community orientation attributes, we observed a similar range of values: 3.66 in Ilhéus and 7.01 in Rio de Janeiro. The result may be related to the choice made by the municipality of Rio de Janeiro of scaling-up expansion of PHC services, which increased population coverage from 3.5% in 2008 to 70% in 2016<sup>22</sup>. It also established a family and community medicine residency program, which increased municipal PHC capacity<sup>17,23</sup>.

International studies have shown that, in relation to the essential / general attributes with a history of investment in PHC, the following locations performed well: Montevideo (7.51 / 6.93), Seoul and metropolitan region (7.63 / 7.45), Department of Santander in Colombia (7.84 / 6.99), Shigatse and Linzi in Tibet (7.36 / 7.41) and Columbia in the USA (6.99 / 6.63). The first study to analyze a city in South Africa also showed essential and general scores close to 6,6<sup>24</sup>.

Despite being culturally and organizationally different models, these locations, together with the municipality of Rio de Janeiro, Brazil, evidenced scores that demonstrate that their own health services are PHC-oriented. However, scores enable us to affirm that services listed above are organized from a structured health care network with established flows. The portfolio of services meets the needs of the population and care continuity and facilitated access is in place.

**Chart 1.** Characteristics of publications on the use of the Primary Care Assessment Tool (PCAT) among primary health care users

Nº of study	Author(s)/year	Country/Region /Federal Unit	City(ies)	n	Target Audience	Data collection period
01	Cassady et al. (2000) <sup>7</sup>	United States	Washington D.C.	450	Children and adolescents	1998/1999
02	Harzheim et al. (2010) <sup>12</sup>	Brazil/ Distrito Federal	Brasília	-	-	2010
03	Berra et al. (2011) <sup>19</sup>	Argentina/ Province of Córdoba	Córdoba	-	-	From June 2009 to June 2010
04	Shi et al. (2001) <sup>4</sup>	.United States/ Carolina do Sul	Columbia	892	adults	1999
05	Ibañez et al. (2006) <sup>25</sup>	Brazil/ São Paulo	62 rural municipalities of São Paulo with more than 100 thousand inhabitants	2923	adults and children	2005
06a	Harzheim et al. (2015) <sup>17</sup>	Brazil/ Rio de Janeiro	Rio de Janeiro	3.145	children	January-June 2014
06b	Harzheim et al. (2015) <sup>17</sup>	Brazil/ Rio de Janeiro	Rio de Janeiro	3.530	adults	January-June 2014
07	Ferrer (2013) <sup>26</sup>	Brazil/ São Paulo	São Paulo – west region	501	children	January-December 2011
08	Macinko et al. (2007) <sup>11</sup>	Brazil/ Rio de Janeiro	Petrópolis	468	adults	January-February 2004
09	Elias et al. (2006) <sup>27</sup>	Brazil/ São Paulo	São Paulo - total municipality divided into three strata	1.117	adults	Not informed
10	Silva (2014) <sup>28</sup>	Brazil/ Minas Gerais	Micro-Region of Alfenas (11 municipalities)	527	adults	June-July 2012
11	van Stralen et al. (2008) <sup>29</sup>	Brazil/Goiás, Mato Grosso do Sul	Seven municipalities of Goiás and two municipalities of Mato Grosso do Sul.	623	adults and children	2006-2007.
12	Leão (2010) <sup>30</sup>	Brazil/ Minas Gerais	Montes Claros	350	children	January-February 2009
13	Carvalho et al. (2013) <sup>31</sup>	Brazil/ Bahia	Ilhéus	509	elderly	August 2010 - August 2011
14	Oliveira (2012) <sup>32</sup>	Brazil/Paraná	Colombo, metropolitan region of Curitiba (with more than 200 thousand inhabitants)	482	children	June-July 2012
15	Braz (2012) <sup>33</sup>	Brazil/Bahia	Vitória da Conquista	271	children	January-June 2012
16	Pieri (2013) <sup>34</sup>	Brazil/Paraná	Londrina	119	adults	2009-2012.
17	Wolkers (2014) <sup>35</sup>	Brazil/Minas Gerais	Uberlândia	64	children	July 2013
18	Mesquita Filho et al. (2014) <sup>36</sup>	Brazil/ Minas Gerais	Pouso Alegre	419	children	January-December 2009
19	Oliveira (2007) <sup>9</sup>	Brazil/ Rio Grande do Sul	Porto Alegre	1184	adults	July 2006-August 2007.
20	Trindade (2007) <sup>10</sup>	Brazil/ Rio Grande do Sul	Porto Alegre	588	adults	July 2006-August 2007.
21	Harzheim et al. (2013) <sup>13</sup>	Brazil/ Rio Grande do Sul	Porto Alegre	1484	Female adults	July 2006-August 2007.
22	Gómez et al. (2012) <sup>37</sup>	Argentina/ Province of Buenos Aires	Lunús	161	adults	2011
23	Rodríguez-Riveros et al. (2012) <sup>38</sup>	Paraguay/ Urban fringe of Asunción	Asunción, region of Bañado Sur (urban area)	360	adults	April-July 2011
24	Berterretche & Sollazzo (2012) <sup>39</sup>	Uruguay/ Province of Montevideo	Montevideo	178	adults	August-October 2011

