MDDT SUMMARY OF EVIDENCE AND BASIS OF QUALIFICATION DECISION FOR
Assessment of IntraOcular Lens Implant Symptoms (AIOLIS) V. 1.0.

BACKGROUND

MDDT NAME: Assessment of IntraOcular Lens Implant Symptoms (AIOLIS)

SUBMISSION NUMBER: U230223/S001

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CONTACT: AMERICAN ACADEMY OF OPHTHALMOLOGY, FLORA LUM, M.D., VICE PRESIDENT, QUALITY AND DATA SCIENCE (FLUM@AAO.ORG; 415/516-8592)

TOOL DESCRIPTION AND PRINCIPLE OF OPERATION

The AIOLIS consists of 37 items developed to assess symptoms, perceptions of general vision, and frequency of wearing glasses or contact lenses. The instrument includes 15 questions each about the frequency and bother of the ocular symptoms (i.e., 30 questions), 5 general vision questions (including satisfaction with vision), a question about how well one can see things up close, and a question about frequency of wearing glasses or contact lenses.

The symptom items assess the frequency and bothersomeness in the last 7 days of 15 key visual symptoms: snowballs; halos; starbursts or streaks; glare during the day; glare during the night; light flashes or streaks with eyes open; light flashes with eyes closed; rings and spider webs; hazy vision; blurry vision; distortion in vision; double or multiple images; dark, crescent-shaped shadow or dark line; floaters; and flickering or shimmering images. Each of these items except for flickering or shimmering images are administered using a written definition and photographic image of the symptom to minimize confusion related to visual symptom terminology. All of the symptom items are administered using polytomous response options.

Frequency and bother for each of the 15 symptoms are scored. Frequency items are scored 0 = Never, 1 = Sometimes, 3 = Usually, and 4 = Always. Bother items are scored 0 = Not at all, 1 = A little, 2 = Somewhat, 3 = Quite a bit, and 4 = Extremely. The near vision item is scored 0 = Poor, 1 = Fair, 3 = Good, 4= Very good, and 5 = Excellent. The frequency of wearing glasses or contact lenses item is scored 0 = I didn't wear glasses or contact lenses at all in the last 7 days, 1 = A little of the time, 2 = Some of the time, 3 = Most of the time, and 4 = All of the time. Responses to the items in the general vision scale are transformed linearly to a 0-100 possible range with a higher score representing better general vision. The 5-items in the general vision scale are averaged together to create a simple summated score.

QUALIFIED CONTEXT OF USE

The paper and web versions of the AIOLIS can be used as a secondary or additional safety endpoint to assess the frequency and bother of ocular symptoms in clinical studies of patients who meet the following conditions: age 22 and older, speak and read English fluently, who are bilaterally implanted with the same intraocular lens in each eye, and who were targeted for bilateral emmetropia after cataract surgery. The AIOLIS assesses relevant symptoms common to different IOLs but is not intended to measure every possible patient-reported outcome associated with each IOL. Users who require additional information about a specific IOL (e.g., sustainability of focus while reading) should supplement the AIOLIS with additional questions. The AIOLIS should be administered post-implantation and is not intended to support labeling claims.

SUMMARY OF EVIDENCE TO SUPPORT QUALIFICATION

The AIOLIS instrument was developed following a targeted workshop[1], FDA's guidance documents, and building upon a significant body of published research on visual symptoms associated with IOL implantation. Thirteen focus groups were conducted with 93 patients (87 in English and 6 in Spanish). The focus groups were led by experienced survey researchers using a semi-structured guide. Items were drafted based on information from both the literature and the focus groups. A total of 19 cognitive interviews (14 in English and 5 in Spanish) with draft items were conducted to clarify response options before the field test. In the field test, the AIOLIS was administered via the web to adults scheduled for binocular implantation of the same IOL. The survey was completed pre-operatively (n = 716) and postoperatively (n = 554). The field test showed that 86%-88% of the respondents had only 1 missing answer out of 27 questions asked on both preoperative and postoperative surveys.[2] The results indicate that each symptom should be reported separately with item-level frequencies and descriptive statistics.

The evidence to support the AIOLIS measures is summarized as follows:

Reliability

Based on data from the field test, the 5-item general ratings of vision scale had an internal consistency reliability of 0.79. Internal consistency reliability of the 15 symptoms was 0.74, and item-total correlations ranged from 0.24 (blurry vision) to 0.47 (halos). The median correlation among each of the 15 symptoms (0 = do not have the symptom, 1 = have the symptom) was only 0.19 at baseline and 0.17 post-operative, indicating that the items yield substantially unique information. These correlations provide support for examining each symptom separately.

