Strabismus Data Set

February 2021

2021/PROF/442

Contents

Date of review: February 2023

1 Introduction

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

This document describes a proposed data set for strabismus surgery. The data set was developed through a Delphi exercise involving members of the British & Irish Paediatric Ophthalmology & Strabismus Association.

2   Application

The purpose of this data set is to represent an agreed set of clinical information which can be collected on patients being considered for strabismus surgery. As well as defining the items to be collected, the data set also describes the format for each item. The data set can be used as a basis for clinical care, outcome analysis, clinical audit, revalidation and research. Common use of the data set 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	
Mandatory	Data items which are essential for all applications, and must be collected
Desirable	Advised as valuable for audit or knowledge extraction purposes
Optional	Data items which are required for some applications, and may be collected

NB. Selection of red items to be confirmed by the revalidation committee of the College.

3   Scope

This data set applies to all patients with strabismus. Strabismus is often complex and affects both children and adults. While the dataset is designed for all cases of strabismus it may not cover some outcome items which would be desirable in more complex cases.

4   Principles

The data set is designed to comply with the following principles[2]

1. The data set should be a subset of information routinely collected

The intention is not to burden already busy clinicians with additional work, so the data set should be constructed of items that are, or should be, recorded as part of the 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 the minimum required to ensure patient safety. 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 data sets should be congruent

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

4. The data set should be capable of implementation in an electronic patient record. It is likely that the maximum benefit of the data set 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.

5   Data Types

Each item of the data set has a type determined from table 1 below. These correspond to data types available in most relational database management systems (RDMS), which generally form the core of real EPR systems.

Table 1

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 (avoid spurious precision)
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
LIST	An entity containing one or more values which will be used to represent a 'one-to-many relationship'
DATETIME	A value representing a date and time

6   Components of Data Set

The data set is divided into 3 sections:

1. Patient – demographic data about the patient

2. Assessments – initial assessment and all follow-up assessments

3. Strabismus Surgery – details of strabismus surgery

7 Suggestions for improvement

We have made every effort to ensure that the dataset is comprehensive but also practical. We are certain that it is not perfect and any suggestions for improvements, bearing in mind the guiding principles, would be gratefully received.

1. PATIENT

Item	Description	Value/format	Origin of dataset item
Demographics			
Acute Trust	Unique identifier for the Acute Trust	an5 *Pseudonymised* See endnotes	Cataract - RCOphth
NHS Number	The number used to identify a patient uniquely within the NHS in England and Wales.	n10 *Pseudonymised* See endnotes	Cataract - RCOphth
Date of birth	The date on which the person was born.	n8 ccyymmdd *Pseudonymised* e-GIF See endnotes	Cataract - RCOphth
Consultant	Identifier for consultant in charge of the patient's care (separately from individuals delivering care, e.g. performing a procedure).	STRING	RCOphth guidelines on dataset specification
Person Gender Current (Sex)	A classification of the patient's gender.	n1 --- 0 Not Known 1 Male 2 Female 9 Not Specified ---	Cataract - RCOphth
Ethnic category	The ethnicity of a person using the classification used for the 2001 census.	an2 The 16+1 new ethnic data categories defined in the 2001 census will become the national mandatory standard for the collection of ethnicity.	Cataract - RCOphth
Post Code of Usual Address	First Phrase of Post Code of Usual Address	an4 e-GIF Three- or four-character code, as provided in the Postcode Directory. Must NOT be the patient's full postcode. See endnotes	Cataract - RCOphth

Email	Patient's email address	STRING	Refractive - RCOphth
Telephone	Patient's mobile telephone number	STRING	Refractive - RCOphth
History			
Diagnosis	The diagnosis for which the patient is undergoing surgery	ENUM / LIST More than one value may be recorded -- Esotropia Exotropia Third nerve palsy Fourth nerve palsy Sixth nerve palsy Thyroid eye disease Blowout fracture Orbital fibrosis Esophoria Exophoria Convergence insufficiency Brown's tendon sheath syndrome Double elevator palsy Hypertropia Hypotropia Hyperphoria Hyphophoria Dissociated vertical deviation Inferior oblique overaction Inferior oblique underaction Congenital disorders of eye and eyelid movements Strabismus following cataract surgery Strabismus following retinal surgery Excyclotropia Incyclotropia Microtropia Duane's syndrome Nystagmus Other (specify) --	
Other diagnosis		an255 (max) Free text	

