



Retinal Detachment Data Set

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Introduction

A dataset comprises a set of defined variables representing clinical information about a patient with a given condition. A formal Royal College interest in ophthalmic datasets began in 2002 with the initiation of work on the cataract national dataset. Under the umbrella of the NSF for diabetes a diabetic retinopathy screening dataset was developed and subsequently the Do Once And Share (DOAS) programme supported further dataset work on cataract, glaucoma and diabetic eye care. The widespread use of the cataract national dataset has facilitated useful national audits.¹

This document describes a proposed dataset for retinal detachment. The dataset has been composed by a subcommittee of the Royal College Informatics and Audit Committee, comprising a representative selection of experts in retinal detachment working in a variety of healthcare environments across the UK. The British and Eire Association of Vitreoretinal Surgeons was represented by their Interim Chairman Alistair Laidlaw. Between them the authors have a great deal of experience not only in the management of retinal detachment, but also in audit, electronic data collection,² and research.

Application

The purpose of this dataset is to represent an agreed set of clinical information which can be collected on patients with retinal detachment. As well as defining the items to be collected, the dataset also describes the format for each item. The dataset can be used as a basis for clinical care, outcome analysis, clinical audit, revalidation, and research. Common use of the dataset will ensure that information collected by different clinicians, using different paper or electronic systems in different locations, is easily transferable, and can therefore form the basis of large, anonymised databases for audit and outcomes research. Each data item is colour coded according to the following scheme;

Category	
<i>Revalidation</i>	Required for revalidation purposes
Mandatory	Data items which are essential for all applications, and must be collected
Optional	Data items which are required for some applications, and may be collected

NB. Currently no items are marked red (revalidation) since the selection of these items is the responsibility of the revalidation committee of the College, rather than the Informatics and Audit committee.

Scope

This dataset applies only to patients with rhegmatogenous retinal detachment (RRD), which is defined as retinal detachment associated with retinal breaks, including retinal dialyses. The following sub-categories are excluded;

- Traumatic retinal detachment from penetrating injury or severe contusion (RRD associated with retinal dialyses with or without a history of trauma are included)
- RRD associated with vasoproliferative disorders such as proliferative diabetic retinopathy, sickle cell retinopathy or retinopathy of prematurity
- RRD associated with Inflammatory eye disease including (e.g. CMV, ARN, Pars planitis, endophthalmitis)

Principles

The dataset is designed to comply with the following principles

1. The dataset should be a subset of information routinely collected

The intention is not to burden already busy clinicians with additional work, so the dataset should be constructed of items that are, or should be, recorded as part of the routine clinical management of the patient.

2. Items not required for likely analysis should be excluded

The collection of data requires time and effort, and therefore the total number of items should be kept to a minimum. The range of analyses likely to be conducted on the data is largely predictable, and items not required for these analyses should be excluded.

3. Items in common with other College datasets should be congruent

A number of data items (for example visual acuity, IOP) will be common to other ophthalmic datasets. It makes sense to ensure that only one definition for each item is used throughout all datasets, particularly within a subspecialty.

4. The dataset should be capable of implementation in an electronic patient record

It is likely that the maximum benefit of the dataset will only be achieved when information is being routinely collected using electronic patient record systems. It is therefore essential that it is capable of being implemented electronically.

Datatypes

Each item of the dataset has a data type, from the list below. These correspond to data types available in most relational database management systems (RDMS), which generally form the core of real EPR systems.

Type	Description
NULL	A special entity representing an uncertain or unassigned value
INTEGER	An integer value, normally unsigned (i.e. zero or positive values only)
FLOAT	A floating point value, positive or negative
BOOL	A value representing true or false
STRING	A value containing text (alphanumeric data) of unspecified length
ENUM	A value which represents one of a limited range of values
DATE	A value representing a date
DATETIME	A value representing a date and time

The term 'LIST' is not a data type, but will be used in this document to represent a 'one-to-many relationship'. This is a standard way in a RDMS of representing data items which can vary in number (for example a patient could have one, two or any number of symptoms)

Components of Dataset

The dataset is divided into five sections, described as follows;

- Demographics - demographic data about the patient
- Initial assessment - characteristics of the eye and the retinal detachment
- Fellow eye - characteristics of the fellow eye
- Operation - details of the operation (as a LIST, since more than one may be required)
- Final assessment - outcome and follow up details

Items marked with an asterisk (*) have additional explanations in the Notes section of this document.

