ECVO Manual: Chapter 3. The ECVO Hereditary Eye Disease Scheme (2024)

1. The Scheme

The ECVO has a Hereditary Eye Disease Scheme (further referred to as the Scheme) as mentioned in the Bylaws of the ECVO, Article 4.9, used for the diagnosis and control of Known and Presumed Hereditary Eye Diseases (KP-HED) in animals.
The main purposes of the Scheme are to set standards for the diagnosis and provide advice for the control of KP-HED of dogs and cats. The diseases included are either disabling, painful or perturbing to the wellbeing of animals, or diseases that necessitate surgical, or otherwise physiologically altered intervention or lifelong medication.

The Scheme provides definitions, guidelines, advice and information concerning KP-HED, as described in the ECVO Manual for KP-HED of dogs and cats. Additional information is given in the appendices of the scheme, and through illustrations. Current versions of these documents are published on the ECVO website www.ecvo.org.

The Scheme guarantees that:

- all examiners are able to recognize and to differentiate relevant and irrelevant clinical signs of KP-HED and establish their significance in dogs and cats;
- rules and guidelines are provided for the examination and validation of specifically trained European Specialists in Veterinary Ophthalmology (Diplomates) and specifically trained veterinarians (European Eye Scheme Examiners or ESE) to provide a service for owners, breeders, the breed and kennel clubs and the public in general, by providing an appropriate level of expertise for the diagnosis of KP-HED.

Examinations under the Scheme are performed in accordance with the ECVO Constitution and Bylaws and include a general screening examination of the eye and its adnexa. Based on the examination, a certificate is issued. The certificate is valid for 12 months. It is recommended that animals used for breeding are examined annually. Animals not used for breeding may be examined at longer intervals, in accordance with the ECVO Manual. If the examination findings are inconclusive, it may be necessary for the animal to be re-examined earlier than recommended in this paragraph. This shall be stated on the certificate.

2. Organization and panels

The ECVO Diplomates and the national ESEs (when recognized) shall form a National Panel in countries where this has been agreed upon, and the necessary rules and regulations set. These rules and regulations shall not contain any provision that violates the Constitution or Bylaws of the ECVO or the rules of the Scheme.
Each National Panel shall have a Board, elected by its members. The Board shall consider all business and policies pertaining to the affairs of the National Panel. In the absence of a National Panel, the HED-Committee of the ECVO can act in its place.
For countries where an established National Panel has been in existence for more than 5 years, on the advice of the HED-Committee, this Panel can apply to the Executive Committee of the ECVO for recognition under the ECVO Scheme.
The National Panel must meet at least once per year to discuss the Scheme and its operation.

3. Panellists

Panellists approved by the ECVO to perform examinations under the Scheme are:

- Diplomates of the ECVO
- Eye Scheme Examiners (ESEs), being veterinarians, specifically trained and examined in countries where this has been agreed. This agreement may be extended ad infinitum by the ECVO.
- Affiliate members as defined in the ECVO Constitution & Bylaws.

Training and examination of Eye Scheme Examiners (ESEs)

Before training commences

- The candidate must confirm normal stereoscopic vision and colour vision (binocular, with a minimum visual acuity of 0.7 corrected for refractive errors).
- An education and training plan based on the requirements of the ECVO Eye Scheme must be organised by the candidate.
- It is recommended to have a main supervisor, who can be an ECVO Diplomate or an ESE from an ECVO approved national Panel.
- The candidate must have access to the basic ophthalmic instruments; direct and indirect ophthalmoscopes with a variety of condensing lenses, a slit-lamp biomicroscope and a gonioscopy lens.

Practical training

- Practical training consists of supervised ophthalmic examinations of dogs and cats performed according to the ECVO Scheme. A case log with a running number shall be kept for all animals examined. The record should include breed, sex, age and colour variant of the animal examined, ophthalmic findings and diagnosis/-es. The case log must be signed by the supervisor(s).
- Supervisors can be ECVO Diplomates, ECVO approved ESEs and ECVO affiliate members. Panellists from non-ESE national panels and acknowledged by the ECVO HED Committee, may in exceptional circumstances be approved to serve as supervisors. Their approval must be confirmed before the training commences.
- At least 500 dogs must be examined under direct supervision.
- At least 50 of the dogs shall be examined under direct supervision of an ECVO Diplomate.
- Up to 100 of the 500 dogs can be examined under direct supervision of an ACVO Diplomate.
- Specific requirements regarding breeds, color variants and diagnosis, that are listed in Appendix A, must be fulfilled and clearly documented in the case log.
- Gonioscopy must on be performed under supervision on at least 20 dogs and 15 of these must be “ICAA affected”*. Further definition of gonioscopy requirements is specified in Appendix A.
- At least 100 cats must be examined and included in the case log. A minimum of 10 of these cats shall be examined under direct supervision.