2. ASSESSMENTS

Assessment timepoints:

1. Pre-operatively (all patients)

2. At 3 months post-operatively (all patients)

3. At 1 year post-operatively (for patients still under review)

4. Prior to any repeat surgery (all patients)

Item	Description	Value/format	Origin of dataset item
Date of assessment	Date on which patient attends the hospital / clinical area for pre-operative assessment of strabismus	an10 ccyy-mm-dd e-GIF	Cataract - RCOphth
Visual acuity			
Distance Visual Acuity Measurement Standard	The standard which is being used to measure Distance Visual Acuity.	an50 --- Snellen Log MAR - ETDRS LogMAR single letter scoring LogMAR crowded LogMAR single Decimal Kays pictures crowded Kays pictures singles Cardiff Cards at 50cm Cardiff Cards at 1m Preferential looking (Teller / Keeler / Other) ---	Cataract - RCOphth
Distance Visual Acuity Measurement Method	The procedure by which the distance visual acuity is obtained: Distance vision (sight test) with glasses or other optical correction preceded by a test of refraction. Distance vision (sight test) using 'every day' usual correction with glasses or other optical correction.	an50 --- Best corrected distance visual acuity Habitual distance visual acuity Pinhole distance visual acuity Unaided distance visual acuity ---	Cataract - RCOphth

	Distance vision (sight test) without glasses or other optical correction, using the pinhole assessment. Distance vision (sight test) without glasses or other optical correction, and without using the pinhole assessment.		
Pre-operative Distance Visual Acuity Right eye	A measurement of vision using the specified Visual Acuity Standard taken from the most recent measure of visual acuity taken before surgery for that eye.	See endnotes	Cataract - RCOphth
Pre-operative Distance Visual Acuity Left eye	A measurement of vision using the specified Visual Acuity Standard taken from the most recent measure of visual acuity taken before surgery for that eye.	See endnotes	Cataract - RCOphth
Pre-operative Distance Visual Acuity Both eyes open	A measurement of vision using the specified Visual Acuity Standard taken from the most recent measure of visual acuity taken before surgery with both eyes open.	See endnotes	Cataract - RCOphth
Binocularity	Measure of binocular function	ENUM --- None Simultaneous perception Sensory fusion Motor fusion Stereopsis ---	
Stereopsis measurement method	Test used to measure stereopsis	ENUM / LIST More than one value may be recorded -- Frisby Lang TNO Preschool Randot	

		Titmus circles / Wirt fly --	
Stereopsis in seconds or arc	Measurement of stereoscopic vision	INTEGER	
Horizontal Prism fusion range (PFR) BI - Distance	Prism dioptres (base in)	Integer	
Horizontal Prism fusion range (PFR) BO - Distance	Prism dioptres (base out)	Integer	
Horizontal Prism fusion range (PFR) BI - Near	Prism dioptres (base in)	Integer	
Horizontal Prism fusion range (PFR) BO - Near	Prism dioptres (base out)	Integer	
Correction	Whether glasses / contact lenses were worn or not	BOOL	
Vertical Prism fusion range BD	Prism dioptres (base down)	Integer	
Vertical Prism fusion range BU	Prism dioptres (base up)	Integer	

