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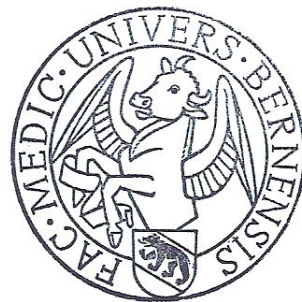
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## **Quality of Information for Women seeking Breast Augmentation in the Internet**

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**Abbreviations:**

<b>BA</b>	Breast Augmentation
<b>EQIP</b>	Ensuring Quality Information for Patients
<b>GH</b>	Google.com hits
<b>IPDAS</b>	International Patient Decision Aid Standards
<b>IQR</b>	Interquartile Range
<b>NA</b>	Not Applicable
<b>PDF</b>	Portable Document Format
<b>WWW</b>	World Wide Web

## **Abstract**

### **Background**

Recently published data show that many women interested in breast augmentation (BA) actively search the Internet for information. The Internet is currently the main source of information on this topic.

### **Objectives**

Little is known about the quality of available information on the Internet concerning BA. Our goal was to evaluate this in a systematic manner using a validated and reproducible tool.

### **Methods**

Women (n=96) unrelated to medicine were asked which keywords they would use to search the Internet if they were interested in BA. Five keywords were used. Qualitative and quantitative assessment was performed with the modified Ensuring Quality Information for Patients (EQIP) tool. A total of 2500 websites containing information on BA were identified using Google, Bing, Yahoo, Ask and AOL.

### **Results**

Out of 623 eligible websites, only 153 (25%) addressed more than 20 EQIP items. Scores were higher for encyclopedias and academic websites compared to hospital and practitioner websites. The median EQIP score was only 15 (IQR: 12-20), and quantitative postoperative morbidity and mortality risk estimates were available in only 38% and 25% of the websites, respectively. Major complications (e.g. capsular contraction, implant safety) were mentioned in only 156 (25%) of the websites.

### **Conclusions**

This is the first assessment of online patient information on BA using the EQIP tool. Our analysis demonstrated several shortcomings in the quality of information provided to BA candidates. There is an immediate need for better informative and educational websites regarding BA procedures that are compatible with international quality standards for plastic surgery.

## **Introduction**

The Internet is an increasingly important source of medical information for patients.<sup>1,2</sup> The plastic and aesthetic surgery market is consumer-oriented and relies strongly on marketing and advertising in a crowded playing field. Thus, the availability of objective and complete patient information on the Internet is increasingly important, because many women seek detailed information about procedures such as breast augmentation (BA) even before consulting a medical expert in the field.

BA with implants is the most commonly performed aesthetic surgical procedure,<sup>3</sup> and any information on the Internet significantly contributes to a patient's decision to undergo it.<sup>4</sup> Unfortunately, the Internet is also an uncontrolled space and the information presented there is not subjected to any control or peer review processes. Consequently, it is the responsibility of the informing institution to provide accurate, professional, and unbiased medical information.<sup>5</sup>

Despite ongoing efforts to standardize such information according to international guidelines,<sup>6</sup> the existing education portals vary considerably in terms of quality, quantity, and understandability.<sup>7</sup> Using the Web-based Delphi consensus process, the International Patient Decision Aids Standards (IPDAS) collaboration<sup>4</sup> has established precise recommendations and guidelines for developers of decision aids in healthcare.<sup>4,8</sup> The IPDAS collaboration provides a list that helps determine whether patient decision aids include content and process items to be important.<sup>9</sup> Existing tools such as the Ensuring Quality Information for Patients (EQIP) assess the quality of patient decision aids.

The EQIP is a checklist applicable to all existing types of information; it has recently been expanded<sup>10,11</sup> to meet the criteria of the patient information appraisal from the British Medical Association and the IPDAS.<sup>4,12</sup> The EQIP instrument has fewer items and assesses only website elements such as readability, design, and the quality of written information. The assessment of Internet information via EQIP has been successfully applied in other studies.<sup>8,13-15</sup> To the best of our knowledge however, the available Internet information regarding BA has not yet been evaluated according to the EQIP criteria or with any other reproducible and validated tool. In this study, we have evaluated the quality of existing patient information on BA in the Internet using the modified EQIP instrument.

## **Material and Methods**

### **Eligibility Criteria, Information Sources and Data Selection**

The five largest internet search engines (Google, Bing, Yahoo, Ask, and AOL)<sup>16</sup> were used for data collection. Synonyms for surgical breast augmentation (BA) of non-medical related Internet users were obtained. Therefore, 96 women not related to medicine were asked to spontaneously state which keywords they would use to search the Internet for information about BA. The age of these individuals ranged from 19 to 42 years. They were from Switzerland, Germany, and the UK. None of them previously received BA. We did not ask them if they were interested in receiving BA in the future. According to their responses, the most frequent keywords were: *plastic breast surgery, breast augmentation, breast implants, boob job and breast enlargement*. These were used to perform an Internet search (**Table 1**). The keywords were used in various combinations to identify websites containing patient information on BA surgery. By implementing Internet users' behavior, we only screened the first 100 hits for every search engine and assumed that most users would limit their web search well below this number.<sup>8</sup>

### **Data Entry**

Data obtained from eligible websites were entered into an online, password-protected platform entitled "Systematic Review Platform | Review-Net.com."<sup>17</sup> We built this platform on the open source content management system Drupal version 7 described previously.<sup>18</sup> This ensured a standardized data entry without missing data.