Validity Evidence Based on Content

A significant body of research and publications provided the initial basis for the content of the AIOLIS[4-10]. The focus groups provided qualitative information that was used to help develop survey items assessing patient experiences with vision symptoms or problems before and after cataract surgery and intraocular lens implant, perception of vision, and frequency of wearing glasses or contacts. As part of the focus groups, participants reviewed a draft questionnaire. They identified items critical they found unclear or confusing, and provided feedback on whether the survey asks about the most important

aspects of their vision, how it affects their life, and whether they felt the survey was missing important content. The combination of published research and the newly conducted focus groups provided sufficient evidence to support the content of the AIOLIS.

Validity Evidence Based on the Construct

Responsiveness to change associated with IOL surgery was observed in the field test.[2,3] Visual acuity improved post-operatively, partially due to the cataract removal. In addition, the percentage of all symptoms decreased significantly ($p < .0001$) from before to after surgery, except for dark crescent-shaped shadows, which were uncommon preoperatively and postoperatively (4% at both time points). The prevalence of the most common pre-operative symptoms was as follows: glare (pre-operative/post-operative 84%/36%), blurry vision (68%/22%), starbursts (66%/28%), hazy vision (63%/18%), snowballs (55%/17%) and halos (52%/22%). The greatest level of symptom bother (reporting either *quite a bit* or *extremely* bothered) comparing preoperative to post-operative was reported for blurry vision (pre-op 54%/postoperatively 15%), snowballs (52%/14%), glare (49%/15%), and halos (46%/14%). The level of bother of all symptoms declined from before to after surgery except for dark crescent-shaped shadows (10%/12%).

Change in the frequency of 15 symptoms was significantly associated with the retrospective rating of change asked postoperatively (Compared to before you had cataract surgery, how are your visual symptoms now?): $F(4, 497) = 9.15$, $p < 0.0001$. The change in symptoms was monotonically related to the retrospective change item, with a mean increase of 0.39 SD in symptoms for those reporting being much worse and a decrease of 1.06 SD for those reporting being much better.

DISCUSSION OF THE EVIDENCE STRENGTH TO SUPPORT QUALIFICATION

Three primary sources of evidence were used to support the qualification of the AIOLIS. Existing research and publications provided an initial basis for identifying content and assessment approaches. Focus groups confirmed and expanded the content identified in the literature. The field test evidence was from a large sample of patients who have received intraocular lens implants. The current evidence demonstrates adequate reliability of the scores to describe the experience of patients undergoing intraocular lens implant surgery. The change of scores across time, and relationships with other outcomes support the validity of the scores within the approved context of use.

ASSESSMENT OF ADVANTAGES/DISADVANTAGES OF QUALIFICATION

Assessments of Advantages of Using the MDDT

The primary advantage of the MDDT is that it provides a reliable and valid quantification of the frequency and bothersomeness of 15 symptoms and perceptions of vision associated with intraocular lens implants. As documented in the public workshop,[1] visual symptoms and perceptions of vision are essential to patients receiving intraocular lens implants. The AIOLIS can help quantify and provide patients and clinicians with information regarding visual symptoms. The use of the AIOLIS can

help inform future patients about the possible subjective assessment of the results of the procedure.

Assessments of the Disadvantages of Using the MDDT

The following disadvantages of using the MDDT were identified: 1) Inability to measure all important concepts related to the possible outcomes of intraocular lens implants and 2) insufficient evidence to determine a clinically meaningful difference or score estimate. The AIOLIS assesses relevant symptoms and visual perceptions common to different IOLs but is not intended to measure every possible patient-reported outcome associated with each IOL. Users who require detailed information about a specific IOL (e.g., sustainability of focus while reading) should supplement the AIOLIS with additional questions. While the AIOLIS includes a question on the frequency of wearing glasses or contact lenses and a general vision scale, these questions are not part of the qualified MDDT. The inability to measure all possible outcomes can be mitigated using other measures targeted at specific types of intraocular lenses, additional safety endpoints, and other existing assessments of other relevant patient-reported outcomes. The lack of evidence to aid in the interpretation of scores can currently be mitigated by presenting the AIOLIS scores using descriptive statistics.

CONCLUSIONS

The content's importance to patients and clinicians, and prior existing evidence[4-10], qualitative work and the results of the AIOLIS field test[2,3] provide sufficient evidence to support the validity and reliability of the AIOLIS in the qualified context of use.

CONTACT INFORMATION FOR ACCESS TO TOOL

For access to the AIOLIS, please contact:

Flora Lum, M.D.

Vice President, Quality and Data Science, American Academy of Ophthalmology, 655 Beach Street

San Francisco, CA 94109

flum@aao.org

415 561-8592

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