

Falls before and after cataract surgery: a prospective cohort study



The George Institute
for Global Health Australia

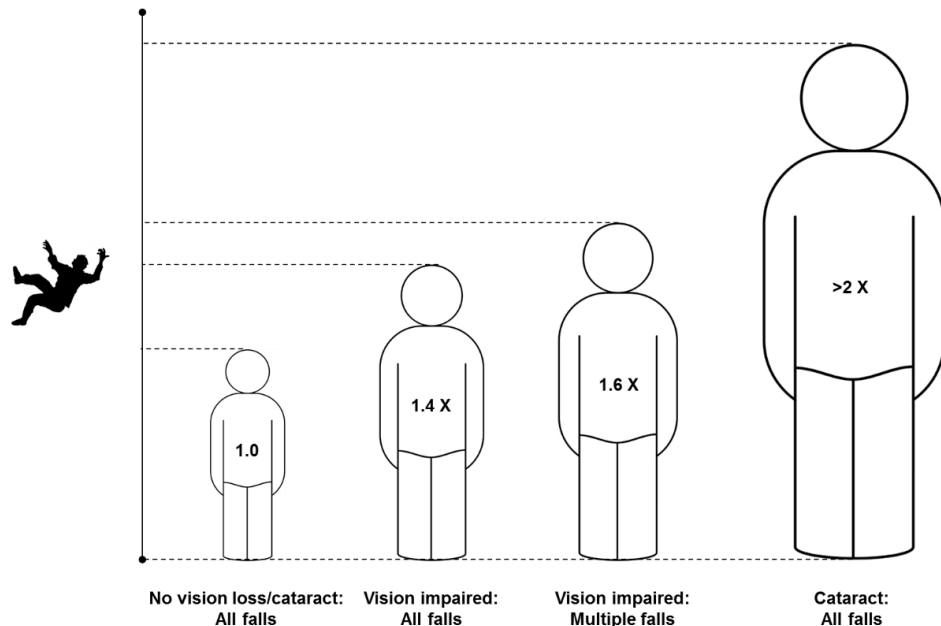
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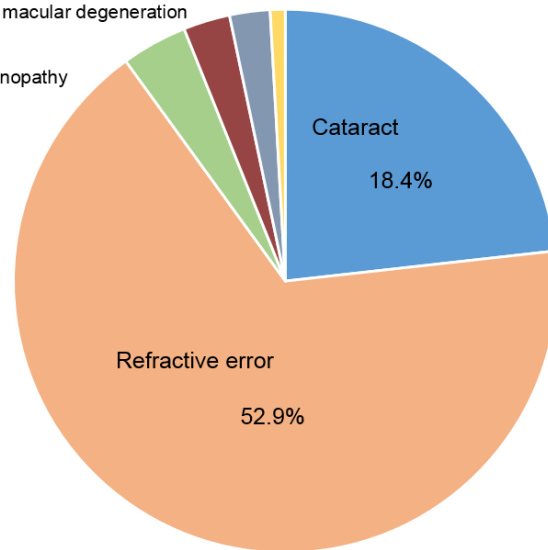


Vision impairment and falls

- Vision impairment has long been recognised as a risk factor for falls



- Age-related macular degeneration
- Glaucoma
- Diabetic retinopathy
- Trachoma

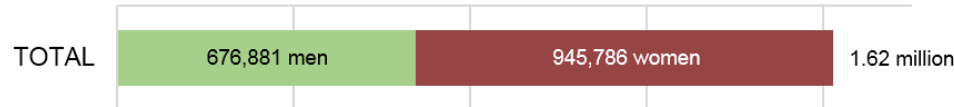


- People with cataract are 2–3 times more likely to experience a fall (Blue Mountains Eye Study, Melbourne VIP)



Cataract in the older population

- ~ 33% of adults aged ≥ 65 years have clinically significant cataract



- Cataract impairs vision by:
 - reducing the sharpness of the images we see
 - impacting our ability to identify colours
 - causing glare sensitivity on sunny days and at night
 - impairing our ability to discriminate between an object and its background (contrast sensitivity)



Cataract – changes to vision



Glare from oncoming headlights



Street scene



Cataract – changes to vision



Viewing stairs through cataract



Cataract surgery & falls: Evidence to-date

- Expedited first eye cataract surgery reduces rate of falls (UK, Harwood 2005)
 - Randomised controlled trial: 306 women aged > 70 years
 - 154 participants expedited surgery (within 1 month of referral); 152 routine 12 month wait (controls)
 - 12 month follow up (prospective falls reporting)
 - **40% reduction in risk of recurrent falls in operated group during 1 year of follow up**
 - **34% reduction in overall falls rate in operated group (compared to controls)**