Theoretical training

Before sitting the examination, the candidate should acquire a sufficiently high level of current knowledge of

- Ocular embryology and anatomy
- Ocular physiology
- Basic examination techniques *and pharmacological substances used for diagnostics*
- Breed-related diseases and genetic testing
- Neuro-ophthalmology

For this, the candidate

- Must have studied the literature concerning known and presumed hereditary eye diseases (KP-HED) in animals, including textbooks, relevant published scientific articles and the ECVO Manual for KP-HED in Dogs and Cats. List of relevant literature is indicated in Appendix B.
- Must participate in at least 3 ECVO-recognized continuing education courses in ophthalmology (each of a duration of minimum 1,5-2 days), which include the use of ophthalmic equipment, diseases of the anterior and posterior segments, and basic genetic principles
- Must attend the annual ECVO congress (in person or on-line if hybrid-congress is offered), and there especially the HED session, at least once every 3 years. Yearly attendance is highly recommended for training, and for achieving updated knowledge about the assessment of HED's.
- Must document the participated courses and congresses using a theoretical training log. Certificates of attendance should be attached to the log as a single PDF document.

The requirements defined by ECVO will be considered minimum requirements. National or regional requirements for training and examination may exceed the demands of the ECVO.

The training requirements are subject to change at the discretion of the ECVO HED Committee and the ESE Exam Committee.
Minor changes (i.e. small increases in the numbers of animals to be examined/cases to be seen, decreases in the numbers of animals to be seen etc) will be effective immediately after they have been published.

Major changes, marked with * in the requirements (i.e. significant increase in numbers of animals to be examined/cases to be seen, additional courses etc), will have a transition period of 5 years for those candidates already in training. Candidates who have not finished their training in 5 years from the change, have to fullfill the increased requirements.

NOTE: It is the candidates own responsibility to stay updated on the requirements.

Duration of validity of the training program and credentials

When presented for evaluation and approval, the different parts of the education programme (i.e. courses and practical training) are valid for ten years. Thus, if credentials are submitted to the ESE subcommittee on the 1st of November 2023, educational activities from 01st November 2013 until 31st October 2023 can be counted.

Once approved, the credentials are valid for 7 years, counted from the date of approval until the last application to sit the exam.
Example: A candidate submits the credentials on 20.11.2021. The candidate can still sit the exam in 2028, if applied before 20.11.2027.

NOTE: In case of military service, maternal/paternal leave, serious illness etc, the candidate may apply for a prolongation of the training period or validity of the accepted credentials. The application shall be made without delay. The ESE subcommittee decides if the prolongation is granted and defines the period of extension. *Credentials (cases, courses etc) obtained during the pause in training cannot be included in the training log as part of the training programme*.

Examination

An examination is necessary to qualify as an ECVO-Eye Scheme Examiner (ESE).
All training requirements must be fulfilled before the cases/credentials are presented to the ECVO HED committee / ESE Exam Committee. When the credentials are approved by the ECVO HED committee / ESE Exam Committee the candidate is qualified to sit the ESE examination for the scheme.

Candidates may apply to sit an exam organized by any active ECVO Panel.

The examination committee for the examination to qualify as Eye Scheme Examiners (later ESE Exam Committee) consists of at least three members of ECVO Panels. At least two members should be ECVO Diplomates. Preferably, members or former members of national eye examination committees or the ECVO Exam Committee should be included.

The examination consists of

- A written section of 3 hours' duration on multiple choice (50 questions; 3 min/question) and/or short open-end questions on known and presumed hereditary eye diseases (KP-HEDs) and relevant ophthalmology topics
- A combined practical and written section of 45 minutes' duration based on 45 images of known and presumed hereditary eye diseases (KP-HEDs) as well as normal ocular variations (slide recognition session). The candidates have 1 minute per slide to answer.
- A practical section which consists of an ophthalmic examination of at least 5 animals according to the ECVO Scheme, including issuing an ECVO Certificate. The candidates have 15 minutes for the examination of each animal, plus 5 minutes to fill in the certificate.
  The practical section can only be taken once the candidate has passed the first two sections of the examination.

Candidates may sit each part of the examination (MCQ, slide recognition and practical/ oral) up to a maximum of four times.

The exams must be completed within seven years from the approval of the credentials.

Prior to the examination, all candidates are required to sign an agreement of confidentiality not to divulge the details of the MCQ or slide recognition questions to a third party, as inevitably questions may be recycled for future examinations.

Appeals procedure

Appeals regarding exam results should be directed in writing to the Executive Board of ECVO that will handle it according to normal appeals procedures.
OR:
Any candidate who wishes to appeal against the decision on failure in the examination must do so within 90 days of the postmarked date of his/her results notification letter, via the ECVO Secretary. The request for appeal must be made in writing to the ECVO Secretary and shall include a statement of the grounds for reconsideration and documentation in support of the petition.

