

Supplementary Table 1

Control contact lens users: diagnoses for the 213 Controls

Diagnosis	Frequency
Diseases classified as unrelated to contact lens wear: listed by frequency	
Viral conjunctivitis	17
Dry eyes	10
Chalazion	5
Posterior vitreous detachment	4
Sub-tarsal foreign body	4
Conjunctivitis	3
Allergic conjunctivitis	3
Blepharitis & dry eye	3
Marginal keratitis & bilateral blepharitis	3
Conjunctival abrasion (non-lens related)	2
Ocular migraine	2
Recurrent corneal erosion syndrome	2
Chalazion & bilateral blepharitis	3
Corneal foreign body	2
Blepharitis	2
Blepharitis & dry eyes	2
Inflamed chalazion	1
Corneal scar	1
Acute anterior uveitis and right chalazion	1
Acute anterior uveitis	1
Meibomian gland dysfunction & dry eyes	1
Corneal foreign body & conjunctival abrasion	1
Lattice degeneration	1
Sub-tarsal foreign body and corneal abrasion	1
Ametropia	1
Nothing found (given lid hygiene and/or lubricants)	2
Allergic reaction (lids)	1
Blunt trauma	1
Conjunctival retention cyst	1
Eczematous lids	1
Ocular hypertension	1
Nothing found (possibly a systemic viral illness)	1
Allergic reaction (lids) & dry eye	1
In-growing eyelash	1
Episcleritis	1
Blepharitis and right acute hordeoleum	1
Limbitis	1
Dry eyes following viral conjunctivitis	1
Chalazia	1
Vitreous floaters	1
Blepharo-conjunctivitis	1
Marginal keratitis	1
Optic neuritis	1
Marginal keratitis & bilateral dry eyes	1
Retrolbulbar optic neuritis	1
Optic disc drusen	1
Preseptal cellulitis and bilateral blepharitis	1
Preseptal cellulitis and chalazion	1

Diseases classified as unrelated to contact lens wear: listed by frequency continued	
Diagnosis	Frequency
Marginal keratitis and blepharitis	1
Scleritis	1
Chemical keratitis	1
Nothing found	1
Total unrelated to Contact Lens wear	104

Diseases classified as Contact Lens (CL) related: listed by frequency	
Corneal infiltrative event (CIE)	44
CL overwear	23
CL associated - microbial keratitis (MK) - moderate	11
CL associated - microbial keratitis - mild	8
CL associated - uncertain whether a CIE or MK	1
Corneal abrasion (1 in mild keratoconus patient)	8
Toxic (chemical keratitis)	2
CL related punctate corneal erosions (possibly fit related)	1
CL overwear & R conjunctival abrasion	1
CL overwear & dry eyes	1
CL overwear & corneal abrasion	1
Conjunctival abrasion: CL related	1
Scatched CL's & CL related dry eyes	1
CL related punctate epitheliopathy	1
CL related corneal epitheliopathy	1
Epithelial oedema: probably secondary to a tight CL	1
Epitheliopathy: probably CL solution related	1
Retained CL with associated punctate corneal erosions	1
CL associated conjunctival hyperaemia	1
Total CL-Related	109

Supplementary Table 2

Contact lens (CL) solution information table (listed alphabetically by manufacturer (where known) and product name)