Item	Description	Value/format	Origin of dataset item
Refraction			
Refraction Type	The method used to obtain a refraction value. This may be obtained by measurement of the patient's current glasses (focimetry) or by refraction of the patient at the time (either automated or manual including either subjective or retinoscopic refractions).	an50 --- Subjective Focimetry Autorefraction Retinoscopy ---	Cataract - RCOphth
Refraction Right eye Sphere	The spherical component of the optical correction required by the patient prior to surgery for the right eye. The sphere is the base correction upon which cylinder, reading addition (and prism) may be superimposed	±nn.nn 2dp Dioptres NB - It is essential to specify if the value is positive or negative.	Cataract - RCOphth
Refraction Right eye Cylinder	The cylindrical correction superimposed on 2.12 as part of the patient's refraction for the right eye	±nn.nn 2dp Dioptres NB - It is essential to specify if the value is positive or negative.	Cataract - RCOphth
Refraction Right eye Axis of cylinder	The axis of the cylindrical refraction in 2.13 for the right eye	nnn.n 1dp 000.5 to 180.0 degrees	Cataract - RCOphth
Refraction Right eye Reading Add	The amount of addition to the refraction in 2.12 - 2.14 that is prescribed for near vision for the right eye	n.nn 2dp Dioptres	Cataract - RCOphth

Item	Description	Value/format	Origin of dataset item
Refraction Left eye Sphere	The spherical component of the optical correction required by the patient prior to surgery for the left eye. The sphere is the base correction upon which cylinder, reading addition (and prism) may be superimposed	±nn.nn 2dp Dioptres NB - It is essential to specify if the value is positive or negative.	Cataract - RCOphth
Refraction Left eye Cylinder	The cylindrical correction superimposed on 2.16 as part of the patient's refraction for the eft eye.	±nn.nn 2dp Dioptres NB - It is essential to specify if the value is positive or negative.	Cataract - RCOphth
Refraction Left eye Axis of cylinder	The axis of the cylindrical refraction in 2.17 for the eft eye.	nnn.n 1dp 000.5 to 180.0 degrees	Cataract - RCOphth
Refraction Left eye Reading Add	The amount of addition to the refraction in 2.16 - 2.18 that is prescribed for near vision for the eye for surgery.	n.nn 2dp Dioptres	Cataract - RCOphth

Item	Description	Value/format	Origin of dataset item
Oculomotility			
Current experience of diplopia	Indication of whether the patient is currently experiencing diplopia	BOOL	
Method of measurement	To indicate how strabismus angle was measured	ENUM / LIST -- The same measurement may be taken with different techniques -- Alternate prism cover test Simultaneous prism cover test Hirschberg Krimsky Synoptophore Prism reflection test --	
Position in which angle was measured	Indication of head position when eye measurements were made. Important in incomitant squints.	ENUM / LIST -- More than one value may be recorded (e.g. may wish to record in primary, left and right head turns) -- Primary position Down gaze Right / down gaze - Dextrodepression Left / down gaze - Laevodepression Up gaze Right / up gaze - Dextroelevation Left / up gaze - Laevoelevation Right gaze Left gaze Right head tilt Left head tilt --	
Distance horizontal angle with glasses	The angle of the squint measured at distance and near with and without glasses on using the prism cover test.	FLOAT	
Distance horizontal angle without glasses		FLOAT	
Near horizontal angle with glasses		FLOAT	
Near horizontal angle without glasses		FLOAT	
Horizontal angle description	The nature of the deviation – to be applied to each of the angles measured to indicate the direction of the deviation	ENUM -- X XT E	

		ET --	
Vertical angle description	To indicate which eye is higher or lower	ENUM -- Right Hypotropia Right Hypertropia Left Hypotropia Left Hypertropia --	
Distance vertical angle with glasses	The angle of the squint measured at distance and near with and without glasses on using the prism cover test.	FLOAT	
Distance vertical angle without glasses		FLOAT	
Near vertical angle with glasses		FLOAT	
Near vertical angle without glasses		FLOAT	
Compensatory head posture	To record if the patient adopts a head posture in order to control their double vision or take advantage of a null zone	ENUM / LIST More than one value may be recorded -- None Left head turn Right head turn Left head tilt Right head tilt Chin up Chin down --	
Torsion descriptor	Describes the direction of torsion	ENUM -- None Incyclotorsion Excyclotorsion --	
Torsion size	Describes the amount of torsion	Integer	