The Secretary shall notify the President of the College and the Chairperson of the Examination Committee. The President shall appoint a committee of three Diplomates who are not officers or members of the Examination Committee to serve as an Appeals Committee within 30 days of notice of an appeal. The Chairperson of the Examination Committee shall submit the examination and scores of the candidate, the complete list of scores of all candidates on that examination, and a statement of the criteria used for the Committee's recommendation for pass and fail to the Appeals Committee indicating the reason(s) for rejecting the candidate.

The Appeals Committee shall return its verdict within 60 days of its appointment.

Exceptions to training and examination requirements

ECVO board eligible veterinarians (i.e. former ECVO residents who have successfully completed the residency program but have not passed the board exams)

Training:
- 100 HED examinations must be done under supervision of and ECVO Diplomate or ESE. The candidate must fill an ECVO form for each case. Relevant cases from the residency training log can be included.
- 20 gonioscopy examinations under supervision and 15 of these must be “ICAA affected” (see appendix A – qualitative list). Relevant cases from the residency training log can be included.

Exam:
- If the candidate has failed all parts of the board exam, he/she must sit all parts of the

ESE exam
- If the candidate has passed the theoretical MCQ board exam, the candidate must only sit the slide and practical ESE exam
- If the candidate has passed both the theoretical MCQ and the slide exam, the candidate must only sit the practical ESE exam.

The exams must be completed within seven years from the approval of the credentials.

Panelists from non-ECVO national eye panels

Training:
- requirements of the ECVO Scheme Qualitative list (appendix A) must be fulfilled. Cases seen as a national panelist within the last 10 years can be included.
- 100 national HED examinations / year or 300 HED examinations / 3 years during the previous 3 years must have been performed.
- gonioscopy on at least 20 dogs must be performed and presented. 15 cases have to be ICAA affected (see Appendix A). Cases seen as a national panelist within the last 10 years can be included.
- 100 HED examinations must be done under supervision of and ECVO Diplomate or ESE. The candidate must fill an ECVO form for each case.

Exam:
The ECVO HED Committee and ESE exam subcommittee evaluate the training requirements and exams of the European national panels per request. Based on the evaluation, no parts/ some parts / all parts of the ESE exam, must be attended by those members of the national panel who want to become an ECVO approved Eye Scheme Examiner.

A list of presently evaluated panels, asking for approval:
Italy – no exam required, but a course on KP-HED is defined and required

Note: Training requirements for national panelists are valid for 5 years from publication of these instructions. After that, a national panellist wishing to be approved as an ECVO ESE has to fullfill all training requirements +/- sit the ECVO ESE sit the ESE exams.

Requirements for maintaining Panellist status

The Board of the National Panel is responsible for the compliance of their Panellists with the following rules. If no National Panel exists, the HED-Committee of the ECVO can act in its place. The Panellists, including both Diplomates and ESE are obliged to work under the rules of both the ECVO Scheme and the National Scheme.

- If work is conducted by an examiner in serious violation of these rules, the Board of the National Panel or, if no national panel exists, the HED-committee is entitled to expel the person from the panel.

- If there is proof of continuing misdiagnoses by a Panellist, this individual shall be re-examined, or the Board of the National Panel is entitled to expel the examiner from the Panel. If expelled, the former Panellist is neither allowed to issue ECVO certificates, nor issue documents that imply the same status as the ECVO certificate.
- The Panellist shall complete the minimum number of examinations for the Scheme of 100 per year or 300 per 3 years; if less, re-qualification is necessary. Recently qualified Panellists are exempted from this requirement during their first full year as Panellist. Panellists on maternal leave or a documented shorter period of work debilitating disease can apply the Board of the National Panel for exemption.
- If The Panellist wants to perform gonioscopy as part of the examination under the ECVO Scheme, the Panellist shall complete a minimum number of gonioscopy examinations for the Scheme of 10 per year or 30 per 3 years (which may be part of the general examinations for the Scheme); if less, gonioscopy must not be performed. Recently qualified Panellists are exempted from this requirement during their first full year as Panellist. Panellists on maternal leave or a documented shorter period of work debilitating disease can apply the Board of the National Panel for exemption.
- The Panellist shall attend the annual meeting of the national panel. If absent from 3 consecutive meetings, without dispensation of the Board of the National Panel, the Panellist can be expelled from the national panel. If the panel holds other related meetings (e.g. arbitrary or appeal cases) the Panellist shall attend these meetings. If absent of more than half of these meetings over 3 consecutive years, without written dispensation of the Board of the National Panel, the individual can be expelled by the Board of the national Panel.
- The Panellist shall attend at the least one annual scientific meeting during 3 years. If absent without dispensation of the Board of the National Panel (or the HED-Committee), the individual can be expelled by the Board of the national Panel ((or the HED-Committee of the ECVO)
- The Panellist shall contribute to the education of new panel members through practical training and instruction of aspirants.
- The Panellist must possess good eyesight with a normal stereoscopic, colour vision (binocular, with a minimum visual acuity of 0,7 corrected for refractive errors). A certificate of visual acuity is to be presented to the Board of the National Panel or the HED-Committee of the ECVO every 5 years until the age of 70, and after that age, every second year.
- Under exceptional circumstances the Board of the National Panel, or if there is no Panel, the HED Committee of the ECVO may grant a Panellist exemption from the minimum requirements for number of eye examinations conducted, and meeting attendance.
- A decision to expel a Panellist from the Panel is taken by the Board of the National Panel. The Panellist has the right to appeal to the National Panel at the next annual meeting or alternatively to the HED Committee of the ECVO.
- A Panellist who is expelled from the panel may be allowed to sit a new examination in order to requalify. The decision is taken by the Board of the National Panel (or the HED-Committee of the ECVO) which will also decide on the extent of the examination.