### **Data Assessment**

Following elimination of duplicate websites obtained from all five search engines, the websites were categorized according to their origin: *A) Academic/Educational Institution, B) Encyclopedias, C) Health departments, D) Hospitals, E) Industry, F) News services (press), G) Patient groups, H) Practitioners, I) Professional societies, and J) Portals*. All websites were saved in PDF for further analysis. We excluded websites such as those from scientific journals that contained restricted information. Websites languages other than English were also excluded due to the language limitations of the review team.

### **Evaluation Tool**

Eligible websites were evaluated with the modified EQIP instrument including 36 items of which the validity and reproducibility was shown in previous studies.<sup>10,11</sup> The modified EQIP



instrument is a convenient checklist that is easily applicable to all types of patient information. It can be used to assess the content, identification, and structural data of patient information platforms. These are the three aspects of patient information that should be mandatorily covered by website developers according to the international guidelines.<sup>10</sup> The modified EQIP instrument was developed through a process of item generation with testing for concurrent validity, inter-rater reliability and utility. A group of patient information managers and health care professionals tested EQIP in three annual audits of patient information documents produced by the University Hospital of Geneva, Switzerland.<sup>11</sup> Deviating from the modified EQIP tool, which proposed a rating scale of four options: *yes*, *partially yes*, *no*, and *NA* (not applicable), we eliminated the “partially yes” (**Table 2**) option using the binary scale of *yes* vs. *no*, as previously described.<sup>8,11,19</sup>

### **Items Describing Breast Implant Safety**

Recently published data have shown serious health care provider and patient concerns about the safety of silicone breast implants.<sup>20</sup> Websites were screened for medical information about the safety of breast implants. Therefore, the EQIP checklist was adapted to add a specific item addressing the presence of such information.

### **Data Assessment**

Three reviewers independently assessed all websites. Disputes on divergent results were defined by consensus.

### **Items describing Treatment Alternatives**

There are pros and cons to using the Internet in patient education. In general, we differentiate between saline or silicone gel implants, smooth or textured surface implant shells, and round or anatomical shapes.<sup>21</sup> With regards to implant placement, four different surgical approaches are typically used: inframammary, periareolar, transaxillary, and umbilical incision.<sup>22</sup> All websites were assessed for information on treatment alternatives and information explaining the differences between them. These were addressed in Item 5 of the modified EQIP tool.

### **Quantitative and Qualitative Patient Risk**

Infection after placement of breast implants is one of the leading morbidity causes in around 2.5% cases.<sup>23</sup> Capsular contracture - a common complication after BA procedures whose origin has not been fully elucidated yet<sup>24</sup> - was reported in up to 30% of cases.<sup>25-27</sup> All

websites were assessed for such information and addressed in Item 9 and Item 10 of the modified EQIP tool.

### **Statistical Analysis**

Proportions derived from the nominal variables were compared with Fisher's or  $\chi^2$  tests; continuous variables were compared with Student *t* or one-way ANOVA tests where applicable. All *p* values were two-sided and were considered statistically significant when  $p < 0.05$ . The websites were scored from 0 to 36 according to the number of addressed items from the expanded EQIP instrument. Thus, each criterion was given equal weight of importance. We chose to dichotomize the EQIP score by arbitrarily using the 75<sup>th</sup> percentile as a cut-off point for discriminating high score from low score websites as previously described.<sup>8</sup> Briefly, the reason for dichotomization was to simplify the analysis, presentation and interpretation of the results in order to identify significant differences between the high score and low score websites. Statistical analysis was performed with SPSS version 22 for Mac (IBM Corp. Armonk, NY)

## Results

### Websites containing breast augmentation (BA) patient information

Screening Google, Bing, Ask, Yahoo, and AOL with the keywords *breast augmentation*, *breast enlargement*, *breast implants*, *plastic breast surgery*, and *boob job* revealed 2508 websites (**Figure 1**). There were 623 English language websites containing BA consumer health information. These were further assessed after excluding irrelevant websites, duplicates, and access-restricted scientific sources.

### Scoring

Website scores obtained from the modified EQIP tool are illustrated in **Figure 2**. The EQIP score (a continuous variable) was dichotomized by using the arbitrary 75<sup>th</sup> percentile cut-off point to discriminate high score and low score websites, as previously described.<sup>8,28</sup> This resulted in 470 low, and 153 high score websites.

### Top rated websites

**Table 3** shows the rating and the scores of the 95<sup>th</sup> percentile websites. The choice of the 95<sup>th</sup> percentile was arbitrary. Using a different cut-off point would have resulted in a larger number of websites - this would have been impractical for the readers. The top websites were developed in Australia (n = 2) and the United States (n = 14). Interestingly, the top rated websites were not found within the first 10 search results in Google, but much further down in the search results. Indeed, most of them were not even within the first 100 results (**Table 3**).

### Country with largest number of high score websites (countries with > 10 websites)

As shown in **Figure 3**, the USA had the lowest score websites (median score 15; IQR 12 - 20) and the largest variation in the scores. However, the top websites originated from the USA, which further shows that they are diluted in a large number of low quality score websites. Furthermore, the website with the highest score originated from Los Angeles, USA.<sup>29</sup> It contains an interactive introduction video that takes approximately 15 minutes to show different aspects of BA such as the risks and benefits as well as treatment alternatives.

Among countries that published more than 10 websites, Australian providers tended to have significantly higher quality (median score 21, IQR 16-24) followed by Canada (median score 19, IQR 13-22), and the UK (median score 16, IQR 11-22) ( $p=0.002$ ).