Demographics

The elements in this section are likely to be common to all ophthalmic datasets.

Item	Description	Values/format
Patient ID	An identifier which will uniquely identify the patient. In England and Wales this could be the NHS number. This would be removed in anonymised datasets	INTEGER
Age	The age of the patient in years at the time of presentation. Age provides sufficient information for scientific analysis, without also being patient identifiable data (PID), unlike date of birth	INTEGER
Sex	The patient's gender	ENUM (Male, Female)
Postcode	The postcode district (outward code). This is the first part of a postcode, and generally corresponds to a post town. It gives useful information for demographic analysis, without being PID	STRING
Consultant	Identifier for consultant in charge of patient (to allow individual audits)	INTEGER
Ethnic category	The ethnicity of the patient using the classification used for the 2001 census ³	ENUM (British, Irish, Any other White background, White and Black Caribbean, White and Black African, White and Asian, Any other mixed background, Indian, Pakistani, Bangladeshi, Any other Asian background, Caribbean, African, Any other Black background, Chinese, Any other ethnic group, Not stated)

Item	Description	Values/format
Route of referral	Route by which patient arrived in the ophthalmic department, based on who made the initial diagnosis (e.g. if an Optometrist sends a patient via the GP with a suspected diagnosis of RRD, this item would have a value of 'Optometrist')	ENUM (Optometrist, GP, Ophthalmologist from other Trust, Ophthalmologist from same Trust, General A&E, Ophthalmic A&E, New diagnosis in clinic, Other)

Initial assessment

Some of the elements in this section will be common to other ophthalmic datasets. Note that many of the items that might be expected in this section, are found in the operation section. This is to avoid duplication of data entry, and reflects the fact that initial examination findings are often refined at the time of surgery.

Item	Description	Values/format
Assessment Date	Date of this assessment	DATE
Symptoms	List of presenting symptoms	LIST (Floaters, Flashes, Field loss, Central vision loss)
Date of onset of symptoms	Date when patient first noticed any symptoms, or NULL if no symptoms	DATE* or NULL
Date of onset of central vision loss	Date when patient first noticed central vision loss, or NULL if no central vision loss	DATE* or NULL
Systemic condition	Relevant systemic condition associated with retinal detachment	ENUM (None, Marfan's, ROP, Stickler)
Eye	Eye	ENUM (Right, Left)
Refraction	Refractive error as spherical equivalent	FLOAT

Item	Description	Values/format
Prior refraction	Estimated refractive error prior to any form of refractive surgery (LASIK, cataract surgery etc)	ENUM (Myopia, Emmetropia, Hypermetropia)
Assessment Acuity	Best recorded acuity	Visual acuity*
Anterior segment abnormality	Relevant abnormalities of the anterior segment	LIST(Corneal opacity, Posterior synechiae, Coloboma, Odontokeratoprosthesis)
Lens	Status of lens of eye. (Phakic - cataract is defined as a lens opacity sufficient to warrant lens surgery at the same operation)	ENUM (Phakic, Phakic cataract, Aphakic, Aphakic Soemmerring ring, PC IOL, AC IOL, Phakic IOL, Angle supported IOL, Iris clip IOL)
Date of cataract surgery	If pseudophakic or aphakic, date of cataract surgery	DATE* or NULL
IOP	Intraocular pressure in mmHg	INTEGER
Date of previous RRD surgery	Date of previous RRD surgery	DATE* or NULL
Vitreous	Attached or detached on clinical examination. (definition of PVD is at the discretion of examining ophthalmologist)	ENUM (Uncertain, PVD, No PVD, Vitrectomised eye)
Vitreous haemorrhage	Amount of blood in the vitreous*	ENUM (0 - 4)
Predisposing lesions	Clock hours of lattice, or lattice-like lesions	ENUM (0 - 12)
Prophylaxis	Evidence of previous prophylactic retinopexy	BOOL

Item	Description	Values/format
Pathological myopia	Posterior segment features of pathological myopia including staphyloma, and RPE atrophy	BOOL

