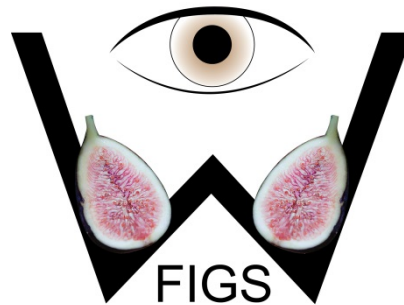# Falls in Glaucoma Study (FIGS)

Pradeep Ramulu MD MHS PhD
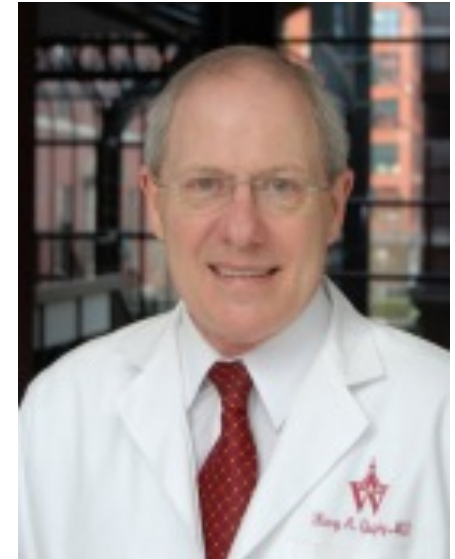
Glaucoma Center of Excellence
Wilmer Eye Institute

Thank You

National Institutes of Health

National Eye Institute
NATIONAL INSTITUTES OF HEALTH

RPB Research to Prevent Blindness

Preserving vision and restoring sight through research.
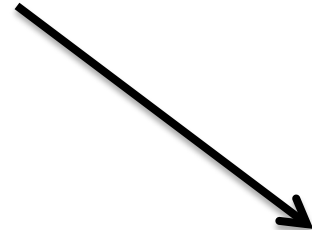
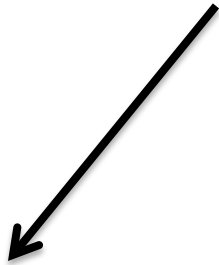Grateful Patients