SOFT CL DISINFECTION SOLUTIONS						Verified	
Unless stated data from ACLM handbooks, internet, solution packaging (Boots and Mesmeryez) and online						Availability at 01_2011	Formulation source
Manufacturers name	Rebranded name	Active disinfectant(s)	Excipients (non-disinfectant ingredients)	Availability at 01_2011	Formulation source	Verified	
AMO [®] Oxysept 1 step	Not applicable (NA)	Hydrogen peroxide 3%	Neutralized with enzyme neutralizing tablet containing catalase, hydroxypropyl methylcellulose, and cyanocobalamin (vitamin B12) as color indicator, with buffering and tableting agents. Solution also contains sodium stannate, sodium nitrate, buffered with phosphates and purified water	Yes	Website	Y	
AMO Complete RevitaLens	NA	Polyquaternium-1 0.0003%, Alexidine dihydrochloride 0.00016%	EDTA, Tetriconic 904, boric acid/borate [1]	Yes	Kilvington, 2010	Y	
Alcon OPTI-FREE EXPRESS	NA	polyquaternium-1 (POLYQUAD [®]) 0.001% and myristamidopropyl dimethylamine (ALDOX [®]) 0.0005%	Sodium citrate, sodium chloride, boric acid, sorbitol, aminomethylpropanol, TETRONIC [®] 1304 ^d , with edetate disodium 0.05%	Yes	Package insert	Y	
Alcon OPTI-FREE PureMoist	NA	polyquaternium-1 (POLYQUAD [®]) 0.001% and myristamidopropyl dimethylamine (ALDOX [®]) 0.0006%	Sodium citrate, sodium chloride, boric acid, sorbitol, aminomethylpropanol, disodium EDTA, two wetting agents (TETRONIC [®] 1304 ^d and HydraGlyde [®] Moisture Matrix [EOBO-41 [®] polyoxyethylene polyoxybutylene])	No from June 2011	Package insert	Y	
Alcon OPTI-FREE RepleniSH	NA	polyquaternium-1 (POLYQUAD [®]) 0.001% and myristamidopropyl dimethylamine (ALDOX [®]) 0.0005%	Sodium citrate, sodium chloride, sodium borate, propylene glycol, TEARGLYDE [®] proprietary dual action reconditioning system (TETRONIC [®] 1304 ^d , nonanoyl ethylenediaminetriacetic acid)	Yes	Package insert	Y	
ASDA All in One contact lens solution	Uncertain whether this is own manufacture or rebranded	Polyhexanide (PHMB) (concentration unstated on packaging)	Poloxamer, HPMC, sodium hyaluronate, sodium phosphate	Uncertain	Phone interview with store staff	Y	
B&L ^a Biotrue	NA	Polyaminopropyl biguanide (PAPB) 0.00013% & polyquaternium 0.0001%. PAPB and PHMB are interchangeable terms ^e	Hyaluronan, sulfobetaine, poloxamine, boric acid, sodium borate, edetate disodium & sodium chloride	Yes	Package insert	Y	
B&L EasySept	NA	Hydrogen peroxide 3% with catalytic disc	Phosphonic acid, phosphate buffers & sodium chloride	Yes	Package insert	Y	
B&L Renu MPS for sensitive eyes	NA	Polyaminopropyl biguanide (PAPB, DYMED [®]) 0.00005%	Boric acid, edetate disodium, poloxamine, sodium borate & sodium chloride	Yes	Package insert	Y	