### **Overall quality of medical information according to the modified EQIP instrument**

The median EQIP score of the assessed websites was 15 (IQR 12-20) (**Figure 3**). One website fulfilled only three items, and none of the 623 websites addressed all 36 items of the modified EQIP protocol (**Table 2**). The website with the highest score (32) was developed by an academic center (University of California, Los Angeles, USA).<sup>29</sup> 153 homepages addressed more than 20 items from the modified EQIP instrument (i.e. high score websites). Median scores tended to be significantly higher for encyclopedias (28), academic centers (26), and portals (23) versus practitioners (19) and hospital sites (20) ( $p = 0.002$ ). The comparative analysis of high score and low score websites identified 30 items that were significantly more frequently addressed by high score websites (**Table 2**).

### **Description of qualitative and quantitative risks**

#### ***Morbidity and mortality risks***

Postoperative morbidity and mortality risk estimates (Item 9) were available in 71% of high score websites and 27% of low score websites, major complications (capsular contracture, Item 10, 70% versus 10%,  $p < 0.001$ ; and implant safety 77% versus 30%,  $p < 0.001$ ) were mentioned on the fewest websites. Item 14 (describes warning signals that the patient may detect) was poorly addressed (22% versus 2%,  $p < 0.001$ ) in both low and high score websites.

#### ***Website publication year***

Most websites were published from 2008 onwards ( $n=550$ , 88%). There was no quality difference regarding the publication date of the website (**Figure 4**) because the quality of the information did not improve with time.

## Discussion

Examples of patient breast augmentation (BA) information evaluation on the Internet are only sporadically described,<sup>30,31</sup> and generally show that most websites lack complete information. The conclusion is even that they contain unregulated and incorrect information.<sup>31</sup> The market for aesthetic and plastic surgery procedures continues to grow.<sup>32</sup> As shown by Walden and other authors, candidates interested in BA primarily use the Internet as a research tool and are influenced by this information on multiple levels.<sup>33-35</sup> Therefore, assessment with a reproducible instrument of the available Internet-based medical information is critical. None of the assessed websites met all 36 items of the modified EQIP instrument.

We showed a significant lack of information for women potentially interested in BA. Most websites evaluated included general information about BA. The marketing and advertising purpose for aesthetic and plastic surgery procedures seemed to play the most important role. Most online information was incomplete, misleading, false, or underestimated potential surgical risks.

A previous study found that the websites of plastic surgeons in California had very high quality and were ethically sound level.<sup>36</sup> However, the field of aesthetic surgery deals more with customers than with patients. The market is consumer-oriented and strongly relies on marketing and advertising tools in an increasing crowded field of providers. This tempts the physician to take marketing action according to selling his “products” and to influence the patient’s interest. Understanding the patients’ interests in plastic surgery is a powerful tool in delineating the market for plastic surgeons.<sup>37</sup> However, issues of economics should never yield to medical responsibilities and ethics.

The Internet currently represents the largest available pool of medical information. However, this information is not subject to any peer review or quality management process. Search engines (e.g. Google) rank their results as a function of page views. Surprisingly, website quality has no relationship to its ranking by the search engine (**Table 3**). Assuming that Internet users searching for information will only assess the first 10 pages of search results (i.e. 100 websites), one can say that they will miss potential high quality information.

Doctors have developed many websites providing BA information. In contrast, most high score websites (i.e. websites addressing 20 or more items from the modified EQIP instrument)

originated from educational or scientific groups, encyclopedias, and portals. One could argue that academic centers offer better information because they are more sensitive to patient's expectations and needs rather than profit and market. Indeed, websites developed by non-profit institutions scored higher - and for us this is somewhat expected because of their mission which allows them to provide more accurate and objective information than most individual centers and practitioners who are mostly driven by the market. Some hospitals and practitioners are aware of this fact and link to the websites developed by non-profit institutions rather than create their own content.

In contrast to the recommendations of first generation EQIP developers,<sup>11</sup> our findings revealed that two healthcare providers had an informed consent form on their website. This inclusion of patient decision aids is not recommended.<sup>10</sup> The reasons, as shown by Melloul et al., are as follows: 1) the addition of a consent form could provoke a certain pressure on the patient to sign it, and 2) consent forms are useless if there is no interactive dialogue between patients and medical professionals.<sup>8</sup> Providing informed consent to a patient for a surgical procedure does not only involve a handout of written information about the procedure. Patients have to be informed orally as well as educated and actively participate in the discussion with the health care provider.<sup>38</sup>

Most websites were from the USA. In general, these were the lowest score websites with the largest variation within the scores. However, the top websites also originated from the USA. This highlights that high quality information is diluted in a large number of low quality score websites. In comparison, websites from Australian providers tended to be significantly high quality. There were few low score websites within the Australian cluster. Out of 29 Australian websites, two (7%) were in the top 95<sup>th</sup> percentile. In comparison, information originating from the USA (n=527) delivers only 14 (3%) websites in the top 95<sup>th</sup> percentile.

The quantity of medical information has increased recently.<sup>8</sup> The majority of websites assessed were published from 2008 onwards (550/623, 88%). However, it is estimated that providers regularly update the publishing date to simulate current information. Nevertheless, the quality of such information did not seem to improve over time. The increase of quantity without quality improvement over time shows that there is an increasingly large pool of useless and misleading information.