4. Arrangements for the Eye Examination

Individual animals can be presented for ophthalmic examination, or group examinations can be arranged. Minimum facilities for performing an ophthalmic examination include darkened surroundings, an examination table and suitable electrical power supply.

5. Procedure for the Eye Examination

Examination for the Scheme is performed according to the current ECVO rules (See ECVO Manual). An ECVO certificate is issued upon completion of the examination.

- Partial or preliminary examinations are not permitted.
- Gonioscopy may be performed as an additional examination.
- An ECVO certificate shall be issued for each animal. Breed specific forms issued by breed clubs may be filled and signed by an ECVO examiner in addition.
- The following documents should be available before the examination:
    - the animal's registration document or other identifying document
    - any previous eye certification

The owner and/or his agent will present the animal for examination at the appropriate time together with the documents referred to above. If the animal's registration or other identifying documents are not available, examination can be undertaken, but the Certificate will not be issued until the Panellist has been provided with the relevant documentation.
Prior to the examination, the owner or their appointed agent, must sign an agreement to the examination procedure, recording of results, submission of results to the appropriate National Kennel Club and that the results will be made available in the public domain, as outlined in the Scheme. This will complete the first part of the Certificate, verifying that the details given in that section are correct. Details included in this section relate to the identification of the animal being submitted for examination and the date of the last eye examination. Microchip number or tattoo should be verified under direct control of or by the examiner, or his/her designated assistant, prior to the ophthalmic examination.

Certificates for the Scheme can only be issued for permanently identified animals (e.g. by microchip or tattoo). Exceptions for mixed-breed animals that are permanently identified and animals outside the scheme are given in § 6.
Subject to the registration documents being available as stated above, the Certificate should be signed and issued by the Panellist and distributed according to the instructions. If online-registration of results is available, this process should be completed immediately or at the latest within three days of the examination.

If paper copies are issued, this distribution will involve:
1) Top copy (white) will be sent as soon as possible (within 14 days of the date of examination) to the appropriate Kennel club or National Scheme authority, which will undertake to make the result publically available within a maximum of 10 weeks after the date of examination,
2) One copy (yellow) can be sent by the owner to the appropriate Breed club, or is sent by the Panellist to the Breed club within a maximum of 10 weeks after the date of the examination,
3) One copy (pink) will be retained by the Panellist as their record,
4) One copy (white) will be given to the owner or agent,

5) One (optional) copy (blue) may be distributed to the referring veterinarian by the Panellist or owner.

All animals presented under the Scheme will have a general screening examination of the eye and adnexa in darkened surroundings. This will include the necessary use of a short-acting mydriatic.
For an ophthalmic screening examination in accordance with the ECVO Scheme, evaluation of the **entire eye** is recommended. This examination includes the adnexa, and the anterior and posterior segments. Visual function should also be noted if abnormal.
It is recommended initially to **examine the visual processes** by visual behaviour, followed by examination of the ophthalmic reflexes and reactions, e.g. menace reaction, dazzle-, palpebral- and pupillary light reflexes (PLRs). **Biomicroscopy** of the adnexa and anterior segment is then performed. Evaluation of the iridocorneal angle is done by **gonioscopy** (see gonioscopy below). These procedures are followed by dilation of the pupils using short acting mydriatics. Ophthalmoscopy and biomicroscopy (slit lamp examination) are then performed with focus on the posterior and anterior segments of the eye.
The minimum equipment to be used for the examination is a slit-lamp biomicroscope (at least 10 x magnifications) and a binocular indirect ophthalmoscope with appropriate lenses. The use of other equipment is optional.
If **electroretinography** is used as an early diagnostic test for hereditary retinal degeneration, the following standardized protocol of the ECVO has to be followed: Ekesten B, Komáromy AM, Ofri R, Petersen-Jones SM, Narfström K. Guidelines for clinical electroretinography in the dog: 2012 update. Doc Ophthalmol DOI 10.1007/s10633-013-9388-8, published online: 01 June, 2013.
The Panellist should evaluate all conditions specified on the certificate, and all boxes referring to diagnoses should be ticked. The appropriate boxes should be left open if gonioscopy has not been performed or if diagnoses from the drop-down menus, boxes No 7 and 18, “Other” are not relevant. Details of all lesions and conditions found at the time of examination, whether relating to hereditary eye disease or not, should be concisely and legibly recorded, in English or in the national language in the descriptive comments section in the middle of the Certificate, using drawings and/or written remarks. Photographic documentation of conditions should be done whenever possible.

