Classification Criteria for Vogt-Koyanagi-Harada Disease

THE STANDARDIZATION OF UVEITIS NOMENCLATURE (SUN) WORKING GROUP[1,2,3,*]

• PURPOSE: To determine classification criteria for Vogt-Koyanagi-Harada (VKH) disease.
• DESIGN: Machine learning of cases with VKH disease and 5 other panuveitides.
• METHODS: Cases of panuveitides were collected in an informatics-designed preliminary database, and a final database was constructed of cases achieving supermajority agreement on the diagnosis, using formal consensus techniques. Cases were split into a training set and a validation set. Machine learning using multinomial logistic regression was used on the training set to determine a parsimonious set of criteria that minimized the misclassification rate among the panuveitides. The resulting criteria were evaluated on the validation set.
• RESULTS: One thousand twelve cases of panuveitides, including 156 cases of early-stage VKH and 103 cases of late-stage VKH, were evaluated. Overall accuracy for panuveitides was 96.3% in the training set and 94.0% in the validation set (95% confidence interval 89.0, 96.8). Key criteria for early-stage VKH included the following: (1) exudative retinal detachment with characteristic appearance on fluorescein angiogram or optical coherence tomography or (2) panuveitis with ≥2 of 5 neurologic symptoms/signs. Key criteria for late-stage VKH included history of early-stage VKH and either (1) sunset glow fundus or (2) uveitis and ≥1 of 3 cutaneous signs. The misclassification rates in the learning and validation sets for early-stage VKH were 8.0% and 7.7%, respectively, and for late-stage VKH 1.0% and 12%, respectively.
• CONCLUSIONS: The criteria for VKH had a reasonably low misclassification rate and seemed to perform sufficiently well for use in clinical and translational research. (Am J Ophthalmol 2021;000: 205–211. © 2021 Elsevier Inc. All rights reserved.)

AJO.com Supplemental Material available at AJO.com.

Using a formalized approach to developing classification criteria, including informatics-based case collection, consensus technique–based case selection, and machine learning, classification criteria for Vogt-Koyanagi Harada (VKH) disease were developed. Key criteria for early-stage VKH included characteristic exudative detachments or panuveitis with ≥2 of 5 neurologic features; for late-stage VKH criteria included sunset glow fundus or uveitis with ≥1 of 3 cutaneous features. The resulting criteria had a low misclassification rate.

Accepted for publication March 31, 2021.

[1] Members of the SUN Working Group are listed online at ajo.com.

[2] **Writing Committee:** Douglas A. Jabs[1,2], Alastair K. Denniston[3], Andrew D. Dick[4,5,6], James P. Dunn[7], Michal Kramer[8], Peter McCluskey[9], Neal Oden[10], Annabelle A. Okada[11], Alan G. Palestine[12], Russell W. Read[13], Jennifer E. Thorne[1,2], and Brett E. Trusko[14].

[3] **Affiliations:** From the [1]Department of Epidemiology, Johns Hopkins University Bloomberg School of Public Health, Baltimore, Maryland, USA; the [2]Wilmer Eye Institute, Department of Ophthalmology, Johns Hopkins University School of Medicine, Baltimore, Maryland, USA; the [3]Academic Unit of Ophthalmology, University of Birmingham, Birmingham, United Kingdom; the [4]Academic Unit of Ophthalmology, Bristol Medical School, University of Bristol, Bristol, United Kingdom; the [5]National Institute for Health Research Biomedical Research Centre at Moorfields Eye Hospital, London, United Kingdom; the [6]University College London Institute of Ophthalmology, London, United Kingdom; the [7]Retina Division, Wills Eye Hospital, Department of Ophthalmology, Thomas Jefferson University School of Medicine, Philadelphia, Pennsylvania, USA; the [8]Department of Ophthalmology, Rabin Medical Center, Sackler School of Medicine, Tel Aviv University, Tel Aviv, Israel; the [9]Save Sight Institute, Department of Ophthalmology, University of Sydney School of Medicine, Sydney, New South Wales, Australia; the [10]The Emmes Company, LLC, Rockville, Maryland, USA; the [11]Department of Ophthalmology, Kyorin University School of Medicine, Tokyo, Japan; the [12]Department of Ophthalmology, University of Colorado School of Medicine, Aurora, Colorado, USA; the [13]Department of Ophthalmology and Visual Sciences, University of Alabama at Birmingham, Birmingham, Alabama, USA; and the [14]Department of Medicine, Texas A & M University, College Station, Texas, USA.