B&L ReNu Multiplus	B&L ReNu Fresh	Polyaminopropyl biguanide (PAPB, DYMED®) 0.0001%	Hydroxyalkylphosphonate (HYDRANATE®), boric acid, edetate disodium, poloxamine, sodium borate & sodium chloride	Yes	Package insert	Y
Boots CL solution		Polyaminopropyl biguanide (PAPB) 0.0001% PAPB and PHMB are interchangeable terms ^c	Hydroxyalkylphosphonate 0.03%, poloxamine 1%, boric acid, disodium edetate, sodium borate & sodium chloride	Same formulation as B&L ReNu Multiplus/Fresh	Package insert	Y
Boots All In One		Polyaminopropyl biguanide (PAPB) 0.00005% PAPB and PHMB are interchangeable terms ^c	Poloxamine 1%, boric acid, disodium edetate, sodium borate & sodium chloride	Same formulation as B&L ReNu MPS for sensitive eyes	Package insert	Y
Ciba Vision AOSepT Plus	NA	Hydrogen peroxide 3% with catalytic disc	Phosphonic acid, phosphate buffers, poloxamer & sodium chloride	Yes	Package insert	Y
Ciba Vision Solocare Aqua ^e	Menicon Solocare Aqua	PHMB 0.0001%	Dexapanthanol (provitamin B5), Tromethamine, Sodium dihydrogen phosphate, Poloxamer 407, Ethylenediaminetetraacetic acid (EDTA), Sorbitol	Yes	Product brochure	Y
CooperVision Options Multi	NA	PHMB 0.0001%	Borate buffers	Yes	ACLM Handbook	Y
CooperVision/Sauflon ComfortVue	Procis Premium All in One (Optic Actuell, Germany).	PHMB 0.0001%	Poloxamer, phosphate buffer, hydroxypropyl methylcellulose	Uncertain	ACLM Handbook	Y
CooperVision Sauflon Synergi	easyvision all purpose (Specsavers, UK) AND Irista Silicone Hydrogel multipurpose solution (France marketed by Generale d'Optique)	Oxipol, Oxychlorite complex (sodium chlorite and hydrogen peroxide)	Phosphate, poloxamer, Hydroxypropyl methylcellulose (HPMC), Polyvinylpyrrolidone (PVP) [2]	Yes	Garcia-Porta, 2015	Y
CooperVision Sauflon Multi	easyvision peroxide (Specsavers, UK)	Hydrogen peroxide 3% with platinum catalytic disc		Yes	ACLM Handbook	Y
CooperVision Sauflon All in One Light	easyvision multipurpose (Specsavers, UK)	PHMB 0.0001%	Phosphate, Poloxamer, Disodium edetate [3]	Yes	Beattie, 2003	Y
CooperVision CyClean		PAPB 0.0013 and Polyquaternium 0.001%	Hylauronan, Sulfobetaine (detergent that may have antimicrobial effects), boroc acid, sodium borate, EDTA, sodium chloride	Uncertain	Phone interview with store staff	Y
Menicon MeniCare Soft multipurpose solution	NA	PHMB 0.0001%	Phosphate, Poloxamer, HPMC (Biopol), EDTA	Yes	Manufacturer	N
MesmerEyez multipurpose soft lens solution	Unknown no response from UK distributor	PHMB (concentration not on bottle or website) No response	Macroglycerol, hydroxystearate 60, EDTA, propylene glycol, tonicity agents (2)	Yes	Kilvington, 2010	Y
			EDTA, Poloxamer, Boric acid, Sodium borate, sodium chloride, hydroxypropylmethylcellulose	Yes	Bottle label	Y