The website with the highest score was provided by an academic center (University of California, Los Angeles, USA).<sup>29</sup> This website contained excellent patient information about BA with a balanced level of risks and benefits. It was one of the few websites (n=5,1%) that contained a named space for the reader's notes (Item 35). This is an explicit item in the modified EQIP.

Involving patients in surgical treatment decision-making leads to potentially significant and enduring differences in healthcare outcomes.<sup>39,40</sup> Well-informed and well-educated patients feel more comfortable with their surgical procedures and are more compliant. Potential major complications were addressed only in a few websites (n=156, 25%). This may negatively influence not only patient information but also psychological outcome<sup>41</sup> as well as the cosmetic results of the procedure.

This study has some limitations. *First*, websites in languages other than English were excluded from further assessment because of the language limitations of the review team. This quality of non-English websites remains unknown. However, most of the population in developed countries speak English as their first or second language.<sup>42</sup> *Second*, the keywords used were in English and the searches were expected to reveal mainly websites published in English. *Third*, plastic surgery is more common in economically developed countries. Another limitation is the selection of the keywords used in various combinations for website assessment. We sampled young women not familiar with BA in an attempt to identify the most common keywords that they would use to search the Internet. The ideal sample may have been women attending their first consultation for consideration for BA, however they would have already searched the Internet by that time. This circumstance could have led to a potential lack of some relevant keywords and hence websites. However, the list of keywords we obtained was substantial and complete. *Fourth*, there were limits in the assessment instrument itself. The modified EQIP tool was not developed to assess websites referring specifically to BA, but rather to patient information regarding any kind of treatment or surgery. Furthermore, as the modified EQIP instrument does not include all the components of the IPDAS checklist, some elements of the international recommendations were not addressed in this study.<sup>4,8,10</sup> However, the modified EQIP instrument was shown to be simpler and associated with higher inter-rater reliability than the IPDAS. Furthermore, we eliminated the option "partially yes" and kept the binary options of "yes" versus "no" with regards to compliance with the modified EQIP items. Although the validity and reproducibility of the

modified EQIP instrument was performed including the “partially yes” option, we do not consider that by eliminating the “partially yes” option would negatively affect the reproducibility of this instrument. *Fifth*, we included an additional item to the modified EQIP instrument referring to the safety of implants. This was specific to BA and should not be used in assessing other procedures. However, this adjustment to the modified EQIP instrument does not guarantee its validity. *Finally*, conducting a survey in women asking them to assess the top 10 websites identified in our study may have provided useful information, for example to associate the validated modified EQIP instrument with patient satisfaction of Internet-based information.

The data suggest that physicians and website developers comply with the following patient information regarding BA: *First*, all websites should be screened with the modified EQIP instrument to meet the defined quality standards of patient information. No information should be omitted. The developers should provide objective information regarding treatment alternatives, possible complications (including local rates if available), and other risks of the procedures. This would ensure adequate patient information. *Second*, consent forms should not be included. This removes any decision-making pressure prior to surgical consultation. Legally, patients should of course be informed personally about the planned procedure prior to written consent. *Third*, website content should be regularly updated with new literature, techniques, and outcome data when available. *Fourth*, websites should also include photographs, videos, and interactive tools to increase patient education.



## **Conclusions**

This systematic analysis of available websites providing information for BA candidates highlights a significant lack of patient information particularly with respect to the morbidity and mortality risks associated with plastic surgery. Although some of the websites reached high scores according to the modified EQIP tool, none of them met all of the required quality criteria. We encourage professional societies to produce a document with comprehensive and complete information following the EQIP criteria. There is an urgent need for important improvements in the available patient information regarding BA. This will provide unbiased, informative, and educational tools for patients. Following the results and their interpretation in this study, the next step will be the creation of a website with all information on BA procedures according to the modified EQIP instrument. Such a website will clearly meet international quality standards. Furthermore, this website should be designed not to be only informative but also educational. It will be created in a true multidisciplinary collaboration with doctors, nurses, patient representatives, epidemiologists, and healthcare IT specialists.

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## Tables:

**Table 1:**

Synonyms and Google search hits (GH) (January 2014) for *breast augmentation*. Numbers of different keywords suggested by the responders.

	Synonyms (from Thesaurus.com)	google.com hits (GH)		Women not related to medicine (n=96)
1	<b><i>Plastic breast surgery</i></b>	<b>36'400'000</b>	1	<i>Breast enlargement</i> (n=82)
2	<b><i>Breast augmentation</i></b>	<b>31'000'000</b>	2	<i>Breast augmentation</i> (n=7)
3	<b><i>Breast implants</i></b>	<b>29'100'000</b>	3	<i>Plastic surgery for breast enlargement</i> (n=2)
4	<i>Silicone implants</i>	26'600'000	4	<i>Silicone breasts</i> (n=3)
5	<i>Silicone breasts</i>	20'500'000	5	<i>Boob job</i> (n=2)
6	<b><i>Boob job</i></b>	<b>18'800'000</b>		
7	<b><i>Breast enlargement</i></b>	<b>4'000'000</b>		
8	<i>Mammoplasty</i>	374'000		
9	<i>Mammoplasty</i>	350'000		
10	<i>Mamma augmentation</i>	20'300		

**Table 2:**

Criteria for evaluation of patient information document quality according to the expended “Ensuring quality information for patients” (EQIP) instrument<sup>8,10,11</sup> as well as results demonstrating overall response rate to each item.