* **Corresponding author:** Douglas A. Jabs, Department of Epidemiology, Johns Hopkins University Bloomberg School of Public Health, 615 North Wolfe St, Baltimore, MD 21205, USA.

In 1906 Vogt[1] and independently in 1929 Koyanagi[2] described a disorder characterized by chronic anterior uveitis, alopecia, vitiligo, and dysacusis. In 1929 Harada described a disorder characterized by bilateral serous retinal detachments, chronic posterior uveitis, and cerebrospinal fluid pleocytosis.[3] Subsequently it was recognized that these anterior and posterior segment inflammatory conditions were manifestations of the same disease process, and the disease was named Vogt-Koyanagi-Harada (VKH) disease.

VKH disease is a well-delineated disorder that classically follows an evolutionary disease progression. The disease starts with a prodromal phase characterized by a "flu-like" illness, headache, and meningismus, followed by bilateral choroiditis with serous retinal detachments (early-stage disease, previously termed "acute"). Typically these detachments are multiple with multiple, early pinpoint leaks and late dye pooling on fluorescein angiogram; occasionally they may evolve into bullous detachments. Although the detachments can subside spontaneously, untreated disease typically evolves into a chronic anterior uveitis or panuveitis. The early stage often, though not always,

0002-9394/$36.00
https://doi.org/10.1016/j.ajo.2021.03.036

is accompanied by neurologic symptoms of tinnitus and dysacusis; lumbar puncture, if performed, demonstrates cerebrospinal fluid pleocytosis. Several months after disease onset, late-stage disease (previously termed "chronic") occurs with a "sunset glow" fundus, often with peripapillary atrophy, foveal granular pigment deposition, and peripheral, depigmented, atrophic chorioretinal spots, typically in the inferior periphery. Active late-stage disease has a chronic anterior uveitis or a panuveitis with choroidal inflammatory lesions, similar to those seen in sympathetic ophthalmia and sometimes termed "Dalen Fuchs–like nodules." Late-stage disease also may be accompanied by cutaneous lesions, including alopecia, poliosis, and vitiligo. Ocular complications of late-stage disease include choroidal neovascularization and subretinal fibrosis.[4-7]

VKH disease occurs most often in individuals of East Asian or South Asian heritage but also is common in the Middle East.[4,8] In Japan, VKH is the most common uveitic disease seen in tertiary care ophthalmology referral clinics.[8] In the United States, it is seen most often among persons of Hispanic or Native American heritage.[4] The HLA-DR4 genotype is a risk factor, in particular HLA-DRB1*0405.[9]

Treatment of early-stage VKH typically consists of high-dose oral or pulse intravenous corticosteroids.[7,10-13] Early corticosteroid treatment (within 2 weeks of onset of symptoms) is associated with a marked reduction in progression to late-stage disease,[11] but corticosteroid treatment over 6 months in duration is required.[12] Late-stage disease seems to do better with immunosuppression than with corticosteroids alone,[14] and early-stage disease with a delay in treatment initiation may do better with immunosuppression as well.[15]

The Standardization of Uveitis Nomenclature (SUN) Working Group is an international collaboration that has developed classification criteria for 25 of the most common uveitic diseases using a formal approach to development and classification.[16-21] Among the diseases studied was VKH disease.

METHODS

The SUN Developing Classification Criteria for the Uveitides project proceeded in 4 phases as previously described: (1) informatics, (2) case collection, (3) case selection, and (4) machine learning.[18-21]

• **INFORMATICS:** As previously described, the consensus-based informatics phase permitted the development of a standardized vocabulary and the development of a standardized, menu-driven hierarchical case collection instrument.[18]

• **CASE COLLECTION AND CASE SELECTION:** De-identified information was entered into the SUN preliminary database by the 76 contributing investigators for each disease, as previously described.[18-21] Cases in the preliminary database were reviewed by committees of 9 investigators for selection into the final database, using formal consensus techniques described in the accompanying article.[20,21] Because the goal was to develop classification criteria,[22] only cases with a supermajority agreement (>75%) that the case was the disease in question were retained in the final database (ie, were "selected").[21]