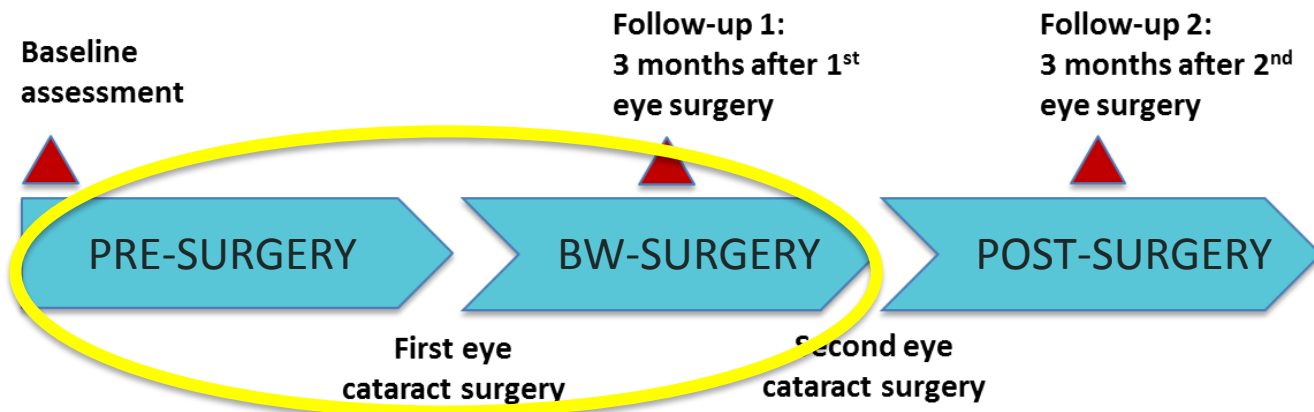
Cataract surgery & falls: Conflicting evidence

- First eye cataract surgery increases rate of hospitalised falls (Meuleners 2013):
 - >28,000 bilateral cataract surgeries in WA
 - patients >2 times more likely to be hospitalised from fall injury between 1st and 2nd eye surgery, than prior to surgery
- Cataract surgery produces no difference in the likelihood of falls (McGwin 2006):
 - 214 older patients with cataract (US): 122 underwent surgery; 92 did not
 - Risk ratio 0.96, 95% CI 0.64–1.42
- Cataract surgery reduces the rate of hip fracture (used as a proxy for falls):
 - Analysis of >1 million cataract surgeries (Medicare, US)
 - Risk ratio 0.84 (95% CI 0.81 – 0.87) (Tseng et al JAMA 2012)



The FOCUS Study: Fall Risk & Cataract

- The FOCUS Study: Longitudinal cohort study of fall risk and secondary health outcomes in older adults with cataract
 - 329 participants aged ≥ 65 years (October 2013–Aug 2015)
 - Bilateral cataract; recommended for 1st eye surgery
 - 8 public hospitals: Sydney, Melbourne, Perth



FOCUS study design

- Assessments at each time point include:

- Measures of vision
- Refractive error and spectacles
- Visual disability (Catquest 9-SF)
- Quality of life (EQ-5D-5L)
- Physical function (SFPB)
- Incidental & Planned Exercise (IPEQ)



- Falls self-reported prospectively (monthly) by falls calendar with phone follow-up:
 - 24 months or 6 months after second eye surgery

Mark the calendar with an **F** on the day you have a fall, then write in the time and place.

JULY 2013

ID:

MON	TUES	WED	THUR	FRI	SAT	SUN
			EXAMPLE: F 2:30pm Bedroom	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

At the end of the month, complete and pull out this page, place it in one of the envelopes supplied and put it in the post. No stamp is required to post the envelope.

Every month, if you forget to return your monthly falls calendar or report having a fall during the month, you will receive a phone call from the research team.



Study participants

Inclusion criteria

Aged 65 years and over

Recommended by optometrist, GP or ophthalmologist for first eye cataract surgery

Exclusion criteria

Cognitive impairment (Short Portable Mental Status Questionnaire > 2 errors)

Diagnosis of dementia, Parkinson's disease or stroke

Unable to complete study assessments in English language

Significant ocular co-morbidities, e.g. glaucoma, diabetic retinopathy, age-related macular degeneration

Planned combined ocular surgery, e.g. glaucoma and cataract

Residing outside metropolitan area (preventing completion of study visits)

Living in a residential/long-term care facility

Unable to walk (either aided or unaided)