Gonioscopy
Gonioscopy is not included in the basic ophthalmoscopic examination but may be performed as an additional examination, and performed prior to pupillary dilation (see Procedures for eye examinations above). A standard procedure for examination and technique in regard to performing gonioscopy is recommended. This includes the use of a focal light source *and* magnification (e.g. slit-lamp microscope) as well as special gonioscopy lenses (e.g. Barkan, Koeppe, 4-mirror lens). Technical errors (due to position of the goniolens, avoidance of unintentional indentation etc) should be avoided. If performed, the result of gonioscopy shall be recorded on the ECVO Certificate.
It is recommended that gonioscopy is done in breeds in which primary glaucoma is known to occur. A list of relevant breeds is published in the ECVO Manual, chapter 6. Guidelines, and revised regularly by the ECVO HED committee.
The evaluation of the iridocorneal angle (ICA) for iridocorneal angle abnormality (ICAA) is ticked as defined in the ECVO Manual, chapter 6. Guidelines, present at the time of examination.

If any additional (or alternative) method of examination, not mentioned on the form, is used, the box in the examination section, "other" is ticked and specified, and the Certificate is only valid if accompanied by an additional document specifying the method(s) used.

6. Examination outside the Scheme

- If a permanently identified dog or cat is examined outside the Scheme by an ECVO Panellist and a KPHED is recognized, the Panellist is strongly advised to issue an ECVO Certificate.
- If no certificate is issued, the Panellist is obliged to keep record of such cases and report the number of cases per disease to the ECVO HED-Committee annually (due at the annual HED-committee meeting).
- Mixed-breed dogs or cats that can be identified by microchip or tattoo can be examined within the Scheme, and an ECVO Certificate, with the first part signed by the owner/agent, can be issued. If there is an appropriate system for registration of results, a copy of the certificate should be sent to the relevant body. The Panellist is obliged to keep records of these examinations.

7. Publication of Results

The name of the registered animal examined under the Scheme, the registration and identification numbers, together with the results of the examination shall be made public. An ECVO certificate from one country should be accepted by all European National registries.

8. Conflicting results of eye examinations conducted on the same animal

- If the results of two eye examinations of the same animal conflict, the most adverse judgement is valid until the animal is examined by a minimum of three members of the National Panel or by a Chief or deputy Chief Panellist, whose decision will be final.
- When an animal is determined to be "affected" for a known or presumed inherited eye disease (KPHED) by a panel member or the local appeals authority, and the animal is transferred to another registry, the result "affected" for this KP-HED will not be changed, unless the animal has been re-examined by the appeals authority of the new registry. The latter results, with the exception of conditions that necessitate surgical, or otherwise physiologically altered intervention, (e.g. distichiasis, entropion, etc.), are definitive.
- When an animal is determined to be "affected" for distichiasis by a panel member, the decision is final. When an animal is judged "affected" for another presumed inherited eye disease (KP-HED) which necessitates surgical, or otherwise physiologically altered intervention e.g. entropion, ectropion or macroblepharon, an appeal must be lodged within fourteen (14) days after the initial examination. The animal is then examined by a minimum of three members of the National Panel or by a Chief or deputy Chief Panellist, whose decision will be final.
- Eye examinations in case of conflicting results are performed at the owner's expense.

"Undetermined" and "Suspicious"

If an **adult* animal** displays clinical features that possibly fit the KP-HED, but changes are inconclusive (not specific), **"undetermined"** is ticked for the relevant disease and it is **recommended** that the animal be **re-examined**.
If an animal displays minor, but specific clinical signs of the KP-HED mentioned, **"suspicious"** is ticked for the relevant disease. Further development will confirm the diagnosis. It is **required** that "suspicious" cases are re-examined.