• **MACHINE LEARNING:** The final database then was randomly separated into a training set (~85% of cases) and a validation set (~15% of cases) for each disease, as described in the accompanying article.[21] Machine learning was used on the training set to determine criteria that minimized misclassification. The criteria then were tested on the validation set; for both the training set and the validation set, the misclassification rate was calculated for each disease. The misclassification rate was the proportion of cases classified incorrectly by the machine learning algorithm when compared to the consensus diagnosis. For VKH disease, the diseases against which it was evaluated were Behçet disease uveitis, sympathetic ophthalmia, sarcoidosis-associated panuveitis, syphilitic panuveitis, and tubercular panuveitis. Early-stage and late-stage VKH were evaluated separately, as they have different clinical features.

The study adhered to the principles of the Declaration of Helsinki. Institutional review boards at each participating center reviewed and approved the study; the study typically was considered either minimal risk or exempt by the individual institutional review boards.

RESULTS

Two hundred twenty-four cases of early-stage VKH and 177 cases of late-stage VKH were collected, and 156 (70%) cases of early-stage VKH and 103 (58%) cases of late-stage VKH achieved supermajority agreement on the diagnosis during the "selection" phase and were used in the machine learning phase. These cases of VKH were compared to cases of other uveitides, including 194 cases of Behçet disease, 110 cases of sympathetic ophthalmia, 102 cases of sarcoidosis-associated panuveitis, 70 cases of syphilitic panuveitis, and 277 cases of tubercular panuveitis. The details of the machine learning results for these diseases are outlined in the accompanying article.[21] The characteristics of cases with early-stage VKH are listed in Table 1 and with late-stage VKH in Table 2. The criteria developed

TABLE 1. Characteristics of Cases of Early-Stage Vogt-Koyanagi-Harada Disease.

Characteristic	Result
Number of cases	156
Demographics	
Age, median, years (25th, 75th percentile)	39 (28, 51)
Sex (%)	
Male	26
Female	74
Race/ethnicity (%)	
White, non-Hispanic	12
Black, non-Hispanic	7
Hispanic	12
Asian, Pacific Islander	41
Other	27
Missing	1
Uveitis history	
Uveitis course (%)	
Acute, monophasic	54
Acute, recurrent	2
Chronic	35
Indeterminate	9
Laterality (%)	
Unilateral	1
Unilateral, alternating	0
Bilateral	99
Ophthalmic examination	
Keratic precipitates (%)	
None	66
Fine	22
Round	1
Stellate	0
Mutton fat	10
Other	1
Anterior chamber cells, grade (%)	
0	18
½+	13
1+	29
2+	24
3+	12
4+	4
Hypopyon (%)	0
Anterior chamber flare, grade (%)	
0	54
1+	29
2+	16
3+	0
4+	1
Iris (%)	
Normal	87
Posterior synechiae	13
Sectoral iris atrophy	0
Patchy iris atrophy	0
Diffuse iris atrophy	0
Heterochromia	0
IOP, involved eyes	
Median, mm Hg (25th, 75th percentile)	13 (12, 16)
Proportion of patients with IOP > 24 mm Hg either eye (%)	0
Vitreous cells, grade (%)	
0	47
½+	12
1+	25
2+	10
3+	6
4+	0
Vitreous haze, grade (%)	
0	68
½+	12
1+	14
2+	4
3+	1
4+	0
Retinal and choroidal findings (%)	
Exudative retinal detachment	94
Multifocal choroiditis without exudative detachment	6
Sunset glow fundus (%)	2
Systemic features (%)	
Headache	63
Tinnitus	29
Dysacusis	17
Meningismus	17
Cerebrospinal fluid pleocytosis[a]	28
Vitiligo	4
Poliosis	2

IOP = intraocular pressure.
[a]Cerebrospinal fluid pleocytosis detected in 44/44 (100%) cases in which lumbar puncture data were available.

after machine learning for early-stage VKH are listed in Table 3 and for late-stage VKH in Table 4. Key features of early-stage VKH disease are characteristic serous retinal detachments (Figures 1 and 2) or uveitis with ≥2 of 5 appropriate neurologic findings. Key features of late-stage VKH are sunset glow fundus (Figure 3) or uveitis with ≥1 of 3 characteristic cutaneous findings. The overall accuracy for panuveitides was 96.3% in the training set and 94.0% in the validation set (95% confidence interval 89.0, 96.8).[21] The misclassification rate for early-stage VKH in the training set was 8.0%, and for late-stage VKH 1.0%.[11] In the validation set, the misclassification rates for early-stage VKH and late-stage VKH were 7.7% and 12%, respectively. The diseases with which early-stage and late-stage VKH were most often confused were each other.