LONG-TERM VISION

Identify the major issues threatening safety/health/quality of life

↓

Understand why these issues are happening
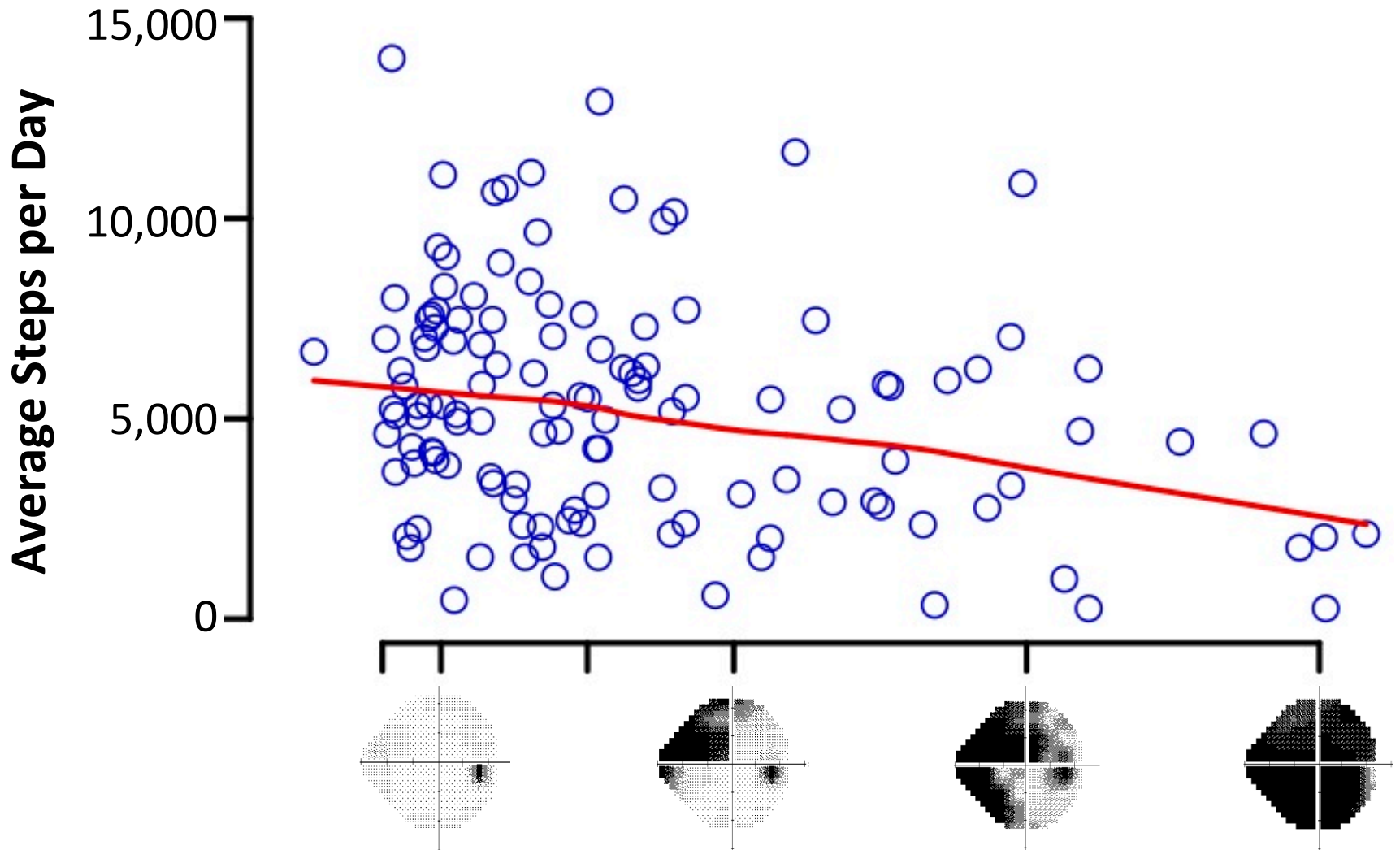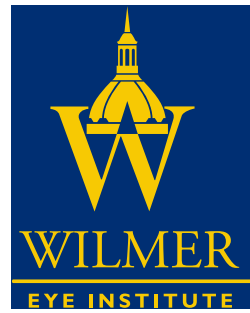
↓

Develop and test solutions for these problems

Keep you safe

Improve your quality of life

Keep you healthy

MAJOR ISSUES THREATENING SAFETY/HEALTH & WELL BEING (IN GLAUCOMA)

People walk less with worse glaucoma

Glaucoma associated with less travel outside the home

Variable	Interval	Δ Weekly excursions	No excursions on given day (OR)
Glaucoma	**vs. controls**	**-1.4**	**1.82**
Severe glaucoma	**vs. controls**	**-2.1**	**2.14**
African-American	vs. non-AA	+1.0	**0.53**
Female	vs. male	-1.4	1.39
MMSE score	5 points ↓	-1.7	1.49

Other covariates: age, education, grip strength, day of week (p>0.2)

Employment, living alone, other driver in home & comorbid illness not included as NS in age/gender adjusted analyses (p>0.3)

Significant problems result from less walking/physical activity

Less activity associated with mortality

Less activity → more heart dz, diabetes, osteoporosis

Less activity associated with lower QoL

Leaving the home less has serious health consequences

↓ life space associated with higher mortality.

↓ life space associated with increased incident risk of Alzheimers and cognitive decline.

↓ life space → greater incident frailty.

Falls may underlie these activity restrictions

VF loss one of **strongest risk factors** for falls

2-4 fold ↑ fall risk with glaucoma

1/3 glaucoma subjects injure themselves from a fall each year

Glaucoma related falls → more than **$1 billion/year**

Glaucoma has a large impact on fear of falling
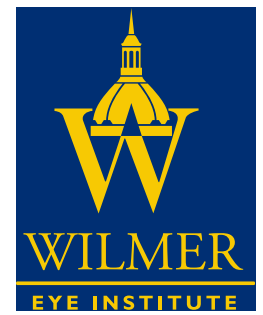
Variable	Interval	Δ Fear of falling score (logits)	p value
Glaucoma	Present	-1.20	0.001
VF Loss, better eye	5 dB worse	-0.52	<0.001
Gender	female	-0.55	0.03
Comorbidities	1 illness	-0.53	<0.001
Lives alone	Yes	+1.16	0.006

Not important: BMI, grip strength, age

WHY CONDUCT FIGS?