	Criteria	Included or NA (=not applicable)	Number of websites	Overall %	High score websites %	Low score websites %	OR (95%CI)	p value
<b>Additional Item</b>	Implant Safety described	Yes No	336 287	54 46	77	30	7.81 (5.08 -11.90)	p<0.001
<b>Content data</b>								
Item 1	Initial definition of which subjects will be covered	Yes No	287 336	46 54	90	31.5	21,74 (12.05 -38.46)	p<0.001
Item 2	Coverage of the above-defined subjects	Yes No	277 10	96 4	99	96	5.92 (0.70-50.00)	p=0.069
Item 3	Description of the medical problem/treatment/procedure	Yes No	460 163	74 26	100	65	NA	p<0.001
Item 4	Definition of the purpose of the surgical intervention	Yes No	489 134	78 22	98	72	19.23 (6.06-62.50)	p<0.001
Item 5	Description of treatment alternatives (e.g. type of implants, implant positioning, incisions)	Yes No	451 172	72 28	95	65	9.71 (4.65-20.41)	p<0.001
Item 6	Description of the sequence of the surgical procedure	Yes No	260 363	42 58	74	31	6.21 (4,12-9.34)	p<0.001
Item 7	Description of qualitative benefits	Yes No	483 140	77 23	95	72	7.09 (3.38-14.92)	p<0.001
Item 8	Description of quantitative benefits	Yes No	265 358	42 58	93	26	3.7 (19.23-71.43)	p<0.001
Item 9	Description of qualitative risks and side effects	Yes No	238 385	38 62	71	27	6.53 (4.37-9.80)	p<0.001
Item 10	Description of quantitative risks and side-effects (e.g. capsular contraction, infection, periareolar loss of sensitivity)	Yes No	156 467	25 75	71	10	2.13 (13.33-33.33)	p<0.001
Item 11	Addressing quality of life issues	Yes No	228 395	37 63	86	20	24.39 (14.70-41.67)	p<0.001
Item 12	Description of how complications will be handled	Yes No	92 531	15 85	28	10	3.35 (2.12-5.32)	p<0.001
Item 13	Description of precautions that the patient may take	Yes No	211 412	34 66	56	27	3.55 (2.43-5.18)	p<0.001
Item 14	Mention of alert signs that the patient may detect	Yes No	42 581	7 93	22	2	16.39 (7.46-37.04)	p<0.001
Item 15	Addressing medical intervention cost and insurance issues	Yes No	219 403	35 75	70	24	7.57 (5.05-11.36)	p<0.001
Item 16	Specific contact details for hospital services (if not hospitals, “not applicable”)	Yes No NA	24 3 596	4.5 0.5 95	91	87.5	NA	p=0.643
Item 17	Specific details of other sources of reliable information/support	Yes No	117 506	18 82	37	13	4.05 (2.64-6.21)	p<0.001
Item 18	Coverage of all relevant issues for the topic (summary item for all content criteria)	Yes No	7 614	1 99	5	0	NA	p<0.001



Identification data								
Item 19	Date of issue or revision	Yes No	491 132	79 21	89.5	75	2.81 (1.60-4.90)	p<0.001
Item 20	Logo of the issuing body	Yes No	513 110	82 18	88	81	1.69 (0.99-2.88)	p=0.031
Item 21	Name of persons or entities that produced the document	Yes No	577 46	93 7	94	92	1.37 (0.64-2.90)	p=0.267
Item 22	Name of persons or entities that financed the document	Yes No	31 592	5 95	11	3	4.09 (1.97-8.55)	p=0.001
Item 23	Short bibliography of evidence-based data used in the document	Yes No	23 600	4 96	6	3	2.04 (0.86-48.00)	p=0.084
Item 24	Statement about whether and how patients were involved/consulted in the document's production	Yes No	68 555	11 89	23.5	7	4.22 (2.51-7.09)	p<0.001
<b>Structure data</b>								
Item 25	Use of everyday language, explains complex words or jargon	Yes No	618 5	99 1	100	0	NA	p=0.243
Item 26	Use of generic names for all medications or products (if no medication described, "not applicable")	Yes No NA	124 40 459	20 6 74	82	65	2.47 (1.20-5.13)	p=0.011
Item 27	Use of short sentences (<15 words on average)	Yes No	279 344	45 55	90	30	21.28 (12.19-38.46)	p<0.001
Item 28	The document personally addresses the reader	Yes No	230 393	37 63	84	22	18.52 (11.36-30.30)	p<0.001
Item 29	Respectful tone	Yes No	614 9	98 2	100	98	NA	p=0.103
Item 30	Information is clear (no ambiguities or contradictions)	Yes No	590 33	95 5	99	93	11.11 (1.50-83.33)	p<0.001
Item 31	Information is balanced between risks and benefits	Yes No	119 504	19 81	46	10	7.63 (4.93-11.76)	p<0.001
Item 32	Information is presented in a logical order	Yes No	501 122	80 20	97	75	9.8 (3.92-24.39)	p<0.001
Item 33	The design and layout are satisfactory (excluding figures or graphs, see below)	Yes No	501 122	80 20	93	76	3.98 (2.08-7.63)	p<0.001
Item 34	Figures or graphs are clear and relevant (if absent: "not applicable")	Yes No NA	104 31 488	17 5 78	93	66	6.49 (2.12-20.00)	p<0.001
Item 35	The document has a named space for the reader's notes	Yes No	5 618	1 99	80	20	12.66 (1.40-111.11)	p=0.014
Item 36	The document includes a consent form, contrary to recommendations (if not from Hospitals, not applicable)	Yes No NA	2 32 589	1 6 93	7	5	1.46 (0.08-25.64)	p=0.661