TABLE 2. Characteristics of Cases of Late-Stage Vogt-Koyanagi-Harada Disease.

Characteristic	Result
Number of cases	103
Demographics	
Age, median, years (25th, 75th percentile)	40 (29, 49)
Sex (%)	
Male	42
Female	58
Race/ethnicity (%)	
White, non-Hispanic	7
Black, non-Hispanic	7
Hispanic	12
Asian, Pacific Islander	43
Other	27
Missing	4
Uveitis history	
Uveitis course (%)	
Acute, monophasic	2
Acute, recurrent	5
Chronic	83
Indeterminate	11
Laterality (%)	
Unilateral	1
Unilateral, alternating	0
Bilateral	99
Ophthalmic examination	
Keratic precipitates (%)	
None	53
Fine	28
Round	3
Stellate	1
Mutton fat	15
Other	0
Anterior chamber cells, grade (%)	
0	24
½+	16
1+	18
2+	27
3+	14
4+	1
Hypopyon (%)	0
Anterior chamber flare, grade (%)	
0	43
1+	35
2+	18
3+	4
4+	0
Iris (%)	
Normal	64
Posterior synechiae	36
Sectoral iris atrophy	0
Patchy iris atrophy	0
Diffuse iris atrophy	0
Heterochromia	0
IOP, involved eyes	
Median, mm Hg (25th, 75th percentile)	14 (11, 17)
Proportion of patients with IOP > 24 mm Hg either eye (%)	6
Vitreous cells, grade (%)	
0	56
½+	16
1+	16
2+	11
3+	2
4+	0
Vitreous haze, grade (%)	
0	77
½+	7
1+	9
2+	8
3+	0
4+	0
Exudative retinal detachment (%)	8
Sunset glow fundus (%)	86
Multifocal choroiditis (%)[a]	57
Cutaneous features (%)	
Vitiligo	20
Poliosis	22
Alopecia	14

IOP = intraocular pressure.
[a]Sometimes termed "Dalen Fuchs–like nodules."

TABLE 3. Classification Criteria for Early-Stage Vogt-Koyanagi-Harada Disease.

Criteria (Diagnosis requires #1 or #2 AND #3)
1. Evidence of Harada disease
   a. Serous (exudative) retinal detachment AND (b. and/or c.)
   b. Multiloculated appearance on fluorescein angiogram
   OR
   c. Septae on optical coherence tomogram

OR

2. Panuveitis[a] with ≥2 of the following neurologic symptoms or signs[b]
   a. Headache OR
   b. Tinnitus OR
   c. Dysacusis OR
   d. Meningismus OR
   e. Cerebrospinal fluid pleocytosis

AND

3. No history of penetrating ocular trauma or vitreoretinal surgery prior to disease onset

Exclusions
1. Positive serology for syphilis using a treponemal test
2. Evidence for sarcoidosis (either bilateral hilar adenopathy on chest imaging or tissue biopsy demonstrating noncaseating granulomata)

[a]Uveitis should have evidence of choroidal involvement on clinical examination, fluorescein angiography, indocyanine green angiography, or optical coherence tomography, including enhanced depth imaging of the choroid.
[b]Onset of neurologic symptoms and signs and onset of the uveitis should occur within 4 weeks of each other.