Morrison's All in One contact lens solution	Not clear whether this is own brand or rebranded	to email to company on 30.1.16	Sodium and potassium chloride, EDTA, poloxamer, HPMC, sodium hyaluronate, sodium phosphate	Uncertain	From website	Y
Optical Express Ciel All in One contact lens solution	Own manufacture	Polyhexanide (PHMB) concentration not stated	The active ingredient is the only one listed on the packaging	Uncertain	Phone Interview with store staff	
Sainsbury's all in one contact lens solution	Proprietary to Sainsbury's (East Midlands Pharmaceuticals)	Polyhexanide (PHMB) 0.0001%	Disodium Edetate, Hypromellose, Poloxamer, Sodium & Potassium Chloride	No from August 2012	Product brochure	Y
Tesco all in one contact lens solution	Proprietary to Tesco's (East Midlands Pharmaceuticals)	PHMB 0.00015%	Disodium Edetate, Sodium Hyaluronate, Hypromellose, Poloxamer, Sodium & Potassium Chloride	Yes	Product brochure	Y
SOFT CL CLEANING SOLUTIONS						
EYEE crystal cleaning solution now rebranded as Oté Clean 40	Oté Pharma Sol BV Netherlands 5406	PHMB 0.002% as preservative	Non-ionic cleaning ingredients	Yes	From bottle	Y
RIGID CL DISINFECTION SOLUTIONS						
AMO Total Care disinfecting, storing and wetting solution	NA	PHMB 0.0001%	Purified water, tromethamine, sodium chloride, hydroxypropylmethylcellulose, EDTA and tyloxapol	Yes	Website	Y
B&L Boston Advance	NA	chlorhexidine gluconate (0.003%), PAMB (0.0005%)	Cationic cellulose derivative polymer, a cellulosic viscosifier, polyvinyl alcohol and a derivatized polyethylene glycol, edetate disodium (0.05%).	Yes	Package insert	Y
B&L Boston Simplus	NA	chlorhexidine gluconate (0.003%), PAMB (0.0005%)	Poloxamine, hydroxyalkylphosphonate, boric acid, sodium borate, sodium chloride, hydroxypropylmethyl cellulose, Glucam	Yes	Package insert	Y
RIGID LENS CLEANERS						
B&L Boston Cleaner	NA	PHMB 0.0005% Chlorhexidine 0.003%	Alkyl ether sulfate (9.8% w/v), ethoxylated alkyl phenol, sodium chloride, silica suspension, sodium phosphate dibasic and triquaternary cocoa base phospholipids	Yes	Bottle	Y
EYEE crystal cleaning solution now rebranded as Oté Clean 40	Oté Pharma Sol BV Netherlands 5406	PHMB 0.002% as preservative	Non-ionic cleaning ingredients	Yes	Bottle	N

^aAbbot Medical Optics

^bBausch & Lomb

^cPAPB and PHMB are interchangeable terms: the term quoted is the one given on the packaging.

^dTETRONIC® is a registered trademark of BASF.

^eSystem contains antibacterial contact lens case

- 1 Kilvington S, Huang L, Kao E, Powell CH. Development of a new contact lens multipurpose solution: comparative analysis of microbiological, biological and clinical performance. *Journal of Optometry* 2010; 3(3):134-142
2. Garcia-Porta N, Rico-del-Viejo L, Ferreira-Neves H, Peixoto-de-Matos SC, Queiros A, Gonzalez-Mejome JM: Performance of three multipurpose disinfecting solutions with a silicone hydrogel contact lens. *BioMed research international* 2015, 2015:216932.
3. Beattie TK, Seal DV, Tomlinson A, McFayden AK, Grimason AM: Amoebicidal activity of multipurpose contact lens solutions using a most probable number (MPN) enumeration technique. *J Clin Microbiol* 2003, 41:2992-3000.