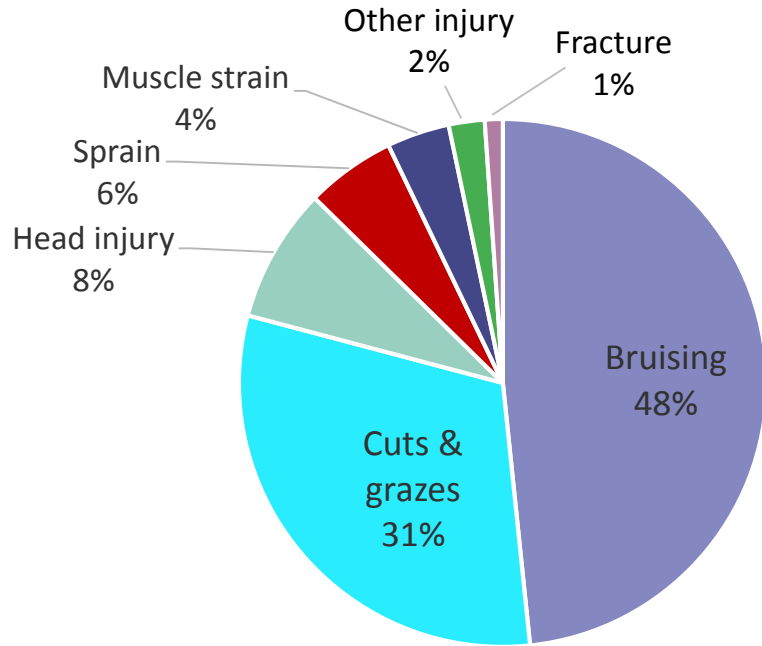
FOCUS Study: Baseline cohort (n=329)

Age (years)	75.7 ± 5.3
Female, n (%)	182 (55.3)
Vision status	
Bilateral habitual visual acuity (Snellen)	6/12 ⁺² ± 2 lines
Bilateral contrast sensitivity (log units)	1.48 ± 0.21
Patient reported visual disability (0 least–100 most)	38.6 ± 14.5
Vision impaired (<6/18), n (%)	32 (9.7)
Health status	
Comorbidities	4 ± 2
Medications	5 ± 4
Antidepressant use, n (%)	39 (11.9)
Health Related QoL (VAS: 0 worse–100 best)	76 ± 18
Physical activity	
Weekly physical activity (hours)	42.8 ± 24.2
Planned activity	3.3 ± 4.3
Walking activity	3.5 ± 4.9
Fallen in past 12 months, n (%)	129 (40.2)

Range 6/4–6/48

Norm >70 years: 1.76 ± 0.15¹

Falls during the wait for first eye cataract surgery



Prospective falls data:

- 267 falls involving 101 (31%) participants
- Median duration of observation 176 days (range 30–730 days)
- Fall incidence 1.2 per year (95% CI 1.0–1.3)