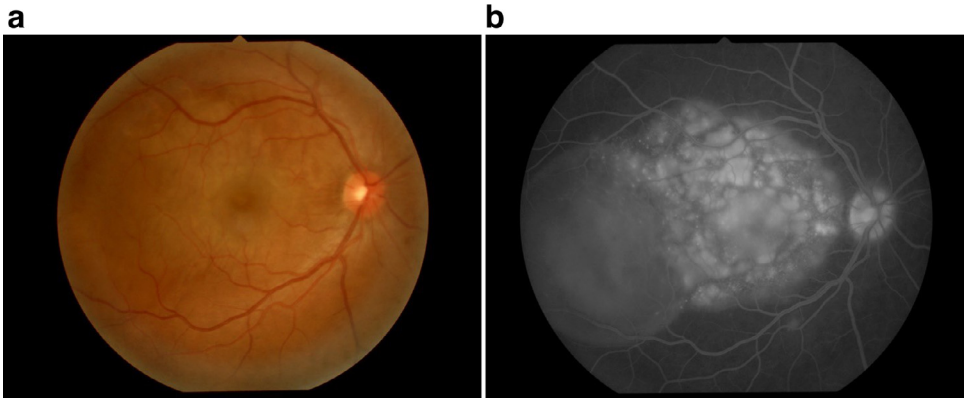

FIGURE 1. Serous retinal detachments in a patient with early-stage Vogt-Koyanagi-Harada disease. A. Color fundus photograph. B. Fluorescein angiogram, demonstrating multiloculated appearance.

TABLE 4. Classification Criteria for Late-Stage Vogt-Koyanagi-Harada Disease

Criteria
1. History of early-stage Vogt-Koyanagi-Harada disease
AND (#2 and/or #3)
2. Sunset glow fundus
OR
3. Uveitis[a] AND ≥1 of the following cutaneous findings
a. Vitiligo OR
b. Poliosis OR
c. Alopecia
Exclusions
1. Positive serology for syphilis using a treponemal test
2. Evidence for sarcoidosis (either bilateral hilar adenopathy on chest imaging or tissue biopsy demonstrating noncaseating granulomata)

[a]Uveitis may be: (1) chronic anterior uveitis; (2) anterior and intermediate uveitis; or (3) panuveitis with multifocal choroiditis ("Dalen Fuchs–like nodules").

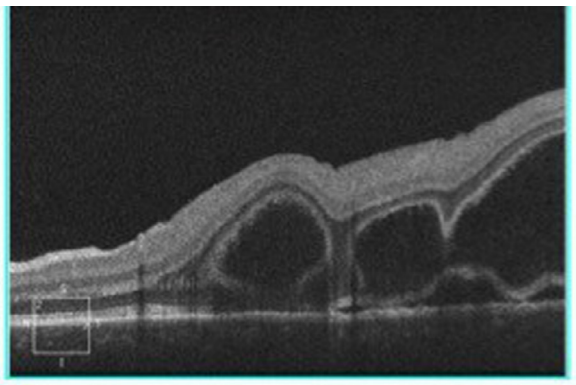

FIGURE 2. Optical coherence tomogram of an exudative retinal detachment in a patient with early-stage Vogt-Koyanagi-Harada disease, demonstrating septate appearance.

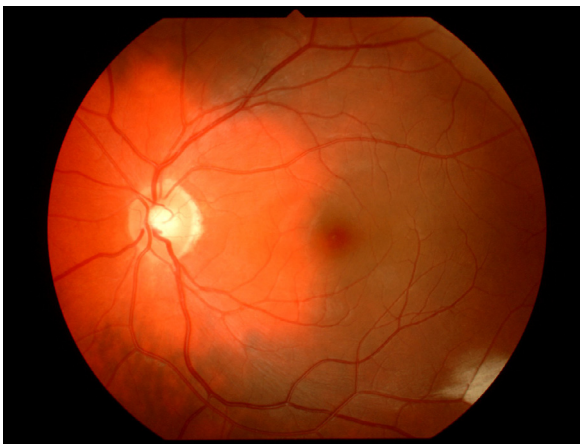

FIGURE 3. Sunset glow fundus in a patient with late-stage Vogt-Koyanagi-Harada disease.

DISCUSSION

The classification criteria developed by the SUN Working Group for early-stage and late-stage VKH have relatively low misclassification rates, indicating good discriminatory performance against other panuveitides and against each other.