Supplementary Table 3

Contact lens types

CL Brand/Name = alternative name	Water content	Oxygen permeability	Material name	Material Group
ACUVUE 2 colours (Johnson & Johnson)	58	21	Etafilcon A	IV
ACUVUE 2/ BIFOCAL (Johnson & Johnson)	58	21	Etafilcon A	IV
ACUVUE ADVANCE / ASTIGMATISM (Johnson & Johnson)	47	60	Galyfilcon A	VA
ACUVUE OASYS/ASTIGMATISM/ PRESBYOPIA (Johnson & Johnson)	38	107.4	Senofilcon A	VA
AIR OPTIX AQUA/ ASTIGMATISM/ MULTIFOCAL (CIBA Vision)	33	110	Lotrafilcon B	VC
AIR OPTIX Night and Day (CIBA Vision)	24	140	Lotrafilcon A	VC
Avaira (CooperVision)	46	100	Enfilcon A	VC
Biofinity /Toric/ Multifocal (CooperVision)	48	128	Comfilcon A	VC
Biomedics 55 Evolution/ Toric (CooperVision)	55	19	ocufilcon D	IV
Boots Night and Day (Boots)	24	140	Lotrafilcon A	VC
Boots Monthly (Boots) = Premium-(Lotrafilcon B)	33	110	Lotrafilcon B	VC
easyvision Monthly Classic/Aspheric/Toric/XR (Specsavers) = Coopervision Frequency 55	55	19	Methafilcon A	II
easyvision Irisian /Toric/Multifocal (Specsavers) = Air Optix for Astigmatism Monthly Toric (Ciba Vision)	33	110	lotrafilcon B	VC
Easy Vision Irisian Sphere = Air Optix Aqua, monthly (Ciba Vision)	33	110	lotrafilcon B	VC
easyvision Opteyes/Toric (Specsavers) = Biofinity Toric Monthly Toric (CooperVision)	48	128	Comfilcon A	VC
easyvision Aquaeyes (Specsavers) = AirOptix Night and Day Aqua	24	140	Lotrafilcon A	VC
EASYVISION UVICIA (silicone hydrogel) = Avaira	46	100	Enfilcon A	VC
EASYVISION LACRIMA PLUS (silicon hydrogel) = clariti elite	56	60	somofilcon A	VB
Expressions Colors (CooperVision)	55	19	Methafilcon A	IV
Frequency 55 / Xcel Toric (CooperVision)	55	19	Methafilcon A	IV
FreshLook Colorblends / Colors / Dimensions (CIBA Vision)	55	16	Phemfilcon A	IV
Proclear/ Toric/ EP (CooperVision)	62	27	omafilcon B	II
PureVision/ Toric/Multi-focal (Bausch & Lomb)	36	91	Bala filcon A	III
PureVision 2 HD/ 2 HD for Astigmatism (Bausch & Lomb)	36	91	Bala filcon A	VA
SofLens 38 (Bausch & Lomb)	38	6	Polymacon	I
SofLens 59 (Bausch & Lomb)	59	17	Hilafilcon b	II
SofLens Toric /Multifocal (Bausch & Lomb)	66	24	Alphafilcon a	II
CRYSTAL (Ocuflcon D 45%)	45	19.6	ocufilcon D	III
GEO COLOUR (from Korea) = 'Circle' SCLs (large diameter)	42	9	polymacon	I
CLARITI ELITE (silicon hydrogel)	56	60	somofilcon A	VB
DESIO (Desiolens.com). Coloured, 62% polymacon, 38%WC	38	9	poylmacon	I
SEQUENCE 55	38	9	polymacon	I
Sauflon clariti	56	60	Somofilcon A	VB
Ascend Premier = Biofinity	48	128	Comfilcon A	VC
IWear XRT Supreme = Biofinity Toric (available in LATAM)	48	128	Comfilcon A	VC
Irisia care (monthly)	33	110	Uncertain	VC

Lens material classification

- Group I: (low water (< 50%), non-ionic)
- Group II: (high water (>= 50%), nonionic)
- Group III: (low water, (< 50%), ionic)
- Group IV: (high water, (>= 50%), ionic)
- Group V: Materials with Dk > 40 Dk units (in mmHg) and greater than expected on the basis of water content
- Group VA: Group 5 materials containing an ionic monomer or oligomer at pH 6-8
- Group VB: Group 5 non-ionic material containing > 50% water
- Group VC: Group 5 non-ionic material containing < 50% water

Supplementary Table 4

Potential risk factors for AK, initially selected for inclusion in the model building process. Results from logistic models without adjustment for confounding.