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Chart 1. continuation

Nº of study	Mean scores (transformed for scale from 0 to 10)											
	A	B	C	D	E	F	G	H	I	J	Ess	Ger
01	-	-	-	-	-	-	-	-	-	-	-	-
02	-	-	-	-	-	-	-	-	-	-	-	-
03	-	-	-	-	-	-	-	-	-	-	-	-
04	-	8,52	7,57	7,35	6,53	-	7,73	3,52	6,96	3,52	6,96	6,63
05	-	8,50	5,00	7,80	4,00	4,00	5,50	5,50	4,20	3,50	5,76	5,33
06a	7,54	7,88	4,72	6,14	6,01	6,63	5,76	5,44	5,43	5,09	6,30	6,09
06b	7,05	7,96	4,19	6,27	6,57	6,63	5,00	3,99	5,08	4,74	5,93	5,73
07	-	-	4,97	4,93	6,61	6,61	6,11	6,11	4,19	4,21	5,64	5,33
08	-	8,01	3,96	8,90	7,49	7,49	7,86	7,86	5,69	5,84	7,37	7,01
09	-	7,62	4,03	7,78	7,80	7,80	8,11	8,11	2,68	3,02	7,32	6,33
10	3,67	8,59	3,21	7,26	6,10	6,41	5,22	4,92	5,69	5,88	5,64	5,67
11	-	8,58	2,74	6,98	6,13	6,13	7,09	7,09	1,73	2,26	6,39	5,41
12			5,42	8,16	6,61	6,61	5,17	7,96	4,12	4,64	6,65	6,09
13		5,84	2,83	4,95	3,56	3,56	3,13	3,13	2,07	3,87	3,86	3,66
14	5,26	6,48	3,82	4,38	6,63	5,74	5,43	5,52	4,96	3,65	5,41	5,19
15	7,40	7,20	4,80	6,90	4,03	7,43	6,10	6,03	3,43	5,97	5,30	5,07
16	-	6,33	4,95	7,60	6,35	6,35	4,33	4,33	3,68	2,15	5,75	5,12
17	7,97	6,00	4,97	7,37	3,10	6,70	2,13	5,43	3,87	0,80	5,50	4,83
18	-	-	4,70	7,80	5,00	5,00	4,25	-	4,70	5,40	5,35	5,26
19	6,07	8,75	2,69	5,87	5,01	5,01	5,69	3,56	3,46	4,98	5,33	5,11
20	6,58	8,49	2,84	6,85	4,95	4,95	5,63	4,18	4,12	4,89	5,56	5,35
21		7,44	4,64	6,74	4,43	6,06	4,79	3,77	5,59	3,55	5,41	5,22
22	-	6,40	4,80	8,10	6,00	6,00	6,00	6,00	7,20	3,60	6,19	6,01
23	-	6,80	2,60	7,60	4,80	4,80	5,80	5,80	5,00	6,80	5,46	5,56
24	-	8,00	4,80	8,60	7,40	7,40	8,20	8,20	5,20	4,60	7,51	6,93