Item	Description	Value/format	Origin of dataset item
Patient reported outcomes			
AS20 - Overall score	Quality of life questionnaire to indicate the impact of the strabismus on the patient's quality of life	INTEGER	
AS20 - Psychosocial subscale		INTEGER	
AS20 - Function subscale		INTEGER	
Newcastle control score total	Score to grade the severity of childhood intermittent exotropia	INTEGER	
Newcastle control score home		INTEGER	
Newcastle control score clinic near		INTEGER	
Newcastle control score clinic distance		INTEGER	
Intermittent Exotropia Questionnaire (IXTQ)- Child	The Intermittent Exotropia Questionnaire (IXTQ) is a patient, proxy, and parental report of quality of life specific to children with intermittent exotropia	INTEGER	
Intermittent Exotropia Questionnaire (IXTQ)- Proxy		INTEGER	
Intermittent Exotropia Questionnaire (IXTQ)- Parent – Overall score		INTEGER	
Intermittent Exotropia Questionnaire (IXTQ)- Parent – Function subscale		INTEGER	
Intermittent Exotropia Questionnaire (IXTQ)- Parent – Psychosocial subscale		INTEGER	
Intermittent Exotropia Questionnaire (IXTQ)- Parent – Surgery subscale		INTEGER	
Diplopia Questionnaire	To assess severity of diplopia	INTEGER	

Post-operative assessment only			
Subjective assessment of benefit	Patient's satisfaction with the outcome of surgery	a50 --- Improved No change Worse than pre-operatively --- See endnotes	Cataract - RCOphth
Satisfaction with quality of care throughout care pathway for strabismus surgery	Indication of how satisfied the patient is with their experience of care during their strabismus surgery.	a50 --- Satisfied Neither satisfied nor dissatisfied Dissatisfied --- See endnotes	Cataract - RCOphth
Post-operative complications	Free text field for unplanned events occurring after surgery that in the opinion of the operating surgeon would potentially adversely affect the outcome or influence post-operative requirements.	ENUM / LIST More than one value may be recorded. --- None Slipped muscle Infection -orbital cellulitis / abscess at muscle insertion Surgically induced necrotising scleritis Retinal detachment Retinal tear Endophthalmitis Anterior segment ischaemia Intractable diplopia Unplanned over/ under correction Ptosis Recurrence Repeat surgery Return to theatre in 30 days Choroidal haemorrhage Globe perforation Suture Granuloma Other (specify) ---	
Other operative incidental events/complications		an255 (max) Free text	

3. STRABISMUS SURGERY

Item	Description	Value/format	Origin of dataset item
Venue of surgery - (site code)	The Eye facility in which the surgery occurred	an255 *Pseudonymised* Non-NHS UK provider where no organisation site code has been issued Not applicable: non-UK provider See endnotes	Cataract - RCOphth
Date of surgery	The date on which the strabismus surgery takes place.	an10 ccyy-mm-dd e-GIF	Cataract - RCOphth
Surgeon	The professional registration code of the operating surgeon, i.e. GMC Number	an8 *Pseudonymised* See endnotes (It is suggested that this is recorded for each muscle rather than each procedure)	Cataract - RCOphth
First name of operating surgeon	First name of the operating surgeon as it is on the GMC register	STRING See endnotes (It is suggested that this is recorded for each muscle rather than each procedure)	Cataract - RCOphth
Last name of operating surgeon	Last name of the operating surgeon as it is on the GMC register	STRING See endnotes (It is suggested that this is recorded for each muscle rather than each procedure)	Cataract - RCOphth
Surgeon Grade	The grade of the operating surgeon	an50 --- Consultant Associate Specialist Staff Grade Trust doctor Fellow Specialist registrar Foundation Year 2 Trainee (formerly SHO) Other --- (It is suggested that this is recorded for each muscle rather than each procedure)	Cataract - RCOphth