Previously proposed sets of diagnostic criteria include the original American Uveitis Society (AUS) criteria, the Revised Diagnostic Criteria for VKH Disease, the Sugiura criteria, and the Chinese Criteria.[23-27] The poor performance of the original AUS criteria[23] led to the "Revised Diagnostic Criteria," which were developed by an international committee.[24] The Revised Diagnostic Criteria classified cases as complete VKH disease, incomplete VKH disease, and probable VKH disease. An analysis of these criteria resulted in the following: 12% of cases were classified as complete VKH, 71% as incomplete VKH, and 9% as probable VKH.[25] One of the reasons for the low proportion

of cases being classified as complete VKH by the Revised Diagnostic Criteria is the use of modern corticosteroid therapy, which may prevent the development of late-stage disease. In 2018, Yang and associates[26] used latent class analysis of case data from Chinese patients to develop diagnostic criteria for VKH disease. These criteria classified cases as early VKH and late VKH and not as complete and incomplete VKH. The resulting criteria seemed to perform better than the Revised Diagnostic Criteria.[26,27] However, these criteria contained the problematic and tautological phrase "No evidence of infectious uveitis or accompanying systemic rheumatic disease or evidence suggestive of other ocular disease entities," which seems to imply exhaustive diagnostic testing.[26,27] The SUN criteria for VKH disease also divide it into early-stage VKH disease and late-stage VKH disease and have many similar factors to the Chinese criteria, but eliminate the nonspecific exclusions with regionally relevant ones.

Although all cases received supermajority agreement on the diagnosis of early- or late-stage VKH, a few cases had features of both stages and were classified as early-stage or late-stage based on the preponderance of features. These few cases with overlap demonstrate that some patients will not move distinctly from early-stage to late-stage disease. Nevertheless, they typically can be classified as one or the other based on the predominant ocular and systemic features.

Modern multimodal imaging has enhanced our ability to evaluate patients with uveitic diseases. Fluorescein angiography and indocyanine green angiography demonstrate multiple choroidal lesions in patients with early-stage VKH. Enhanced-depth imaging (EDI) optical coherence tomography (OCT) of the choroid has demonstrated choroidal thickening in patients with early-stage VKH, which resolves with successful treatment.[28] The SUN database did not have sufficient data on EDI OCT to evaluate it directly as a diagnostic criterion. Choroidal thickening on EDI OCT was included in the Chinese criteria,[26] and all cases of early-stage VKH in the SUN database had evidence of choroidal disease, even if a serous detachment was not evident. Therefore, demonstration of choroidal involvement either by clinical examination or multimodal imaging were included for identification of "panuveitis" in patients with early-stage VKH and neurologic findings, but without serous detachments.

The presence of any of the exclusions in Tables 3 and 4 suggests an alternate diagnosis, and the diagnosis of VKH should not be made in their presence. In prospective studies many of these tests will be performed routinely, and the alternative diagnoses excluded. However, in retrospective studies based on clinical care, not all of these tests may have been performed. Hence the presence of an exclusionary criterion excludes VKH, but the absence of such testing does not always exclude the diagnosis of VKH if the criteria for the diagnosis are met.

Classification criteria are employed to diagnose individual diseases for research purposes.[22] Classification criteria differ from clinical diagnostic criteria in that although both seek to minimize misclassification, when a trade-off is needed, diagnostic criteria typically emphasize sensitivity, whereas classification criteria emphasize specificity,[22] in order to define a homogeneous group of patients for inclusion in research studies and limit the inclusion of patients without the disease in question that might confound the data. The machine learning process employed did not explicitly use sensitivity and specificity; instead it minimized the misclassification rate. Because we were developing classification criteria and because the typical agreement between 2 uveitis experts on diagnosis is moderate at best,[20] the selection of cases for the final database ("case selection") included only cases that achieved supermajority agreement on the diagnosis. As such, some cases that clinicians would diagnose as early-stage VKH or late-stage VKH will not be so classified by classification criteria. The selection of cases during case selection that achieved supermajority agreement on the diagnosis for inclusion in the final database was used because we were developing classification criteria.