Fellow eye

Item	Description	Values/format
Refraction	Refractive error as spherical equivalent	FLOAT
Prior refraction	Estimated refractive error prior to any form of refractive surgery (LASIK, cataract surgery etc)	ENUM (Myopia, emmetropia, hypermetropia)
Acuity	Best recorded acuity	Visual acuity*
Vitreous	Attached or detached on clinical examination. (definition of PVD is at the discretion of examining ophthalmologist)	ENUM (Uncertain, PVD, no PVD, Vitrectomised eye)
Vitreous haemorrhage	Amount of blood in the vitreous*	ENUM (0 - 4)
Predisposing lesions	Clock hours of lattice, or lattice-like lesions	ENUM (0 - 12)
Retinal breaks	Number of retinal breaks	INTEGER
Prophylaxis	Evidence of previous prophylactic retinopexy	BOOL
Retinal detachment	Presence of retinal detachment	BOOL

Operation

The operation is made up of a core of common elements, including the examination findings at the time of surgery, plus optional additions. These additions are designed to be compatible with future datasets for other vitreoretinal conditions (for example macular hole, epiretinal membrane). This information is collected for every retinal procedure carried out between the initial assessment and final follow up.

Common elements

Item	Description	Values/format
Admission type	Type of admission	ENUM (Outpatient, Day case, Inpatient)
Date and time	Date and time of surgery (time is included to allow analysis of out of hours surgery)	DATETIME
Surgeon	Identifier for primary surgeon (to allow individual audits)	INTEGER
Surgeon grade	Grade of primary surgeon	ENUM (Consultant, Fellow, Specialist registrar, Associate specialist, Clinical assistant, Trust Doctor)
Assistant	Grade of assistant if any	ENUM (None, Consultant, Fellow, Specialist registrar, Associate specialist, Clinical assistant, Trust Doctor, Nurse)
Anaesthetic	Type of anaesthetic	ENUM (Topical, Peribulbar, Subtenon, General)
Antisepsis	Preparation of eye prior to surgery	ENUM (Chlorhexidine, Povidone iodine, Other)
Cause of failure	If a redo, what was the cause of failure?	ENUM (Not applicable, Untreated break, Treated break open, PVR, Unknown)

Item	Description	Values/format
Foveal attachment	Status of fovea, on, off, or subretinal fluid bisecting the fovea	ENUM (On, Off, Bisected)
Comorbidity	Concurrent pathology with the potential to compromise central vision	ENUM (AMD, RVO, DMO, Macular hole, Amblyopia, Optic neuropathy, Other)
Extent (ST quadrant)	Extent of detachment in clock hours at ora	ENUM (0 - 3)
Extent (SN quadrant)	Extent of detachment in clock hours at ora	ENUM (0 - 3)
Extent (IN quadrant)	Extent of detachment in clock hours at ora	ENUM (0 - 3)
Extent (IT quadrant)	Extent of detachment in clock hours at ora	ENUM (0 - 3)
Chronic	Signs of chronicity (cysts, thin retina, etc)	BOOL
PVR type	Grade of PVR according to the 1991 classification*	ENUM (None, A, B, C)
PVR CP	Extent of PVR CP in clock hours	ENUM (0 - 12)
PVR CA	Extent of PVR CA in clock hours	ENUM (0 - 12)
Subretinal bands	Presence or absence of subretinal bands	BOOL
Choroidals	Presence or absence of choroidal effusion	BOOL
Breaks in detached retina	Number of breaks found in detached retina	INTEGER
Breaks in attached retina	Number of breaks found in attached retina	INTEGER

Item	Description	Values/format
Type of largest break	Type of largest break	ENUM (Not found, 'U' tear, Round hole, Dialysis, GRT, Macular hole, Outer leaf break, Peripapillary break)
Size of largest break	Size of largest retinal break in clock hours	ENUM (0.5, 1 - 12)
Position of lowest break	Position of most inferior break in detached retina in clock hours	ENUM (1 - 12)
Positioning instructions	Posturing instructions. Log roll is defined as a sequence of posturing positions intended to displace sub retinal fluid away from the macula	ENUM (None, Prone, Supine, One cheek, Alternate cheeks, Log roll, Other)

Anterior segment

Item	Description	Values/format
Lens surgery	Phakoemulsification or lensectomy	ENUM (None, Phakoemulsification, Lensectomy)
IOL	Insertion of IOL	ENUM (None, AC IOL, Iris clip IOL, PC IOL rigid, PC IOL foldable)
Keratoprosthesis	Use of a temporary keratoprosthesis	BOOL