Assistant	The professional registration code of the member of staff assisting with the operation	an8 *Pseudonymised* See NHS Data Dictionary See endnotes	Cataract - RCOphth
Assistant Grade	The grade of the member of staff assisting the operation.	an50 --- Consultant Associate Specialist Staff Grade Trust doctor Fellow Specialist registrar Foundation Year 2 Trainee (formerly SHO) Other (specify) None ---	Cataract - RCOphth
The primary reason for strabismus surgery.	The primary reason for strabismus surgery.	ENUM / LIST More than one value may be recorded -- Reduction / elimination of diplopia Restoration / development of binocular vision Elimination or improvement of abnormal head posture Psychosocial function Restore appropriate ocular alignment Intolerance of prism glasses or patch Restoration of binocular visual field Strabismic amblyopia Reduction of aesthenopic symptoms (fatigue, pain in or around the eyes, blurred vision, headache and occasional double vision) Maintain or restore optimal visual acuity in each eye --	

Item	Description	Value/format	Origin of dataset item
Muscle operated on	To identify which muscle was operated on	ENUM / LIST More than one value may be recorded -- Medial rectus Lateral rectus Inferior oblique Inferior rectus Superior rectus Superior oblique --	
Laterality of Muscle operated on	To identify which muscle in which eye was operated on	ENUM -- Right Left Bilateral --	
Operation carried out	To identify what surgical procedure was carried out to the muscle	ENUM / LIST More than one value may be recorded (e.g. Scott's = recession of MR by x and resection of MR by x) -- Not operated on Recession Resection Adjustable resection Adjustable recession Bilateral Recession Bilateral Resection Recess LR Resect MR Recess MR Resect LR Faden Plication Advancement Plication / Tuck Harada-Ito Transposition Myectomy Myotomy Disinsertion	

		Tendon expander	
		Anterior transposition	
		Superoplacement	
		Inferoplacement	
		Marginal myotomy	
		Central tenotomy	
		Botulium toxin	
		Bupivacaine	
		Z-plasty	
		Extirpation	
		Tenotomy	
		--	
Amount of surgery carried out	To identify how far the muscle was moved from its original insertion or by how much the muscle was shortened	INTEGER	
Muscle previously operated on	To identify surgery on previously operated muscles(default to no)	ENUM -- No Yes --	
Target horizontal angle correction	Indicates the amount of surgery planned e.g. 40 dioptres	FLOAT	
Target vertical angle correction	Indicates the amount of surgery planned e.g. 10 dioptres	FLOAT	
Target condition	To indicate whether the target angle is with or without glasses on	ENUM -- Distance with correction Distance without correction Near with correction Near without correction --	
Muscle surgery performed by	To indicate what grade of surgeon performed the surgery on each muscle	ENUM -- Consultant Junior supervised by consultant Junior unsupervised --	

| Adjustment carried out | To indicate whether adjustment occurred | ENUM
--
No
Yes
-- | |

Item	Description	Value/format	Origin of dataset item
Operative incidental events / complications	Unplanned events occurring during surgery that in the opinion of the operating surgeon would potentially adversely affect the outcome.	ENUM / LIST More than one value may be recorded. --- Globe perforation Intra-operative lost muscle Wrong eye / muscle / procedure Adverse event relating to anaesthetic Other (specify) ---	
Other operative incidental events/complications	Free text field for unplanned events occurring during surgery that in the opinion of the operating surgeon would potentially adversely affect the outcome or influence post-operative requirements.	STRING	Cataract - RCOphth

References

1. Cataract National Data set V1.2 – Royal College of Ophthalmologists.

2. Dataset Guidelines Authors: The Informatics and Audit Committee, Royal College of Ophthalmologists. V1.0 2013

Endnotes

Visual Acuity can be recorded in Snellen, LogMAR or Decimal and then converted to LogMAR for statistical analysis.