138 (52%) falls were injurious

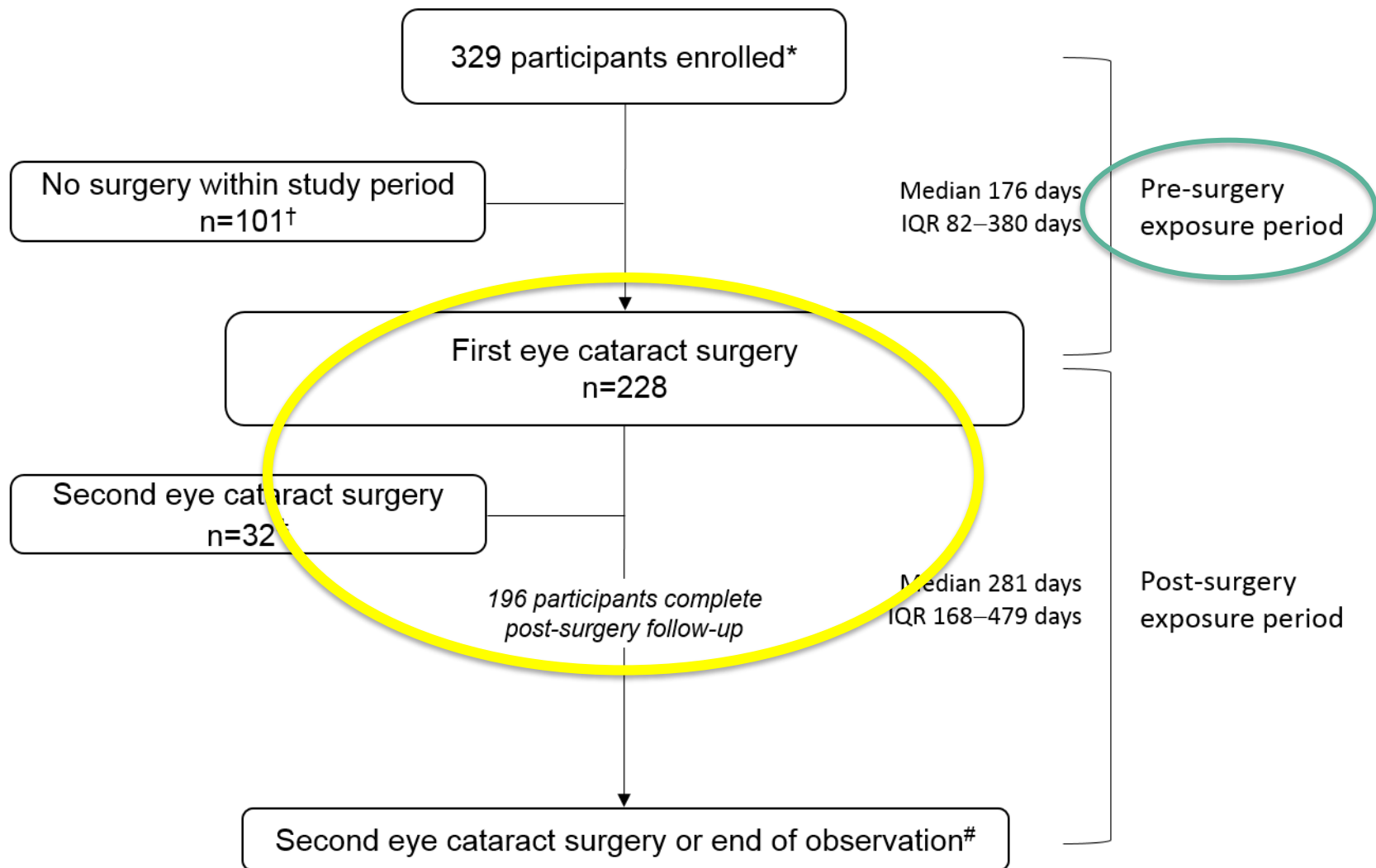


Predictors of falls during the surgical wait

- 329 participants (305 complete cases for analysis)

	Incidence rate ratio	95% CI	P value
Walking activity (hours/week)	1.06	1.01-1.10	0.02
Body mass index	0.96	0.92-1.00	0.06
Quality of life (EQ-5D-5L VAS: 0–100, per 5 unit ↓)	1.12	1.05-1.20	<0.001
Fallen in 12 months prior to Baseline	2.48	1.57-3.93	<0.001

- No visual factors associated with fall risk during the wait for first eye cataract surgery





Participant characteristics: first eye cataract surgery

Characteristics	No cataract surgery in study period n=133	First eye cataract surgery n=196
Socio-demographic		
Age (years)	75.5 ± 4.7	75.9 ± 5.7
Female, n (%)	76 ± 57.1	106 (54.1)
Health status		
Comorbidities (FCI)	4.3 ± 2.3	4.2 ± 2.1
Medications (total)	4.9 ± 3.4	4.4 ± 3.8
≥ 5 medications, n (%)	60 (45.1)	80 (40.8)
Antidepressant use, n (%)	18 (13.5)	21 (10.7)
Physical activity		
Total weekly activity, hours	0.24 ± 0.21	43.2 ± 24.6
Physical function (SPPB score: 0 worst–12 best)		8.2 ± 2.9
Gait speed, m/sec	1.47 ± 0.22	0.9 ± 0.3
Standing balance, sec, 0-60	64 (48.1)	50.0 ± 13.6



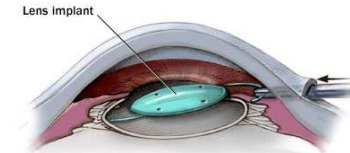
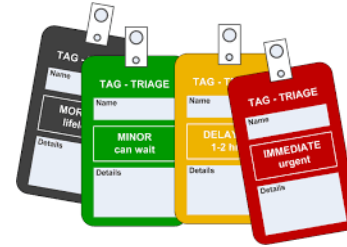
Summary

- Those with a history of falls in the prior year and who walk more during their surgical wait are at greatest risk
 - One in three patients waiting for cataract surgery will experience a fall
 - More than one half of all falls were injurious
- First eye cataract surgery was associated with a 33% reduction in incident falls and significant improvement to vision in the operated eye
- Major change ($>0.75D$) in the spherical equivalent dioptric power of the spectacle lens of their operated eye following surgery had a **2x** increase in fall risk during the post-surgery time period



Best practice management of cataract

- ✓ Efficient processing of referrals
- ✓ Expedited first eye cataract surgery
- ✓ Optimal refractive management





Acknowledgements

- Save Sight Institute
- Sydney Eye Hospital, NSW
- Westmead Hospital, NSW
- Royal North Shore Hospital, NSW
- Bankstown-Lidcombe Hospital, NSW
- Centre for Eye Research Australia
- Royal Victorian Eye & Ear Hospital
- Royal Perth Hospital, WA
- Fremantle Hospital, WA
- Sir Charles Gairdner Hospital, WA

National Health & Medical Research Council; NSW Agency for Clinical Innovation



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Department of Health
South Metropolitan Health Service

Royal Perth Hospital



Eye & Ear Hospital
caring in every sense



Centre for Eye Research Australia