Falls - significant public health issue

#1 cause of accidental death in older Americans

Frequent → hospitalizations in older Americans

2020 → $55 billion

To prevent falls we need to know:

Who is at risk?

What preventable features can be addressed?

Are falls the cause of other mobility deficits?

Question 1:

Which of you is at significant risk for falls?

Importance:

Need to understand who is at risk, as those at risk need (the most) help.

Question 2:
What reversible factors are important
to address to prevent falls?

Importance:
Need to understand what, specifically,
needs to be addressed as
part of fall prevention efforts.

Question 3:
What are the downstream effects of falls?

Importance:
Is fall prevention likely to address other mobility problems
(low physical activity, home isolation)?

Do fall prevention efforts need to focus on the home, walking outside the home, or both?

SOME INFORMATION WE HAVE LEARNED SO FAR

Population Characteristics

Demographics	Values
Age, mean (SD)	70.6 (7.6) yr
African-American race, N (%)	70 (29)
Female gender, N (%)	119 (49)
Education, mean (SD)	15.5 (2.4)
Employment, N (%)	87 (36)
Lives alone, N (%)	49 (20)
Health	
Comorbid illnesses >1, N (%)	158 (65)
Number of medications, mean (SD)	3.6 (3.0)
Body Mass Index, mean (SD)	27.2 (5.1) kg/m^2
Grip strength, mean (SD)	31.6 (10.3) kg
Lower body strength, mean (SD)	17.7 (6.0) kg
Vision	
Binocular visual field sensitivity, median	27.8 dB

Physical activity summary

	Average Steps/day	Min	Max
Physical Activity	3,786	322	14,401
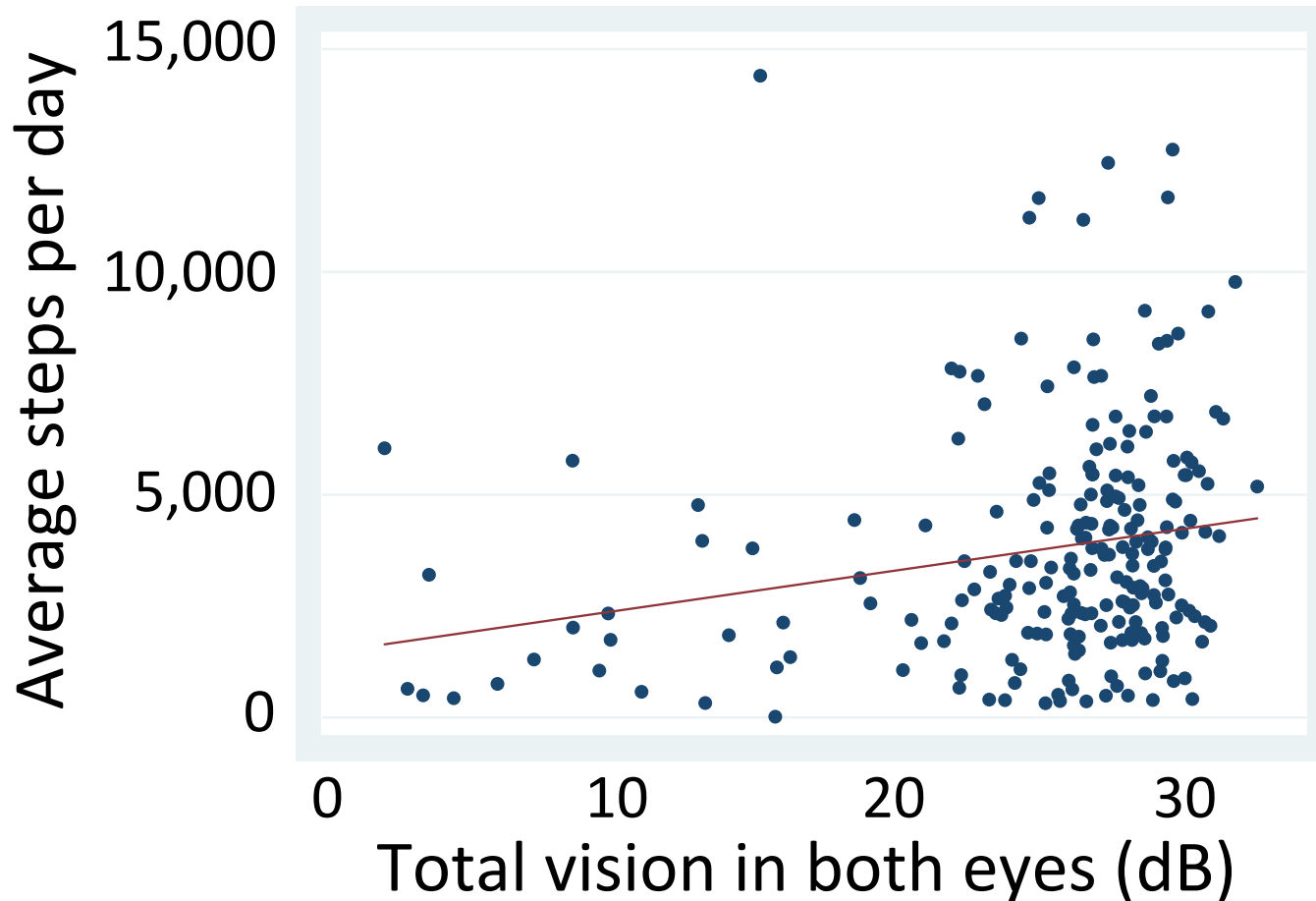
Fear of falling summary