Need Visual Acuity in both eyes if the visual impairment prior to cataract surgery is to be defined as in the National Cataract Audit.

Preference order for Visual Acuity measurements are:

Pre-operative - Best Corrected/Habitual, Unaided, Pinhole.

Post-operative - Best Corrected/Habitual, Pinhole, Unaided.

	Snellen	LogMAR	Decimal
Snellen Fraction:	6/3	-0.30	2.00
Numerator is the test distance, Denominator is the line seen.	6/4	-0.20	1.50
	6/5	-0.10	1.20
Log MAR:	6/6	0.00	1.00
[-]n.nn	6/9	0.20	0.67
Conversion: LogMAR VA = Log(10) [1/(Snellen Fraction)]	6/12	0.30	0.50
	6/18	0.50	0.33
Decimal:	6/24	0.60	0.25
n.nn	6/36	0.80	0.17
Conversion: Decimal VA = Snellen Fraction expressed as decimal value.	6/48	0.90	0.13
	6/60	1.00	0.10
Scale Extension:	5/60	1.10	0.08
0.5/60 ~CF (Counting Fingers)	4/60	1.20	0.07
0.5/120 ~HM (Hand Movements)	3/60	1.30	0.05
0.5/240 ~PL (Perception of Light)	2/60	1.50	0.03
0.5/480 ~NPL (No Perception of Light)	1/60	1.80	0.02
	0.5/60	2.10	0.01
	0.5/120	2.40	0.004
	0.5/240	2.70	0.002
	0.5/480	3.00	0.001

Preferential looking This is not comparable to other forms of visual acuity testing and should therefore be documented as a text field e.g. 6 cycles per degree	

Each Trust may want to pseudoanonymise patients with a lookup table held on the cataract EPR software

Data collected to be pseudonymised according to the following guidance:

Data Item Name	Pseudonymisation	Look-up Table	Point of Pseudonymisation
Acute Trust	Algorithm defined by DoH / CfH SUS / College	Held by RCOphth	At any point prior to exporting from the originating trust.
NHS Number	Algorithm defined locally	Held by site	At the point of extraction from the local system.
Date of birth	None	None required	At the point of extraction from the local system.
Venue	Algorithm defined centrally	Held by RCOphth	At any point prior to exporting from the originating trust.

NB: Surgeons, sites, and trusts will hold their respective 'pseudonymised' codes, to facilitate *ad hoc* extractions and analyses.

Suggested question posed to patient: "Compared with before your operation what you think about the position of your eyes?"
Response options: Improved; No change; Worse than before the surgery.

Suggested question posed to patient: "Overall, how do you feel about your squint / strabismus operation?"
Response options: Satisfied; Neither satisfied nor dissatisfied; Dissatisfied.

Please refer to the 'Postcode Directory' (as published by the Office for National Statistics, with contractual use available via the NHS) for full list of postcodes.

Formats   Example Postcode

1st   2nd Phrases

AN   NAA   M1 1AA

ANN   NAA   M60 1NW

AAN   NAA   CR2 6XH

AANN   NAA   DN55 1PT

ANA   NAA   W1A 1HQ

AANA   NAA   EC1A 1BB

1st Phrase to be used in cataract data set

For details about the different patient reported outcome questionnaires see the following links:

IXTQ

NCS

AS20

Diplopia Questionnaire

Notes on implementation in Electronic Medical Record

1) Where possible the linked menus should be smart (where qualifiers apply to a different field e.g. muscle and operation or diagnosis and qualifier) – for example with diagnosis there are a number of qualifiers not all of which apply to all diagnoses. Once a diagnosis is selected the further options should be curtailed in a clinically meaningful manner. This table gives an example of how this might be done with SNOMED codes for options attached. All diagnoses should have the potential to be qualified by laterality (eso, exo, micro never bilateral) but some will have a more nuanced qualifier as follows, this particularly applies to esotropias and exotropias. Ideally the most common options should come first and at least two options should be available to select the option e.g. text search / drop down.