Pneumatic retinopexy

Item	Description	Values/format
Site of injection	Entry point of injection as a clock hour	ENUM (1-12)
Volume	Volume of gas injected in millilitres	FLOAT

Item	Description	Values/format
Order	Order of procedures	ENUM (Retinopexy first, Gas first)
Stages	Whether one stage or two stage procedure (If 2 stage, date applies to stage 1)	ENUM (1,2)

Removal of silicone oil

Item	Description	Values/format
Route	Route of oil removal. Limbus implies an aphakic eye, capsule means removal via a posterior capsulotomy as part of combined Phako/ROSO	ENUM (None, Limbus, Capsule, Sclerotomy)
360 retinopexy	Supplementary retinopexy in order to create a 360 barrier walling off the anterior retina	BOOL

Vitrectomy

Item	Description	Values/format
Viewing system	Type of viewing system used for the majority of the operation. Contact lens is defined as a Goldman type (flat faced) contact lens which does not give a wide angle view	ENUM (Wide angle viewing system, Contact lens, Indirect ophthalmoscope)
Conjunctiva	Treatment of conjunctiva	ENUM (Peritomy, Local incisions, TSV)
Gauge	Gauge of vitrectomy system	ENUM (None, 20g, 23g, 25g)
Cut rate	Maximum cutter speed	INTEGER

Item	Description	Values/format
Vitreous base	Treatment of vitreous base	ENUM (Standard, Indented trim)
Drainage	Type of drainage of subretinal fluid	ENUM (None, Through break, Drainage retinotomy, Externally)
PFCL	Use of perfluorocarbon liquids	BOOL
Sclerostomies sutured	Number of sclerostomies sutured	INTEGER
Induction of PVD	The creation of a PVD during surgery	BOOL
Peel	Peeling of epiretinal membranes	BOOL
Relaxing retinectomy	Extent in degrees (0 indicates no retinotomy)	INTEGER
Triamcinolone	Use of triamcinolone to enhance visualisation during vitrectomy	BOOL
ICG	Use of ICG	BOOL
Membrane blue	Use of membrane blue	BOOL
Vision blue	Use of vision blue	BOOL

Buckle

Item	Description	Values/format
Peritomy	Extent of conjunctival peritomy in clock hours	ENUM (1-12)
Muscles slung	Number of extraocular muscles slung	ENUM (1 -4)

Item	Description	Values/format
Drainage	Type of subretinal drainage. SND is a suture needle drain	ENUM (None, SND, Laser, Cutdown)
Paracentesis	Whether a paracentesis was carried out	BOOL

Buckling elements (LIST)

Item	Description	Values/format
Type of element	Buckling element	ENUM (Other, 3mm sponge, 4mm sponge, 5mm sponge, 7mm sponge, 276, 277, 279, 280, 40 band, 240 band)
Configuration	Configuration of buckle	ENUM (Encircling, Radial, Circumferential)
Extent	In clock hours (for circumferential only)	ENUM (1 - 12)
Sutures	Number of sutures used to secure the element	INTEGER

Retinopexy

Item	Description	Values/format
Cryotherapy	Cryotherapy used for retinopexy	BOOL
Endolaser	Endolaser used for retinopexy	BOOL
Indirect laser	Indirect laser used for retinopexy	BOOL
Trans scleral diode	Trans scleral diode used for retinopexy	BOOL
360	Retinopexy applied 360 degrees	BOOL

Tamponade

Item	Description	Values/format
Type	Type of tamponade agent	ENUM (None, Air, SF6, C2F6, C3F8, 1000cS oil, 2000cS oil, 5000cS oil, Densiron, Oxane HD, PFCL)
Percent	If gas, the concentration used in percent	INTEGER

Complications

Item	Description	Values/format
Choroidal haemorrhage		BOOL
Lens touch		BOOL
Entry site break/s	Iatrogenic break at vitreous base or ora within one clock hour either side of a sclerostomy	BOOL
Other iatrogenic breaks	Non-entry site iatrogenic retinal break from the vitreous cutter, peeling or other cause	BOOL
Deep suture		BOOL
Drain haemorrhage		BOOL
Incarceration		BOOL