**Table 3:**

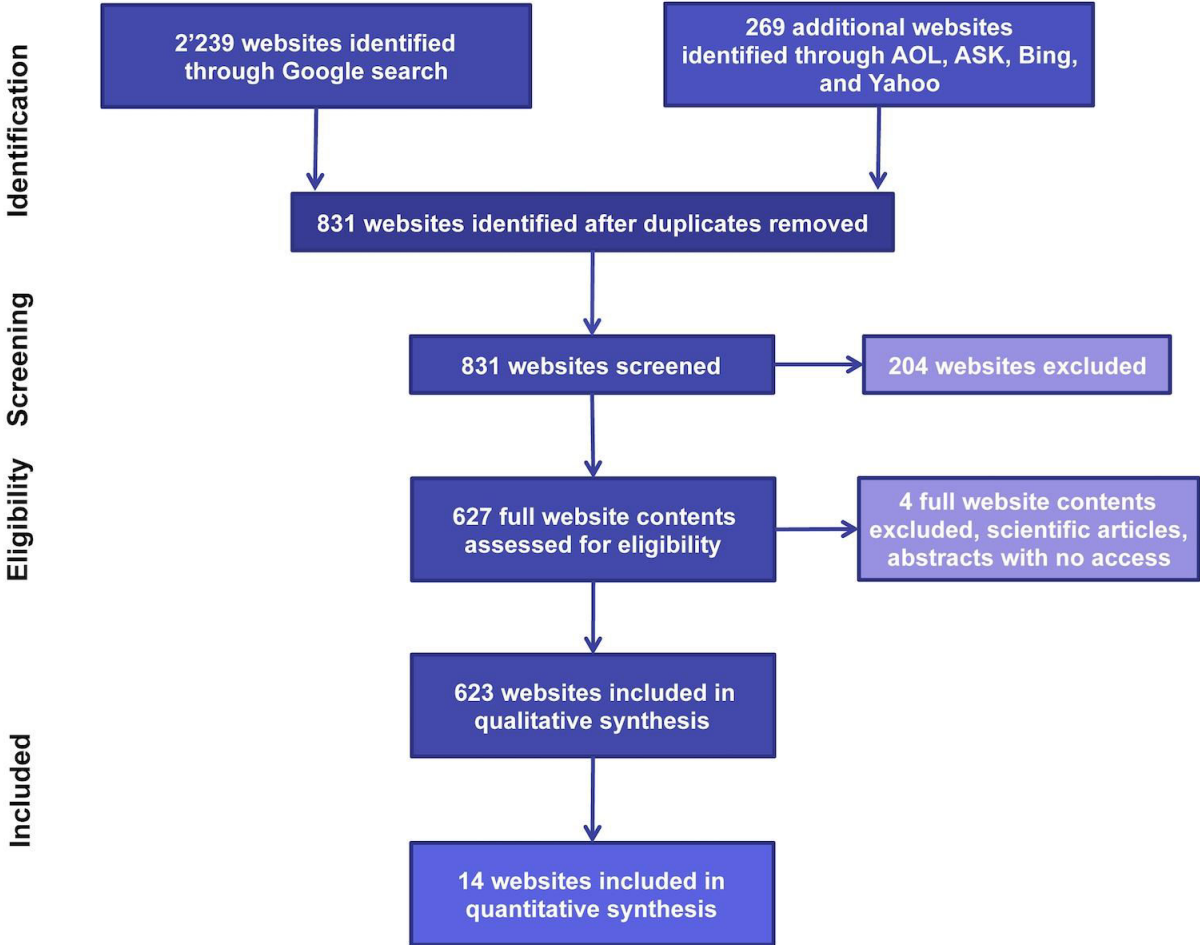
Rating and scores of the top 95<sup>th</sup> percentile websites. The right part of the table shows the position of each top-rated website in the Google search results while searching two example keywords.