Qualifier	SNOMED code Esotropia	Exotropia
Right		
Left		
Accommodative	419494007	
Intermittent	27590007	63988001
Secondary	399207003	397822009
Convergence excess	427113002	
Convergence weakness	x	x
Divergence excess		x
Divergence insufficiency	314788004	
Simulated divergence excess		x
Decompensated		
Consecutive	232099002	232105000
Residual	232100005	232106004
Alternating	39837002	37214009
Congenital	232093001	314786000
High AC/A ratio	x	x
Low AC/A ratio	x	x
Acquired	410503002	
Distance	313155007	313158009
Near	313154006	313159001
Sensory deprivation	400938000	400937005

Monocular	5455000	5725006
Convergent		
Divergent		
Noncomitant		
Comitant		
Cyclic	313156008	
Paretic	400939008	
Intermittent monocular	194101008	194103006
Intermittent alternating	194102001	194104000
Monocular with A pattern	58409000	45062007
Monocular with V pattern	65215002	111529008
Monocular with X and / or Y pattern	94695009	31022000
Monocular with X pattern	194078004	194090002
Monocular with Y pattern	194079007	194092005
Alternating with A pattern	111528000	31254003
Alternating with V pattern	24566000	57805002
Alternating with X and / or Y pattern	51983000	13493007
Alternating with X pattern	194083007	194096008
Alternating with Y pattern	194084001	194097004
Lambda Pattern	421220009	421220009
Noncomitant alternating	7701000119105	347431000119104
Partially accommodative	271710002	
Fully accommodative	232101009	

To simplify the list the following SNOMED codes should be created by combining the following elements

Intermittent monocular = intermittent + right or left

Intermittent alternating = intermittent + alternating

Monocular with A pattern = right / left + A pattern

Monocular with V pattern = right / left + V pattern

Monocular with X and / or Y pattern = right / left + X and / or Y pattern

Monocular with X pattern = right / left + X pattern

Monocular with Y pattern =right / left + Y pattern

Alternating with A pattern = Alternating + A pattern

Alternating with V pattern = Alternating + V pattern

Alternating with X and / or Y pattern = Alternating + X and / or Y pattern

Alternating with X pattern = Alternating + X pattern

Alternating with Y pattern = Alternating + Y pattern

Noncomitant alternating = Incomitant + alternating

Options for other diagnoses are as follows:

Qualifier	Esophoria	Exophoria	Hypertropia	Hypotropia	Microtropia
Right			34824100011910 8	34823100011910 4	
Left			34869100011910 3	34868100011910 1	
Decompensated	x	x			
Consecutive					
Residual					
Alternating			232107008		
Convergent					24674300 6
Divergent					24674400 0
Noncomitant	24675100 9	24675200 2			
Comitant	24673800 4				

2) Once a muscle is selected the further options should be curtailed in a clinically meaningful manner. This table gives an example of how this might be done with SNOMED codes for options attached. Ideally the most commonly performed procedures should come first in the list and two options should be available to select the option e.g. text search / drop down.

	SNOMED Codes (where there is currently no SNOMED code but the procedure is an option an x is placed in the box)					
Procedure	Medial rectus	Lateral rectus	Inferior oblique	Inferior rectus	Superior rectus	Superior oblique
Recession	309872002	309873007		172331000	172330004	172332007
Resection	265284007	309874001		172342009	172341002	172343004
Adjustable resection	231646006	231658006		231675000	231669009	
Adjustable recession	231645005	231657001		231674001	231668001	
Bilateral Recession	172320008	172322000				
Bilateral Resection	172321007	172324004				
Recess LR Resect MR	231640000	231640000				
Recess MR Resect LR	172319002	172319002				
Faden	231654008	231666002	231698008	231679006	231672002	231689005
Plication / Tuck	x	x		x	x	231681008
Advancement	231647002	231659003		231676004	231670005	231682001
Harada ITO						231687007
Transposition	231653002	231665003		231678003	231671009	
Myectomy			172344005			
Myotomy	231648007	231660008	231693004			
Disinsertion	231650004	231662000	231694005	231677008		231684000
Tendon expander						x
Anterior transposition			231695006			231685004
Superoplacement	231651000	231663005				
Inferoplacement	231652007	231664004				
Marginal myotomy	231649004	231661007				
Central tenotomy	172350000	172351001				
Botulinum toxin	404909007 (no code for injection into different muscles)					
Bupivacaine	27196008 (No code for injection of at present)					
Z-plasty			231697003			
Extirpation			231696007			
Tenotomy				172353003	172352008	172354009