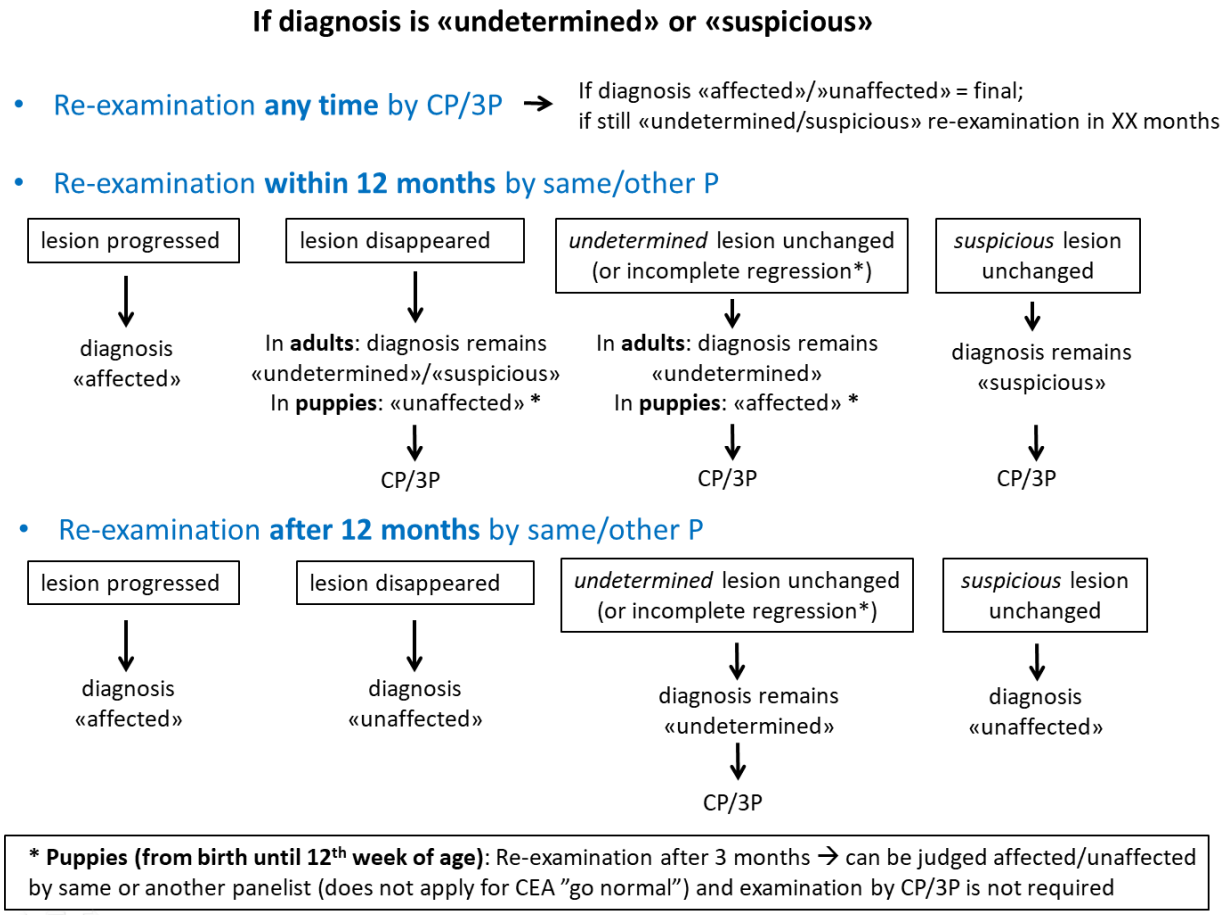
Re-examination can be done

- **Within 12 months of the last examination** by a minimum of three members of the National Panel or by a Chief or deputy Chief Panellist (3P/CP/DCP), whose decision is final except the following alternative:
  The same or another Panellist (P) can do the re-examination within 12 months of the last examination, but if the Panellist (P) determines that the animal previously judged "undetermined" or "suspicious" is "affected", this "affected" judgement is valid. If the owner appeals this decision, the animal is examined by a minimum of three members of the National Panel or by a Chief or deputy Chief Panellist (3P/CP/DCP), whose decision will be final. In the event that the first examiner or another Panellist (P) determines that the animal previously judged "undetermined" or "suspicious" is "unaffected", the initial judgement "undetermined" or "suspicious" remains valid until the animal is examined by a minimum of three members of the National Panel or by a Chief or deputy Chief Panellist (3P/CP/DCP), whose decision is final.
- If a period **of at least 12 months has passed** by the same or by another Panellist (P) (examination by a minimum of three members of the National Panel or by a Chief or deputy Chief Panellist (3P/CP/DCP) is possible but *not* required).
  - In the event that the "undetermined" finding in an **adult* animal** has *not changed* at the subsequent examination, it will be judged "undetermined".
  - In the event that the "suspicious" finding has *not changed* in an animal at the subsequent examination, it will be judged "unaffected"
  - In the event that the "undetermined" or "suspicious" finding has *disappeared* at that examination, it is judged "unaffected"
  - In the event that the "undetermined" or "suspicious" finding has *progressed*, the judgment will be "affected".