				Odds		95% CI for	
Variable	Control	Case	Total	Ratio ¹	p-value	Odds Ratio	
Disinfectant classified by Principal Active Ingredient (PAI)							
1: PHMB (0.00005-0.0001)	90	11	101	<i>Referent</i>			
2: Polyquad-1(0.001%)+ALDOX (0.0005%) ²	26	9	35	2.83	0.038	1.06	7.57
3: Peroxide3%	12	5	17	3.41	0.048	1.01	11.51
4: Polyquad 1(0.0001%)+Polyaminopropyl biguanide	11	2	13	1.49	0.633	0.29	7.60
5: Oxipol	55	29	84	4.31	< 0.001	2.00	9.33
6: Rigid Gas permeable lens solutions	11	5	16	3.72	0.036	1.09	12.71
Unknown	8	2	10				
Total	213	63	276				
Frequency of contact lens CL wear: days per week							
Up to 4 days	34	4	38	<i>Referent</i>			
> 4 days	179	57	236	2.71	0.070	0.92	7.95
Unknown	0	2	2				
Total	213	63	276				
CL materials classification: based on FDA/ANSI standards listed in Supplementary Table 3							
Group I	3	0	3	(empty)			
Group II	13	6	19	2.70	0.086	0.87	8.37
Group III	2	0	2	(empty)			
Group IV	13	7	20	3.15	0.039	1.06	9.37
Group VA	76	13	89	<i>Referent</i>			
Group VB	3	1	4	1.95	0.576	0.19	20.2
Group VC	70	28	98	2.34	0.023	1.12	4.87
Rigid gas permeable	11	5	16	2.66	0.113	0.79	8.91
Unknown	22	3	25				
Total	213	63	276				
CL grouping simplified:							
Groups I + II + III	18	6	24	1.95	0.233	0.65	5.83
Group IV	13	7	20	3.15	0.039	1.06	9.37
Group VA	76	13	89	<i>Referent</i>			
Group VB + VC	73	29	102	2.32	0.023	1.12	4.81
Rigid gas permeable CL's	11	5	16	2.66	0.113	0.79	8.91
Unknown	22	3	25				
Total	213	63	276				

Supplementary Table 4 continued, page 2

				Odds		95% CI for	
Variable	Control	Case	Total	Ratio ¹	p-value	Odds Ratio	
Hygiene Score (HS) Mean	4.30	5.09	4.47	----	< 0.001 ⁴	----	----
Hygiene Score (HS) Categories³							
1: Good-Moderate (score 1.75-5.08)	174	30	204	Referent			
2: Poor (score 5.09-8.08)	39	33	72	4.91	< 0.001	2.68	8.98
Totals	213	63	276				
Hand wash before handling CLs							
1: No/unsure	27	21	48	3.71	< 0.001	1.90	7.22
2: Yes	186	39	225	Referent			
Unknown	0	3	3				
Total	213	63	276				
Shower wearing CLs							
1: No	141	25	166	Referent			
2: Yes	72	38	110	2.98	< 0.001	1.67	5.31
Total	213	63	276				
Water activity wearing CLs							
1: None	114	20	134	Referent			
2: in Ocean/Sea/River/Lake	42	9	51	1.22	0.649	0.52	2.89
3: in Public pool	46	23	69	2.85	0.003	1.43	5.68
4: in Private pool	8	7	15	4.99	0.005	1.63	15.29
5: in Hot tub	3	1	4	1.90	0.586	0.19	19.19
Unknown	0	3	3				
Total	213	63	276				
Water activity: 3,4,5 combined							
1: Nowhere	114	20	134	Referent			
2: in Ocean/Sea/River/Lake	42	9	51	1.22	0.649	0.52	2.89
3: Swimming Pools/Hot tub	57	31	88	3.10	0.001	1.63	5.91
Unknown	0	3	3				
Ethnic group							
1: Asian	29	2	31	Referent			
2: British Other Black	16	1	17	0.91	0.938	0.08	10.79
4: White Caucasian	141	54	195	5.55	0.022	1.28	24.08
6: Other	27	3	30	1.61	0.616	0.25	10.39
Unknown	0	3	3				
Total	213	63	276				