Website Name	Type	Country	EQIP Score (0-36)	Google.com position			
				using keyword <i>breast augmentation</i>		using keyword <i>breast enlargement</i>	
				Position of search result	Page results position (10 results per page)	Position of search result	Page results position (10 results per page)
<b>Cosmetic Surgery, University of California, Los Angeles</b> <a href="http://cosmeticsurgery.ucla.edu">http://cosmeticsurgery.ucla.edu</a>	Academic	USA	32	>100 <sup>th</sup>	>10 <sup>th</sup>	>100 <sup>th</sup>	>10 <sup>th</sup>
<b>Plastic Surgery, University of California, Los Angeles</b> <a href="http://plasticsurgery.ucla.edu">http://plasticsurgery.ucla.edu</a>	Academic	USA	31	>100 <sup>th</sup>	>10 <sup>th</sup>	>100 <sup>th</sup>	>10 <sup>th</sup>
<b>Absolute Cosmetic Medicine</b> <a href="http://www.absolutemakeover.com.au">http://www.absolutemakeover.com.au</a>	Hospital	AUS	31	>100 <sup>th</sup>	>10 <sup>th</sup>	>100 <sup>th</sup>	>10 <sup>th</sup>
<b>Wikipedia</b> <a href="http://en.wikipedia.org/wiki/Breast_implant">http://en.wikipedia.org/wiki/Breast_implant</a>	Encyclopedia	USA	30	<b>1<sup>st</sup></b>	<b>1<sup>st</sup></b>	<b>1<sup>st</sup></b>	<b>1<sup>st</sup></b>
<b>Cruise Plastic Surgery of Orange County</b> <a href="http://orangecountycosmeticsurgery.com">http://orangecountycosmeticsurgery.com</a>	Physician	USA	30	<b>90<sup>th</sup></b>	<b>9<sup>th</sup></b>	>100 <sup>th</sup>	>10 <sup>th</sup>
<b>Beverly Hills Plastic Surgery</b> <a href="http://www.beverlyhillspasticsurgery.com">http://www.beverlyhillspasticsurgery.com</a>	Physician	USA	30	<b>101<sup>st</sup></b>	<b>10<sup>th</sup></b>	>100 <sup>th</sup>	>10 <sup>th</sup>
<b>Sanctuary Medical Center</b> <a href="http://www.breastimplantrevisions.com">http://www.breastimplantrevisions.com</a>	Physician	USA	30	<b>84<sup>th</sup></b>	<b>9<sup>th</sup></b>	>100 <sup>th</sup>	>10 <sup>th</sup>
<b>Image Consultants Plastic Surgery</b> <a href="http://plasticsurgeryelpaso.net">http://plasticsurgeryelpaso.net</a>	Physician	USA	29	>100 <sup>th</sup>	>10 <sup>th</sup>	>100 <sup>th</sup>	>10 <sup>th</sup>
<b>Better Health Channel</b> <a href="http://www.betterhealth.vic.gov.au">http://www.betterhealth.vic.gov.au</a>	Portal/ Others	AUS	29	>100 <sup>th</sup>	>10 <sup>th</sup>	>100 <sup>th</sup>	>10 <sup>th</sup>
<b>Breast Augmentation Utah</b> <a href="http://www.breastaugmentationutahcost.com">http://www.breastaugmentationutahcost.com</a>	Physician	USA	29	>100 <sup>th</sup>	>10 <sup>th</sup>	>100 <sup>th</sup>	>10 <sup>th</sup>
<b>Breast Implants 4 You</b> <a href="http://www.breastimplants4you.com">http://www.breastimplants4you.com</a>	Hospital	USA	29	<b>64<sup>th</sup></b>	<b>7<sup>th</sup></b>	<b>65<sup>th</sup></b>	<b>7<sup>th</sup></b>
<b>The Breast Implant Center</b> <a href="http://www.breastimplantscentral.com">http://www.breastimplantscentral.com</a>	Hospital	USA	29	>100 <sup>th</sup>	>10 <sup>th</sup>	>100 <sup>th</sup>	>10 <sup>th</sup>
<b>Oasis Plastic Surgery</b> <a href="http://oasisplastics.reachlocal.net">http://oasisplastics.reachlocal.net</a>	Physician	USA	28	>100 <sup>th</sup>	>10 <sup>th</sup>	>100 <sup>th</sup>	>10 <sup>th</sup>
<b>Center for Breast &amp; Body Contouring</b> <a href="http://rubisplasticsurgery.com">http://rubisplasticsurgery.com</a>	Physician	USA	28	>100 <sup>th</sup>	>10 <sup>th</sup>	>100 <sup>th</sup>	>10 <sup>th</sup>
<b>Broadway Center for Plastic Surgery</b> <a href="http://www.denverbreast.com">http://www.denverbreast.com</a>	Physician	USA	28	>100 <sup>th</sup>	>10 <sup>th</sup>	>100 <sup>th</sup>	>10 <sup>th</sup>
<b>Bitar Cosmetic Surgery Institute</b> <a href="http://www.bitarinstitute.com">http://www.bitarinstitute.com</a>	Physician	USA	27	>100 <sup>th</sup>	>10 <sup>th</sup>	>100 <sup>th</sup>	>10 <sup>th</sup>