Follow-up

Final follow up visit

Item	Description	Values/format
Date	Date of visit	DATE
Type	Discharge or ongoing follow up	ENUM (Discharge,Ongoing)
Management complete	No additional retinal management planned (This would be true for patients with oil and no plans to remove it)	BOOL
Readmission	Readmission within 28 days	BOOL
Number of operations	Total number of operations for retinal detachment prior to this point, including removal of silicone oil	INTEGER
Attached	Fully attached retina*	BOOL
Oil	Silicone oil tamponade present	BOOL
Acuity	Visual acuity	Visual acuity*
Lens	Status of lens of eye. (Phakic - cataract is defined as a lens opacity sufficient to warrant lens surgery, or to obscure view of fundus)	ENUM (Phakic, Phakic cataract, Aphakic, Aphakic - Soemmerring ring, PC IOL, AC IOL, Phakic IOL, Angle supported IOL, Iris clip IOL)
IOP problem	Whether RRD management has induced an ongoing pressure problem (pressure requiring either monitoring or treatment in an eye that had neither pre-operatively)	BOOL

Item	Description	Values/format
Foveal attachment	Status of fovea, on, off, or subretinal fluid bisecting the foveal. Fovea on is a clinical definition includes cases with subfoveal blebs on OCT	ENUM (On, Off, Bisected)
Macular ERM	Epiretinal membrane at the macula defined as acquired macular distortion and or sight limiting oedema in presence of an ERM	BOOL
Macular hole	Macular hole	BOOL
Macular fold	A retinal fold at or near the macula resulting in significant visual symptoms such as distortion or torsional diplopia.	BOOL
Hypotony	Defined as IOP less than 5mmHg	BOOL

Comments

Item	Description	Values/format
Comments	Any additional comments on any aspect of the case not otherwise appearing in the dataset.	STRING

Notes

This section gives additional detail for some of the terms used in the dataset.

Term	Explanation
Retinal re-attachment	Retinal reattachment is defined as attachment of the retina with no tamponade present, and no subretinal fluid which could spread. This would include those eyes with small traction detachments posterior to a circumferential or encircling buckle. It would also include eyes with anterior fluid walled off by 360 degree retinopexy.
Date	The DATE type is used for the majority of items which refer to points in time. For some items (such as duration of visual symptoms, most patients will express this in terms of days or weeks, rather than a particular date. However, this can be converted into a date for storage, and recreated in any time units (days, weeks, or months) by date subtraction.
Primary surgeon	The surgeon carrying out the most significant components of the operation. In most cases this will be the surgeon that carries out the majority of the operation. However, in the case of a scleral buckling procedure, where surgeon A slings the muscles, sutures the buckle, and completes the operation, and surgeon B carries out the shorter but more significant steps of external search and cryotherapy, the primary surgeon would be Surgeon B.
PVR	PVR is classified according to the modified Retina Society classification of 1991. ⁴
Visual acuity	Visual acuity is an important measure of visual function, but is measured, and expressed in a wide variety of ways (Snellen, ETDRS, LogMar etc). Since this measure is common to all ophthalmic data sets, the datatype and method of storage should be standardised. This is the subject of a separate initiative by the Informatics and Audit Committee.

Term	Explanation
Vitreous haemorrhage	<p>Vitreous haemorrhage is assessed using a simple four point density grading scheme⁵ as follows;</p> <p>Grade 0: No blood present in the vitreous, the entire retina is visible.</p> <p>Grade 1: Some hemorrhage present, which obscures between a total of 1 to 5 clock hours of retina.</p> <p>Grade 2: Hemorrhage obscures between a total of 5 to 10 clock hours of central and/or peripheral retina, or a large hemorrhage is located posterior to the equator, with varying clock hours of anterior retina visible.</p> <p>Grade 3: A red reflex is present, with no retinal detail seen posterior to the equator.</p> <p>Grade 4: Dense VH with no red reflex present</p>

References

1. Cataract National Dataset V1.2 – Royal College of Ophthalmologists.
2. VR database from “Vitreoretinal Surgery” Thomas Williamson, Springer 2008.
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4. Machemer R, Aaberg TM, Freeman HM, Irvine AR, Lean JS, Michels RG. An updated classification of retinal detachment with proliferative vitreoretinopathy. *Am J Ophthalmol* 1991;**112**:159-165.
5. Lieberman RM, Gow JA, Grillone LR. Development and Implementation of a Vitreous Hemorrhage Grading Scale. *Retinal Physician* May, 2006.