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Chart 1. continuation

Nº of study	Author(s)/ year	Country/Region /Federal Unit	City(ies)	n	Target Audience	Data collection period
25	Berra et al. (2013) <sup>20</sup>	Argentina/ Province of Córdoba	Córdoba	296	adults	2010
26	Rodriguez-Villamizar et al. (2013) <sup>40</sup>	Colombia/ Dept of Santander	Six municipalities with rural profile	3.011	adults and children	June-October 2010
27	Lee et al. (2009) <sup>18</sup>	South Korea/ Seoul metropolitan region	Seoul and nearby small towns.	722	adults	April-June 2007
28	Yang et al. (2013) <sup>41</sup>	China/ Province of Hunan	Changsha	2.532	adults	March-August 2009
29	Haggerty et al. (2007) <sup>42</sup>	Canada/ Province of Québec	Five district of Québec: Montreal, Montérégie, Bas-Saint-Laurent, Côte-Nord, Gaspésie	3.441	adults	December 2001-October 2002
30	Rocha et al. (2012) <sup>43</sup>	Spain/ Region of Catalonia	Region of Catalonia	12.933	adults	2006
31	Wang et al. (2015) <sup>44</sup>	China/ South China, Region of Pearl River Delta (urban areas)	Province of Guangdong (seven geographical regions)	3.360	adults	November 2010-February 2011
32	Wong et al. (2010) <sup>45</sup>	Hong Kong	Three regions of Hong Kong	1.000	adults	November 2010-February 2011
33	Tsai et al. (2010) <sup>46</sup>	Taiwan	Taichung	271	adults	April-September 2008
34	Wang et al. (2014) <sup>47</sup>	Tibet	Regions of Shigatse and Linzhi	1386	adults	September-October 2013
35	Wei et al. (2015) <sup>48</sup>	China	Shanghai	725	adults	October-November 2011
36	Wei et al. (2015) <sup>48</sup>	Hong Kong	Hong Kong	391	adults	October-November 2011
37	Tourigny et al. (2010) <sup>49</sup>	Canada/ Province of Québec	Not specified	1.275	adults	Before-and-after sample type. Before (n1): June-September 2004
38	Tourigny et al. (2010) <sup>49</sup>	Canada/ Province of Québec	Not specified	1046	adults	Before-and-after sample type. After (n2): December 2006-March 2007
39	Aoki et al. (2015) <sup>21</sup>	Japan/ Region of Tokyo	Kita	204	adults	September-October 2014
40	Carroll et al. (2016) <sup>50</sup>	Canada/ Province of Ontario	Toronto	1.026	adults	2015 ( ? )
41	Mei et al. (2016) <sup>51</sup>	China / Province of Guangdong	Three cities: Guangzhou, Dongguan and Shenzhen	1.465	adults	June-August 2014
42	Bresick et al. (2016) <sup>24</sup>	South Africa/ Province of Western Cape	Six urban districts of Cape Town and four rural districts and Cape Winelands	1.432	adults	2013

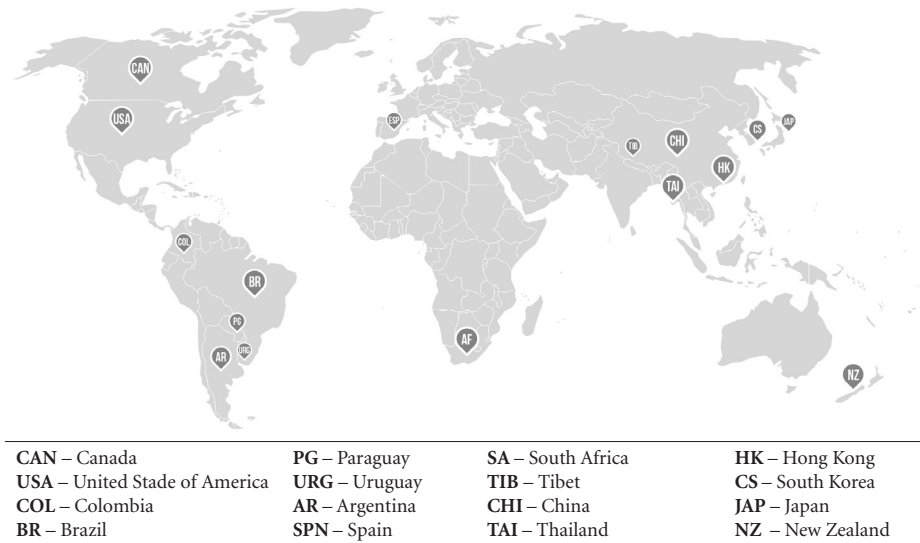
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Chart 1. continuation