Supplementary Table 4 continued, page 3

Variable	Control	Case	Total	Odds	p-value	95% CI for	
				Ratio *		Odds Ratio	
Ethnic group: 1,2,6 combined							
4: White Caucasian	141	54	195	<i>Referent</i>			
6: Other	72	6	78	0.22	0.001	0.09	0.53
Unknown	0	3	3				
Total	213	63	276				
Occupation⁵							
1-3 Professional/Director/Manager/Associate Professional Technical occupations	163	36	199	<i>Referent</i>			
4 Administrative and secretarial occupations	16	6	22	1.70	0.302	0.62	4.64
5 Skilled trades occupations	6	4	10	3.02	0.100	0.81	11.25
6 Caring, leisure and other service occupations	8	4	12	2.26	0.201	0.65	7.93
7 Sales and customer service occupations	13	7	20	2.44	0.077	0.91	6.54
8 Process, plant and machine operatives	5	0	5				
9 Occupations requiring no training	2	1	3	2.26	0.509	0.20	25.65
Unknown	0	5	5				
Occupation: categories 4-9 combined							
1-3 Professional/Director/Manager/Associate Professional Technical occupations	163	36	199	<i>Referent</i>			
4-9 Categories 4 to 9 combined	50	22	72	1.99	0.029	1.07	3.70
Unknown	0	5	5				
Total	213	63	276				
Education level							
1: up to A level	44	19	63	<i>Referent</i>			
4: Degree	96	28	124	0.68	0.260	0.34	1.34
5: Higher Education	73	11	84	0.35	0.013	0.15	0.80
Unknown	0	5	5				
Total	213	63	276				

- Odds ratios (OR) are **not adjusted** for confounding effects of other variables
- PAI category 2 Includes Polyquad-1(0.001%) + ALDOX (0.0005%) AND (as used by 4 controls and 1 case) Polyquad-1 (0.0003%) + Alexidine (0.00016%)
- A mean hygiene score was derived for each patient (see legend to supplementary Table 5 for details). The mean score for each patient was then used to divide the patient sample into a simple binary classification for multivariable analysis in which the worst quartile (the quartile with the highest score) of the sample was categorized as having "Poor" hygiene and compared with the rest categorized as having "Good-Moderate" hygiene. "Good-Moderate" had mean scores 1.75 - 5.08, and "Poor" mean scores 5.09 - 8.08). Hand washing before handling CLs and showering while wearing CLs were kept as separate variables and analysed as such.
- p-value of 0.0004 from non-parametric Mann-Whitney test
- Listed by categories

Supplementary Table 5

Contact lens hygiene compliance assessment methodology

Contact lens hygiene compliance was assessed by patient responses to 14 multiple choice questions listed here. Note: the additional hygiene variables of hand washing before handling CLs, and showering while wearing CLs were kept as separate variables and analysed as such. Hygiene scores were calculated using the following rules. The responses to each question (or composite pair of questions) from each patient were assigned a score of 1 for full compliance, 5 for partial non-compliance, and 10 for complete non-compliance. Some of the closely related original variable pairs were combined into a single analysis variable. The objective was to maximise the difference in scores between those who completely deviated from ‘good hygiene practice’ and those who were totally compliant with ‘good hygiene practice’ (scores 10 and 1 respectively). The questions were given equal importance (no weighting). For each patient, the scores were summed across all the variables, then divided by the number of observations (number of variables with score data), to arrive at a mean score for each patient. The mean score for each patient was then used to divide the patient sample into a simple binary classification for multivariable analysis (the detailed methodology for this is described in footnote 3 supplementary table 4 and in the footnotes to Tables 1 and 2).

Category	Hygiene question Variables	Score	Variable ID
	Q23: How often do you use disinfecting solution		1
1	Always	1	
2	Uses extended wear disposable CLs, dispose on removal, no disinfectant (excluded from main analysis sample)*	1	
3	Sometimes	10	
4	Never (excluded from main analysis sample)#	10	
	Q28: How long had the bottle of solution been open		2
1	1 to 30 days	1	
2	31 to 59 days	5	
3	60 or more days	10	
	Q29: Did you transfer your solution into another container		3
	Q30: Did you use this transferred solution the last time you rinsed or stored the lenses		4
1	Q29=No	1	
2	Q29=Yes, Q30=No	1	
3	Q29=yes, Q30=Unsure	5	
4	Q29=Yes, Q30=Yes	10	
	Q31: Did you rub your lenses the last time before you STORED them		5
1	No	10	
2	Yes	1	
99	Unsure	Blank	
	Q32: Did you rinse your lenses before you STORED them		6(a)
	Q32n If Yes, rinsed with what?		6(b)
1	Q32=No	10	
2	Q32=Yes, Q32n=with Water	5	
3	Q32=Yes, Q32n=with disinfectant solution / Saline	1	
	Q33: Did you rinse your lenses the last time before you inserted them into your eyes		7(a)
	Q33n: If Yes, with what?		7(b)
1	Q33=No	10	