Special note for findings in puppies (birth until 12th week of age):
If a puppy displays clinical features that possibly fit the KP-HED, but changes are inconclusive (not specific) or if its regression with development is expected (e.g. PPM, lens opacity, PHA, retinal folds), then **"undetermined"** is ticked at the relevant KP-HED and and a re-examination indicated in the descriptive comments field using the drop-down menu: "**Undetermined**: Re-examination after 3 months (in puppy)". Findings seen **in puppies** which are typical for the KP-HED and have not changed/not regressed with development (e.g. PPM, retinal "folds") or have progressed (e.g. lens opacities) until re-examination, will be judged "affected". If the lesion has disappeared at that examination, it is judged "unaffected"(this does not apply for CEA-CH, "go normals") and examination by a minimum of three members of the National Panel or by a Chief or deputy Chief

Panellist is *not* required.

Rationale:
In *adult animals* "undetermined" means that the finding is not specific/not typical for the listed KP-HED (as opposed to suspicious = minor typical signs). In *puppies* "undetermined" is also used if findings are expected to regress with development.
If the lesion a) has disappeared at the next examination, it is judged "unaffected"; b) remains unchanged in *adult animals* and is still not typical for the KP-HED, "undetermined" is ticked again (breeding advice = optional/low priority); c) has been seen *in the puppy* and is typical for the KP-HED and has not regressed, it is judged "affected"; d) has progressed and/or become typical for the KP-HED listed, it is judged "affected".



Graphic: serves as an overview of the procedure if a clinical diagnosis is "undetermined" or "suspicious".

10. Appeal Procedures

- An owner has the right to appeal against the results of an eye examination.
- Evaluations of appeal cases are performed by a minimum of three members of the National Panel together or by a Chief or deputy Chief Panellist.
- Any appeal against the result of an eye examination should be lodged with the National Panel or National Registry within 60 days after the examination. In the case of choroidal hypoplasia and retinal dysplasia re-examination must be completed

before 12 weeks of age or within 5 days if the puppy was aged less than 12 weeks at the time of the initial examination.

- The owner will present the animal, and the Certificate issued by the first Panellist, for examination at the owner's expense. The most adverse judgement is valid until the animal is examined by a minimum of three members of the National Panel or by a Chief or Deputy Chief Panellist, whose decision will be final.

11. Further details

Further details of the Scheme are issued by the HED-Committee of the ECVO (see ECVO Manual for KP-HED of Dogs and Cats). Unclear rules or regulations, new disease problems or other matters of concern are to be reported by the Panellist to the HED-Committee Chair. The HED-Committee, on the advice of the Advisory Committee, will provide further details and inform the Panellists by Guidelines in the ECVO Manual.
The most recent information regarding the ECVO Scheme can be found at: www.ecvo.org

Appendix A

The following list of diseases/variations must have been seen and recorded (at the discretion of the national panel). The protocol must be signed by the supervisor(s)
NOTE: The guidelines published in January of the examination year apply.

	Disease	Number
Globe	Microphthalmos	2
Eyelids	Distichiasis	5
	Lacrimal punctum, atresia	3
Cornea	Corneal dystrophy	3
Iris	Persistent pupillary membrane (iris-cornea or iris-lens)	3
	Persistent pupillary membrane (iris-iris, crossing pupil)	2
	Iris hypoplasia	2
	Iris atrophy	2
Lens	other lens opacity: nuclear ring	2
	other lens opacity: fiberglass like, pulverulent, punctate	5
	Pigment on anterior lens capsule	5
	Cataract, complete (total)	2
	Cataract posterior cortical, including posterior polar	10
	Cataract, anterior cortical / subcapsular	5
	other lens opacity: anterior suture lines	5
	other lens opacity: suture line tips	5
	Cataract, nuclear	5
	Lens (sub)luxation (can be seen without supervision – cats can be included)	5
Vitreus	Asteroid hyalosis	2
	Vitreous in anterior chamber	1
	PHTVL/PHPV grade 1	3
	PHTVL/PHPV grade 2-6	2
Fundus	Retinal detachment, complete (cats can be included) One can be seen without supervision	2
	Retinal detachment, partial (cats can be included) One can be seen without supervision	2
	RD focal/multifocal, retinal folds	5
	RD geographic	2
	CEA, CRD	20
	CEA, coloboma (3 has to be in collie-breeds)	5
	PRA early stage	2
	PRA late stage	3
	Micropapilla/Optic nerve hypoplasia	2
	Non-inherited focal retinopathies	5
	Other presumed hereditary retinopathies* (type described)	4
Other	Iridocorneal angle abnormalities (ICAA) as defined in Chapter 6 (Guidelines) as “affected”, of these, at least: 5 cases: Affected “mild”, 5 cases: Affected “moderate”, 5 cases: Affected “severe”	20

*Examples of retinopathies, but not limited to: Canine Multifocal Retinopathy (CMR), Chinese Crested (CC) Pigmentary Chorioretinopathy, Working Dog Retinopathy (WDR), Västgötaspets Retinopathy (J175) (see Chapter 6: Guidelines).