In conclusion, the criteria for early-stage VKH disease and late-stage VKH disease outlined in Tables 3 and 4 seem to perform sufficiently well for use as classification criteria in clinical research.[21,22]

CREDIT ROLES

Douglas A. Jabs, MD, MBA: Conceptualization, Methodology, Validation, Investigation, Data curation, Writing–Review and editing, Visualization, Supervision, Project administration, Funding acquisition. **Alastair K. Denniston, PhD, MRCP, FRCOphth:** Investigation, Writing–Review and editing. **Andrew D. Dick, MBBS, MD, FRCP, FRCS, FRCOphth:** Investigation, Writing–Review and editing. **James P. Dunn, MD:** Investigation, Writing–Review and editing. **Michal Kramer, MD:** Investigation, Writing–Review and editing. **Peter McCluskey, MD:** Investigation, Data curation, Writing–Review and editing. **Neal Oden, PhD:** Methodology, Software, Validation, Formal analysis, Investigation, Resources, Data curation, Writing–Review and editing. **Annabelle A. Okada, MD, DMSc:** Investigation, Writing–Original draft, Writing–Review and editing. **Alan G. Palestine, MD:** Investigation, Writing–Review and editing. **Russell W. Read, MD, PhD:** Investigation, Writing–Review and editing. **Jennifer E. Thorne, MD, PhD:** Methodology, Software, Validation, Formal analysis, Investigation, Data curation, Writing–Review and editing. **Brett E. Trusko, PhD, MBA:** Methodology, Software, Resources, Data curation, Investigation, Writing–Review and editing

Funding/Support: Supported by grant R01 EY026593 from the National Eye Institute, the National Institutes of Health, Bethesda, Maryland, USA; the David Brown Fund, New York, New York, USA; the Jillian M. and Lawrence A. Neubauer Foundation, New York, New York, USA; and the New York Eye and Ear Foundation, New York, New York, USA. Financial Disclosures: Douglas A. Jabs: none; Alastair K. Denniston: none; Andrew D. Dick: consultant: AbbVie, Alimera, Apitope, Astellas, Gyroscope, Janssen, Roche; James P. Dunn: none; Michal Kramer: none; Neal Oden: none; Peter McCluskey: none; Annabelle Okada: consultant: AbbVie Japan, Astellas Pharma Japan, Bayer AG, Daiichi Sankyo; lecture fees: Alcon Pharma Japan, Mitsubishi Tanabe Pharma, Novartis Pharma Japan, Santen Pharmaceutical Corporation, Senju Pharmaceutical Corporation; grant support from Alcon Pharma Japan, Bayer Yakuhin, Mitsubishi Tanabe Pharma; Alan G. Palestine: none; Russell Read: none; Jennifer E. Thorne: Dr Thorne engaged in part of this research as a consultant and was compensated for the consulting service; Brett E. Trusko: none. All authors attest that they meet the current ICMJE criteria for authorship.
Members of the SUN Working Group are listed online at AJO.com.