2	Q33=Yes, Q33n= disinfectant solution / Saline	1	
3	Q33=Yes, Q33n= Hot water	5	
4	Q33=Yes, Q33n= Warm water / Water	10	
	Q34: Did you rub your lenses the last time before you inserted them into your eyes		8
1	No	10	
2	Yes (all responses: "with disinfectant solution")	1	
	Q35: Did you replace all the disinfecting solution in your case		9
1	No, topped it up	10	
2	Yes	1	
99	Unsure	Blank	
	Q36: After you took your contact lenses out, did you rinse your case		10
	Q37: What did you rinse your case with		11
1	No rinse	10	
2	Yes, with Saline	1	
3	Yes, with Water	5	
4	Yes, with disinfectant solution	1	
99	Unsure	Blank	
	Q38: Did you empty your case and leave it to dry		12
1	No	10	
2	Yes	1	
99	Unsure	Blank	
	Q39: How old was your case when the symptoms started		13
1	One to 90 days old	1	
2	More than 90 days	10	
	Q57: Where did you LAST carry out contact lens insertion and removal		14
1	Bathroom	1	
2	Kitchen	5	
3	Bedroom	5	
4	Other	10	
99	Unsure	Blank	

* The categories of lens are not reusable daily wear CL's and irrelevant to the analysis

This category was for 7 controls using saline only

Supplementary Table 6

Covariate adjustment

Confounders (covariates) adjusted for in the final regression models constructed to estimate the odds ratios for a particular risk factor with optimal adjustment for confounding.

Risk factor of 'main interest'	Covariates adjusted for:	Final Model #
Lens Disinfectant (PAI)	Hygiene Score; Hand washing; Shower wearing CLs; Water Activities wearing CLs; Ethnic Group; Occupation	1
CL Materials	As for Model-1, but excluding Rigid CL solutions	2
Hygiene Score	As for Model-1, but excluding "Shower wearing CLs"	3
Hand washing	As for Model-3	3
Shower wearing CLs	As for Model-1	1
Water Activities wearing CLs	As for Model-3	3
Ethnic Group	As for Model-3	3
Occupation	As for Model-3	3

Supplementary Table 7

Swimming whilst wearing contact lenses.

Comparison of current dataset (collected 12-12-2013 to 05-06-2017 with dataset from a similar case control study of microbial keratitis (all causes) in contact lens users for data collected at Moorfields 03-12-2003 to 02-12-2005 (Reference 14 in the Text: Dart JK, Radford CF, Minassian D, Verma S, Stapleton F. Risk factors for microbial keratitis with contemporary contact lenses: a case-control study. *Ophthalmology* 2008; **115**(10): 1647-54).

Dataset and category	Total number	Users swimming in contact lenses	
		Number	Percent
Current study 12-12-2013 to 05-06-2017			
<i>Acanthamoeba</i> keratitis cases	60	40	66.67
Control dataset 22-11-2016 to 05-06-2017	213	99	46.48
Cases and controls combined	273	139	50.92
Dataset from 03-12-2003 to 02-12-2005 study			
Microbial keratitis cases	366	224	61.20
Population controls	637	326	51.18
Hospital controls	1921	1103	57.42
All cases and controls combined	2924	1653	56.53