Nº of study	Mean scores (transformed for scale from 0 to 10)											
	A	B	C	D	E	F	G	H	I	J	Ess	Ger
25	-	7,00	6,00	6,67	6,33	7,00	6,33	5,33	5,00	4,00	6,38	5,96
26	-	9,50	4,81	5,40	9,00	9,00	8,60	8,60	4,20	3,79	7,84	6,99
27	-	8,88	9,05	9,01	5,99	-	5,24	-	6,50	-	7,63	7,45
28	5,82	7,56	6,89	6,56	6,21	-	-	6,75	6,73	-	6,63	6,65
29	8,13	7,22	4,03	7,53	7,40	7,60	5,64	-	-	-	6,79	-
30	-	-	7,59	6,89	7,50	-	5,33	-	-	-	-	7,14
31	-	6,32	5,93	6,23	6,17	6,42	6,92	5,97	6,41	4,38	6,28	5,90
32	-	6,82	3,41	5,83	4,69	5,61	5,31	3,79	5,56	2,30	5,07	4,81
33	-	6,47	5,17	5,53	5,73	5,67	5,40	5,93	5,90	4,27	5,70	5,56
34	-	-	5,66	8,39	7,72	-	7,66	-	8,22	6,78	7,36	7,41
35		5,33	4,00	7,00	4,67	9,00	7,67	4,67	6,50	3,50	6,05	5,81
36		7,33	2,00	4,67	5,33	6,00	4,67	3,67	5,00	3,00	4,81	4,63
37	-	7,06	5,02	8,03	7,12	-	-	-	-	-	-	-
38	-	7,02	5,13	8,30	7,18	-	-	-	-	-	-	-
39	-	-	4,14	6,91	6,16	-	6,46	3,81	-	5,28	-	5,47
40	-	9,00	4,27	7,70	7,83	5,57	6,10	4,53			6,40	-
41	-	6,10	2,19	5,10	2,61		2,62	-	-	-	3,72	-
42	-	7,00	5,00	6,67	7,33	7,33	7,00	5,67	6,00	4,33	6,57	6,43

Caption: A - attribute "extension of affiliation with a health service"; B - attribute "first contact access – use"; C - attribute "first contact access – accessibility"; D - attribute "longitudinality"; E - attribute "coordination – integration of care"; F - attribute "coordination - information system"; G - attribute "comprehensiveness - services available"; H - attribute "comprehensiveness - services provided"; I – attribute "family orientation"; J – attribute "community orientation". Ess – "Essential Attributes Score"; Ger – "Score of all measured attributes".

Source: Prepared by authors from reading and analysis of publications.



**Figure 1.** Map of PCAT studies (user's version) included in the integrative literature review – 2000-2016.

Source: Elaboration by authors from the integrative literature review.

As shown in Chart 1, study by Harzheim *et al.*<sup>17</sup> obtained a sample for the city of Rio de Janeiro, of 3,145 children and 3,530 adults, totaling 6,675 individuals interviewed in field work in the first half of 2014, with a sub-municipal representative for the so-called “health planning area”, and also for the two types of facilities that provided primary health care at the time. This was the largest sample ever performed in a single city that we located in our research until 2015.

Nevertheless, the large sample, for example, enabled authors of this study to stratify the results of attribute scores in subsamples, according to some complementary variables searched in the tool, such as: “administrative areas of the city”, “social class”, “team implantation time”, “elderly users - people over 60 years”. Authors found higher scores in health facilities with a longer time of implantation of their family health teams (primary care teams in Brazil) and did not find differences between social classes and the subgroup of adult users older than 60 years.

Some studies in Canada and Spain have used part of the PCAT or short version adapted and validated to their reality<sup>43,49</sup>, especially in the realm of “comprehensiveness”, in which the list

of items that compose it is very specific in each country. This data collection tool allows the researcher to use part of the tool as specific items to use as a proxy for a particular outcome, or only items that make up the realms for an attribute of interest. In addition, short versions have been developed with the objective of optimizing the collection of information and pointing out ways from evaluations that can be routine<sup>32,43</sup>.

#### **Issues to be incorporated into an upcoming version of the tool**

After reviewing the literature and fifteen years after its initial proposal, the application and analysis of the observed results suggest the need to update items of each attribute of the tool. This applies in particular to the attribute “First contact access”, which could be tested to evaluate the possibility of including / adapting new items, such as the inclusion of new forms of doctor-patient communication, such as e-mail messages, mobile device applications messages, use of video broadcasting software for communication and even use of telemedicine, among others. In addition, the use of electronic information systems



replacing paper medical records has brought to care not only a technological substitute, but also several possibilities for improving the coordination of care that must be incorporated into new versions of the tools. Likewise, change in the epidemiological context raises the need to include new items in the realm of comprehensiveness.

### **Final considerations**

PCAT enables the evaluation of health services from the user's perspective, observing the extent of PHC attributes in the evaluated services. This tool has been used around the world from different versions validated for local contexts that allow the comparability of findings. In addition, it is simple to use / apply and calculate scores, even when there is a need to impute data<sup>16</sup>, which makes it useful and suitable for use in the local management of services. Short PCAT versions have been shown to be competent to evaluate particular aspects of PHC attributes and are yet another important tool for local management.

### **Collaborations**

OP D'Ávila and LFS Pinto collected and read the review papers and wrote the text. L Hauser, MR Gonçalves and E Harzheim developed the analysis and critical review structure of the final version of the paper.

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