**Figures:**

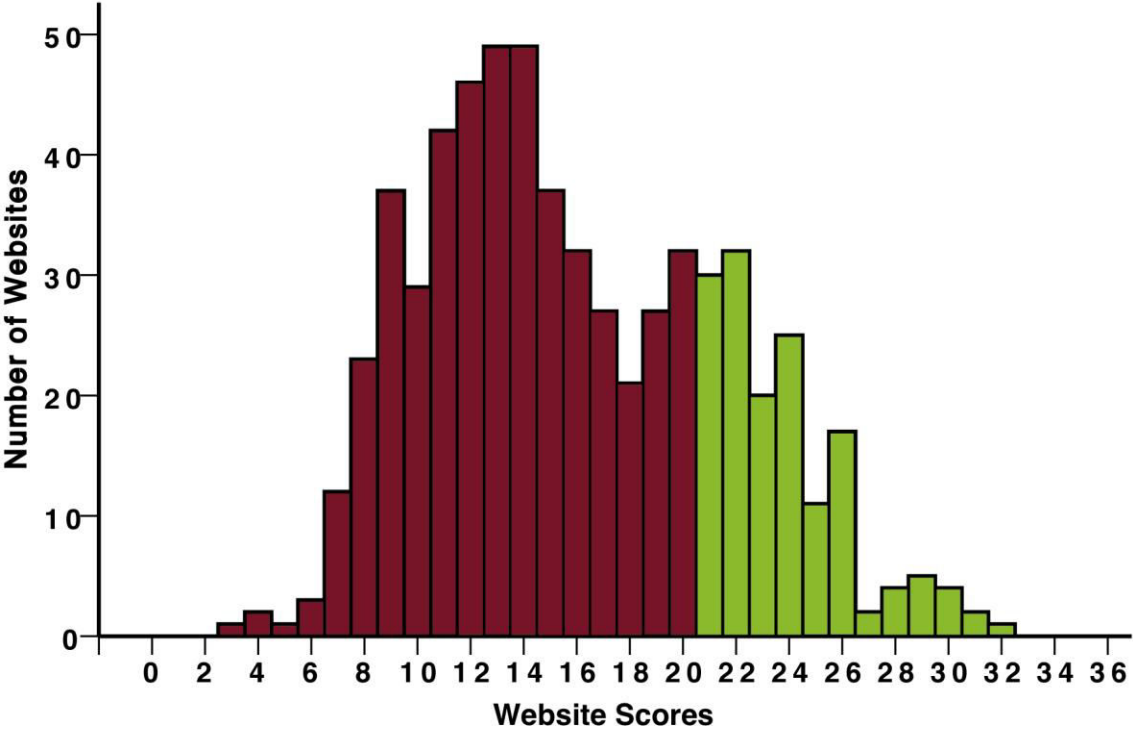
**Figure 1:**

Flow of information through the phases of our systematic review on breast augmentation information in the Internet. Adapted from the PRISMA group and according to previous studies.<sup>43,44</sup>



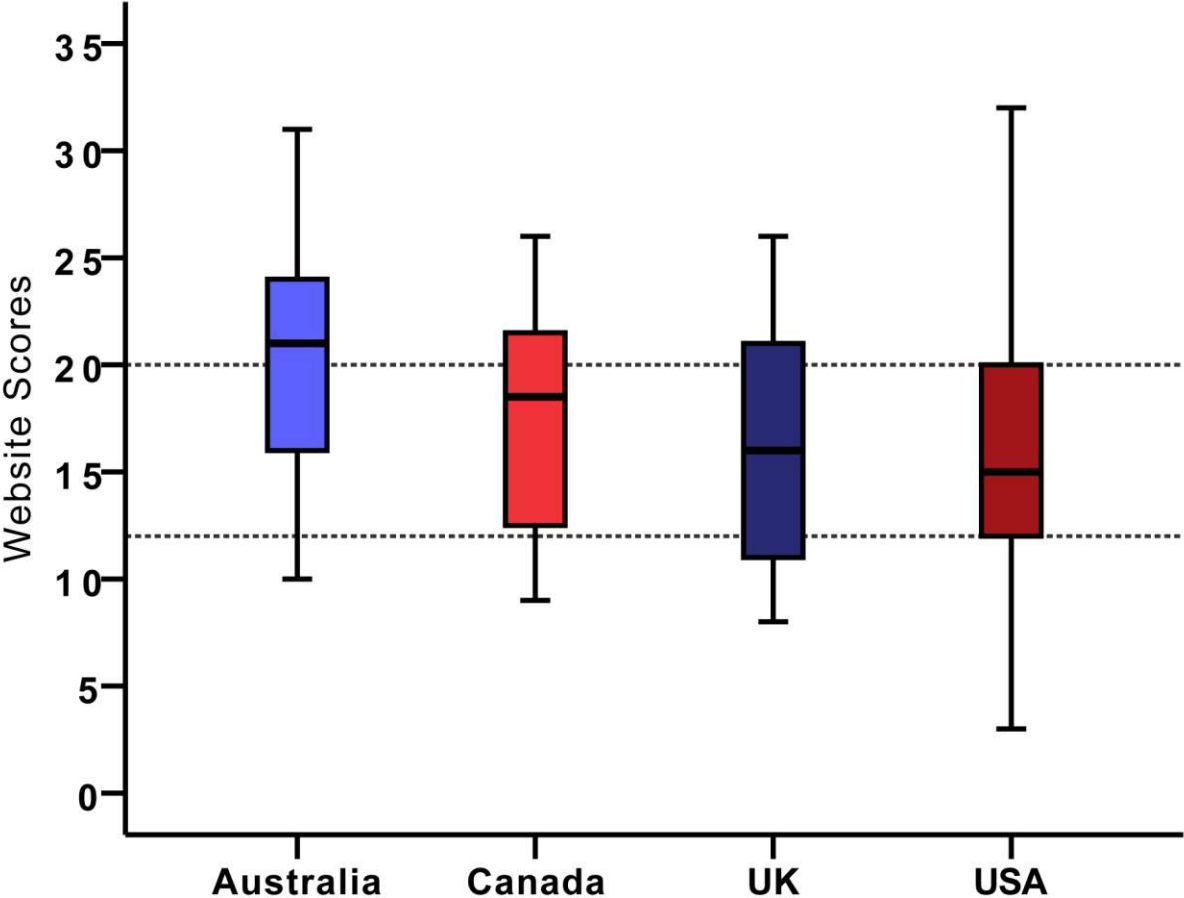
**Figure 2:**

Number of websites according to the scoring system reported using the EQIP instrument. The scores were calculated according to the total number of EQIP items<sup>10</sup> being included in the websites. Each item was given one point. Dark red columns represent low score and green columns represent high score websites. The cut-off point used was the 75<sup>th</sup> percentile of the overall EQIP score.



**Figure 3:**

Countries providing >10 websites within the high score (75<sup>th</sup> percentile) cluster.



**Figure 4:**

Year of publication and evolution of quality (score from the EQIP instrument)<sup>10</sup> of the assessed websites.