3)   It may be desirable to carry out measurement of the squint angle in up to nine positions of gaze plus the tilts. These would be as follows: Primary position, Chin up, Chin down, Left head turn, Right head turn, Chin up + Left head turn, Chin up + Right head turn, Chin down + Left head turn, Chin down + Right head turn, Right head tilt, Left head tilt. It would be helpful if the person inputting data could select a number of positions in which to measure e.g. primary, chin up, chin down and also all 11 positions. The default should be primary position.

4)   If a patient does have diplopia at their pre-operative assessment it is expected that the diplopia questionnaire should be completed before and 3 months after surgery. Likewise when other patient reported outcome measures are used it should be possible to record these pre operatively and at the 3 months post-operative visit.

5)   Visual acuity should ideally be recorded using the same testing method before and after surgery e.g. Kays pictures pre and post – while a child may subsequently be able to perform a more accurate test the aim with regard to surgery is to assess principally for complications which changing vision testing method may confuse.

SNOMED CT Codes relevant to different items in the dataset

Diagnosis

Diagnosis	SNOMED code
Esotropia	16596007
Exotropia	399054005
Third nerve palsy	388980004
Fourth nerve palsy	20610004
Sixth nerve palsy	398760006
Thyroid eye disease	417022003
Blowout fracture	415590006
Orbital fibrosis	426862007
Esophoria	62176008
Exophoria	46343005
Hyperphoria	421452007
Hypophoria	8016009
Convergence insufficiency	194131002
Brown's tendon sheath syndrome	35929003

Double elevator palsy	232109006
Hypertropia	40608009
Hypotropia	29491004
Dissociated vertical deviation	232108003
Inferior oblique overaction	400940005
Inferior oblique underaction	313163008
Strabismus following cataract surgery	415591005
Strabismus following retinal surgery	415593008
Excyclotropia	33584003
Incyclotropia	68041004
Microtropia	28633004
Duane's syndrome	60318001
Nystagmus	563001

Co-pathology

Co-pathology	SNOMED code
Down's syndrome	41040004
Cerebral palsy	128188000
Developmental delay	248290002
Attention deficit hyperactivity disorder	406506008
Prematurity	44247006
Autistic disorder	408856003
Craniosynostosis syndrome	57219006

Operative incidental events /

Complications

Operative incidental events / complications	SNOMED code
Globe perforation	231879009
Intra-operative lost muscle	
Wrong eye / muscle / procedure	370896006
Adverse event relating to anaesthetic	

Post-operative Complications

Complications	SNOMED code
Slipped muscle	
Infection -orbital cellulitis / abscess at muscle insertion	58126003
Surgically induced necrotising scleritis	95797003
Retinal detachment	42059000
Retinal tear (iatrogenic)	232005003
Endophthalmitis	314544008
Anterior segment ischaemia	413552002
Intractable diplopia	24982008
Unplanned over/ under correction	
Ptosis	11934000
Recurrence	
Repeat surgery	
Return to theatre in 30 days	
Choroidal haemorrhage	122003
Perforating scleral wound	231879009
Suture Granuloma	66962008

Authors

Authors: John Somner, Peter Thomas, Robert Froud, John Ferris, Saurabh Jain, Narman Puvanachandra, Chris Lloyd, Nabil Uddin, Tracy Crowley, Veronica Greenwood, Peter Tiffin, Melanie Hingorani, Anthony Vivian