Important: Of the 500 dogs examined, at least 40 must be puppies <10 weeks age of any breed known to be affected by CEA. Of those at least 20 must be collie/sheltie puppies. At least 10 of

the puppies must be merle dogs. Five of the 10 merle puppies can be of other breeds than collie/sheltie.

Appendix B
List of relevant literature: Suggested reading list for candidates for the ESE examination

This reading list is a suggestion, intended as a guide for the candidates to prepare for the exam and is not all-embracing. It is recommended to address the latest issues of the literature mentioned on the list below

Anatomy, embryology and histology, physiology, immunology, pharmacology, neuro-ophthalmology, pathology and vision

- Gelatt & al.: Veterinary Ophthalmology, 6th ed., Wiley-Blackwell, 2021.
- Maggs & al.: Slatter's Fundamentals of Veterinary Ophthalmology, 6th ed., Saunders/Elsevier, 2016

Clinical ophthalmology

- Gelatt & al.: Veterinary Ophthalmology, 6th ed., Wiley-Blackwell, 2021.
- Maggs & al.: Slatter's Fundamentals of Veterinary Ophthalmology, 6th ed., Saunders/Elsevier, 2016.
- Gelatt & Plummer: Color atlas of veterinary ophthalmology, 2nd ed., John Wiley & Sons, 2017.
- Ketring & Glaze: Atlas of feline ophthalmology, 1st ed. John Wiley & Sons, 2012.

Genetics

- ECVO Manual on presumed inherited diseases (Available on https://www.ecvo.org (go to Hereditary Eye Diseases).)
- ACVO Genetics Committee: Ocular disorders proven or suspected to be hereditary in dogs. (Blue Book available on: https://www.ofa.org/diseases/eye-certification).
- Gelatt & al.: Veterinary Ophthalmology, 6th ed., Wiley-Blackwell, 2021.

Journals

Veterinary Ophthalmology (last 7 years till 1st of Jan the year the exam is sat, including e-publications). Other relevant articles (including e-publications) related to inherited eye diseases in dogs and cats during the last 7 years. Please, see the reference lists under breeds listed in the ECVO Manual.

Other recommended articles

Bellamy, K.K.L., F. Lingaas, and P. Madsen, *Heritability of distichiasis in Havanese dogs in Norway.* Canine Med Genet, 2021. **8**(1): p. 11.

Dubin, A.J., et al., *Evaluation of potential risk factors for development of primary angle-closure glaucoma in Bouviers des Flandres.* J Am Vet Med Assoc, 2017. **250**(1): p. 60-67.

Ekesten, B., et al., *Abnormal appearance of the area centralis in Labrador retrievers with an ABCA4 loss-of-function mutation.* Transl Vis Sci Technol, 2022. **11**(2): p. 36.

Everson, R., et al., *An intronic LINE-1 insertion in MERTK is strongly associated with retinopathy in Swedish Vallhund dogs.* PLoS One, 2017. **12**(8): p. e0183021.

Graham, K.L., C. McCowan, and A. White, *Genetic and Biochemical Biomarkers in Canine Glaucoma.* Vet Pathol, 2017. **54**(2): p. 194-203.

Joyce, H., et al., *Identification of a variant in NDP associated with X-linked retinal dysplasia in the English cocker spaniel dog.* PLoS One, 2021. **16**(5): p. e0251071.

Kaukonen, M., et al., *Maternal Inheritance of a Recessive RBP4 Defect in Canine Congenital Eye Disease.* Cell Rep, 2018. **23**(9): p. 2643-2652.

Mäkeläinen, S., et al., *An ABCA4 loss-of-function mutation causes a canine form of Stargardt disease.* PLoS Genet, 2019. **15**(3): p. e1007873.

Mäkeläinen, S., et al., *Deletion in the Bardet-Biedl Syndrome Gene TTC8 Results in a Syndromic Retinal Degeneration in Dogs.* Genes (Basel), 2020. **11**(9).

Oh, A., et al., *Phenotypic characterization of complete CSNB in the inbred research beagle: how common is CSNB in research and companion dogs?* Doc Ophthalmol, 2018. **137**(2): p. 87-101.

Oliver, J.A., A.B. Ekiri, and C.S. Mellersh, *Pectinate ligament dysplasia in the Border Collie, Hungarian Vizsla and Golden Retriever.* Vet Rec, 2017. **180**(11): p. 279.

Stavinohova, R., et al., *Clinical, histopathological and genetic characterisation of oculoskeletal dysplasia in the Northern Inuit Dog.* PLoS One, 2019. **14**(8): p. e0220761.

Winkler, P.A., L.M. Occelli, and S.M. Petersen-Jones, *Large Animal Models of Inherited Retinal Degenerations: A Review.* Cells, 2020. **9**(4).