Activity	Very/Moderately worried	Not worried at all
Walking outside when icy	201	45
Walking outside at night when icy	214	32
Walking on uneven terrain	149	97
Carrying bundles up poorly lit stairs	159	87
Climbing up poorly lit stairs	134	112

Glaucoma quality of life summary

Activity	None	A little/some	Quite a lot/severe
Seeing at night	80	138	27
Adjusting to bright lights	88	129	27
Going from light to dark room & vice versa	100	124	22

Falls follow up

Location	Number of falls
Indoors	96
Outdoors	91
In your own home	59
Area of the home	
Stairs	13
Your bedroom	12
Family/Living room	12
Kitchen	11
Bathroom closest to bedroom	5
Dining room	5
Basement	5
Hallway	3
Another bedroom	1

Falls follow up

Outdoors	Number of falls
Yard or garden of the home	17
Sidewalk	16
Driveway/street just outside the home	12
Porch or steps of your home	11
Driveway/street elsewhere	6
Parking lot	6
Park, forest or walking path	6
Walking outside another building	6

Falls follow up

Type of surface	Number of falls
Cement	47
Wood	36
Linoleum/tile/marble/other smooth surface	29
Carpeting	27
Grass	13
Dirt	4

Falls follow up

Kind of activity performed	Number of falls
Simple	106
Moderate	67
Strenuous	14

Simple activity: standing still, walking, or other basic activities such as dressing, bathing, eating or sitting on a toilet.

Moderate activity: getting up, sitting down, bending over, reaching up, stepping down, or stepping up.

Strenuous activity: climbing ladders or chairs, sports or gardening.

Falls follow up

Cause	Number of falls
Trip	73
Slip	60
Uneven cement/floor	42
Wet surface	32
Snow/Ice	18
Curb	16
Rug	15

Falls follow up

	Number of falls
Hurt	63
Visited medical professional	24
Admitted to hospital	2
Injuries sustained	
Bruising	29
Swelling	17
Pain	42
Sprained ligament	7
Joint dislocation	3
Pulled muscle	7
Broken bone/fracture	7

Where should we be in one year?

Description of how balance/gait is different which different degrees of vision loss

Preliminary assessment of predictors of fall risk (visual & non-visual)

Early plan on how we will try to prevent falls.

Thank *You!*