REFERENCES

1. Vogt A. Fruhzeitiges, ergrauen der zilien, und bemerkungen uber den sogenannten plotzlichen eintritt dieser veranderung. *Klin Monatsbl Augenheilkd*. 1906;44:228–242.
2. Koyanagi Y. Dysakusis, alopecia, und poliosis bei schwerer uveitis nicht traumatischen ursprungs. *Klin Monatsbl Augenheilkd*. 1929;82:194–211.
3. Harada E. Acute diffuse choroiditis. *Acta Soc Ophthalmol Jpn*. 1926;30:356–378.
4. Moorthy RS, Inomata H, Rao NA. Vogt-Koyanagi-Harada syndrome. *Surv Ophthalmol*. 1995;39:265–292.
5. Inomata H, Rao NA. Depigmented atrophic lesions in sunset glow fundi of Vogt-Koyanagi-Harada disease. *Am J Ophthalmol*. 2001;131:607–614.
6. O'Keefe GA, Rao NA. Vogt-Koyanagi-Harada disease. *Surv Ophthalmol*. 2017;62:1–25.
7. Nakayama M, Keino H, Watanabe T, Okada AA. Clinical features and visual outcomes of 111 patients with Vogt-Koyanagi-Harada disease treated with pulse intravenous corticosteroids. *Br J Ophthalmol*. 2019;103:274–278.
8. Ohguru N, Sonada KH, Takeuchi M, et al. The 2009 prospective multi-center epidemiologic survey of uveitis in Japan. *Jpn J Ophthalmol*. 2012;56:432–435.
9. Shindo Y, Ohno S, Nakamura S, et al. A significant association of HLA-DRB1*0501 with Vogt-Koyanagi-Harada disease results form a linkage disequilibrium with the primarily associated allele, DRB1*0405. *Tissue Antigens*. 1996;47:344–345.
10. Read RW, Yu E, Accorinti M, et al. Evaluation of the effect on outcomes of the route of administration of corticosteroids in acute Vogt-Koyanagi- Harada disease. *Am J Ophthalmol*. 2006;142:119–124.
11. Chee SP, Jap A, Bascal K. Prognostic factors of Vogt-Koyanagi-Harada disease in Singapore. *Am J Ophthalmol*. 2009;147:153–161.
12. Lai TY, Chan RP, Chan CK, Lam DS. Effects of the duration of initial oral corticosteroid treatment on the recurrence of inflammation in Vogt-Koyanagi-Harada disease. *Eye*. 2009;23:543–548.
13. Errara MH, Fardeau C, Cohen D, et al. Effect of the duration of immunomodulatory therapy on the clinical features of recurrent episodes in Vogt-Koyanagi-Harada disease. *Acta Ophthalmol*. 2011;89:e357–e366.
14. Bykhovshaya I, Thorne JE, Kempen JH, Dunn JP, Jabs DA. Vogt-Koyanagi-Harada disease: clinical outcomes. *Am J Ophthalmol*. 2005;140:674–678.
15. Paredes K, Ahmed M, Foster CS. Immunomodulatory therapy for Vogt-Koyanagi-Harada patients as first-line therapy. *Ocul Immunol Inflamm*. 2006;14:87–90.
16. Jabs DA, Rosenbaum JT. Nussenblatt RB, the Standardization of Uveitis Nomenclature (SUN) Working Group. Standardization of uveitis nomenclature for reporting clinical data. Report of the first international workshop. *Am J Ophthalmol*. 2005;140:509–516.
17. Jabs DA, Busingye J. Approach to the diagnosis of the uveitides. *Am J Ophthalmol*. 2013;156:228–236.
18. Trusko B, Thorne J, Jabs D, et al. Standardization of Uveitis Nomenclature Working Group. The SUN Project. Development of a clinical evidence base utilizing informatics tools and techniques. *Methods Inf Med*. 2013;52:259–265.
19. Okada AA, Jabs DA. The SUN Project. The future is here. *Arch Ophthalmol*. 2013;131:787–789.
20. Jabs DA, Dick A, Doucette JT, et al. for the Standardization of Uveitis Nomenclature Working Group. Interobserver agreement among uveitis experts on uveitic diagnoses: the Standard of Uveitis Nomenclature experience. *Am J Ophthalmol*. 2018;186:19–24.
21. The Standardization of Uveitis Nomenclature (SUN) Working Group. Development of classification criteria for the uveitides. *Am J Ophthalmol*. 2021 04.09. doi:10.1016/j.ajo.2021.03.061.
22. Aggarwal R, Ringold S, Khanna D, et al. Distinctions between diagnostic and classification criteria. *Arthritis Care Res*. 2015;67:891–897.
23. Read RW, Rao NA. Utility of existing Vogt-Koyanagi-Harada syndrome diagnostic criteria at initial evaluation of the individual patient: a retrospective analysis. *Ocul Immunol Inflamm*. 2000;8:227–234.
24. Read RW, Holland GN, Rao NA, et al. Revised diagnostic criteria for Vogt-Koyanagi-Harada disease: report of an international committee on nomenclature. *Am J Ophthalmol*. 2001;131:647–652.
25. Rao NA, Gupta A, Dustin L, et al. Frequency of distinguishing clinical features in Vogt-Koyanagi-Harada disease. *Ophthalmology*. 2010;117:591–598.
26. Yang P, Zhong Y, Du L, et al. Development and evaluation of diagnostic criteria for Vogt-Koyanagi-Harada disease. *JAMA Ophthalmol*. 2018;136:1025–1031.
27. Jabs DA. Improving the diagnostic criteria for Vogt-Koyanagi-Harada disease. *JAMA Ophthalmol*. 2018;136:1032–1033.
28. Nakayama N, Keino H, Okada AA, et al. Enhanced depth imaging optical coherence tomography of the choroid in Vogt-Koyanagi-Harada disease. *Retina*. 2012;32:2061–2069.