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Manuscript to Report:

Use of Standardization of Uveitis Nomenclature (SUN) for Reporting Clinical Data at 10 Years

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1 Uveitis is a heterogeneous group of infectious and non-infectious intraocular
2 inflammatory diseases. Management of both subsets of uveitis is frequently challenging.¹
3 Since 2000, advances in microbial diagnostics and introduction of biologic drugs,
4 combined with the potential for electronic communication to facilitate research on
5 diseases with low incidence, have provided uveitis specialists with unprecedented
6 opportunities for clinical trials to establish evidence-based management algorithms.
7 Hampering this effort, however, was lack of a common system for describing uveitis,
8 including diagnosis, severity and outcome.²

9

10 The Standardization of Uveitis Nomenclature (SUN) Project is an effort to develop
11 “international consensus for the use of terms to report on uveitis at academic meetings
12 and in the literature.”³ The first phase of the project brought together an international
13 group of 45 uveitis specialists – the SUN Working Group – and used nominal group
14 techniques to reach consensus on nomenclature for presenting clinical data, including
15 uveitis terminology, grading of inflammation, and reporting of outcomes and results.
16 The product of this collaboration – SUN for Reporting Clinical Data – was published in
17 2005.⁴ The report has over 1500 citations, and in an editorial published in 2013, SUN
18 Working Group leaders observed, “investigators appear to be adopting these
19 guidelines”.³ However, use of SUN for Reporting Clinical Data in human uveitis studies
20 has not been formally evaluated.

21

22 We reviewed the peer-reviewed literature in clinical uveitis over the 12-month period
23 that concluded 10 years since publication of SUN for Reporting Clinical Data. We chose
24 this interval to allow sufficient time for application of the recommendations in major
25 investigator-initiated clinical trials. To identify articles reporting human uveitis studies

26 published between October 1, 2014 and September 30, 2015, the National Library of
27 Medicine of National Institutes of Health PubMed database
28 (www.ncbi.nlm.nih.gov/pubmed) was searched on three dates (September 2, 2015;
29 October 31, 2015; February 28, 2016) using the terms, “uveitis 2014[ppdat]” and
30 “uveitis 2015[ppdat]”, with “English” selected under the “Languages” filter. Exclusions
31 included: articles reporting studies in non-human subject experimental systems; meta-
32 analyses; reviews; case reports; editorials; correspondence without new clinical data;
33 articles describing uveitis incidentally and not reporting uveitis patient-related data;
34 and articles describing multiple ophthalmic conditions, in which uveitis cases were a
35 minority.

36
37 Articles were reviewed in a standardized manner with pre-defined data collection
38 sheets to determine compliance with nine SUN-defined items for reporting clinical data:
39 terminology (anatomic classification and descriptors of uveitis); grading inflammation
40 (grading of anterior chamber cells, anterior chamber flare and vitreous haze); and
41 outcomes and results reporting (activity of uveitis terminology, and reporting of
42 corticosteroid-sparing, follow-up and visual acuity outcome).⁴ Use of a SUN-defined item
43 was judged as: compliant if an article reported use of the item as described in the
44 recommendations; non-compliant if an article reported use of the item incorrectly or
45 used a non-SUN reporting system; and partially compliant if an article described a study
46 that used some aspects of the item correctly and other aspects incorrectly, or if SUN and
47 non-SUN reporting systems were combined to describe the item.

48
49 Fourteen publication characteristics were collected: journal impact factor; numbers of
50 authors, author institutions and author countries; senior author clinical specialty,

51 institution type and country; type of study; type of uveitis; sample size; and for clinical
52 studies, course, level of evidence and primary outcome. Citation of SUN for Reporting
53 Clinical Data⁴ was also recorded. Highly skewed explanatory variables that were initially
54 collected as continuous variables were divided into appropriate categories. For SUN-
55 defined items applicable to at least 100 articles, Chi square or Fisher's exact tests were
56 used to assess associations between compliance with SUN for Reporting Clinical Data
57 and 13 categorical publication characteristics, and two-sample t-test was used to assess
58 associations between compliance and journal impact factor; in these analyses, partially
59 compliant was considered non-compliant.

60

61 From a total of 1665, 206 articles qualified for review, including translational (17%),
62 and prospective (19%) and retrospective (64%) clinical studies, published in diverse
63 journals, by groups of authors practicing within and outside ophthalmology, and in US
64 and non-US institutions. Publication characteristics are presented in Table S1 (available
65 at www.aaojournal.org). Compliance with SUN-recommended reporting in applicable
66 studies varied according to item (Table 1): anatomic classification of uveitis (53% of
67 205); descriptors of uveitis (29% of 185); grading schemes for anterior chamber cell
68 (65% of 62), anterior chamber flare (42% of 19) and vitreous haze (50% of 40); activity
69 of uveitis terminology (32% of 50); and reporting of corticosteroid sparing (63% of 19),
70 follow-up (50% of 105) and visual acuity outcome (18% of 107).

71

72 Associations between publication characteristics and compliant use of SUN-defined
73 items were tested for: anatomic classification; descriptors of uveitis; reporting of follow-
74 up; and reporting of visual acuity outcome. Results of these analyses are presented in
75 Table S2 (available at www.aaojournal.org). Publication characteristics significantly

76 associated with correct use of one or more items of the nomenclature included: higher
77 journal impact factor; uveitis-specialized ophthalmologist as senior author; multiple
78 countries involved in the research; heterogeneous or mixed diagnostic type of uveitis;
79 larger sample size; prospective course of study; epidemiological or experimental design
80 of study; and medical or surgical interventional outcome.

81

82 The SUN Working Group has advocated for the application of SUN for Reporting Clinical
83 Data in all uveitis studies initiated after their report.⁴ With the caveat that inclusion of
84 English language papers may skew towards use, we find that 10 years following
85 publication, the recommendations are being widely incorporated into human uveitis
86 research. All recommendations are being followed, although there is variation in the
87 implementation of different items, and no item is correctly applied in more than two-
88 thirds of studies. These observations may indicate lack of awareness, or the validation of
89 alternative methods, such as optical coherence tomography for inflammation grading.⁵
90 However, for some items, in over 50% of articles that cite SUN for Reporting Clinical
91 Data, authors do not apply the nomenclature correctly, suggesting lack of understanding
92 and need for education. Universal use of one clinical nomenclature for uveitis remains
93 an important goal for all practitioners who manage this complex group of diseases, and
94 opportunities should be identified to instruct investigators on use of SUN for Reporting
95 Clinical Data.

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101 **References**

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