

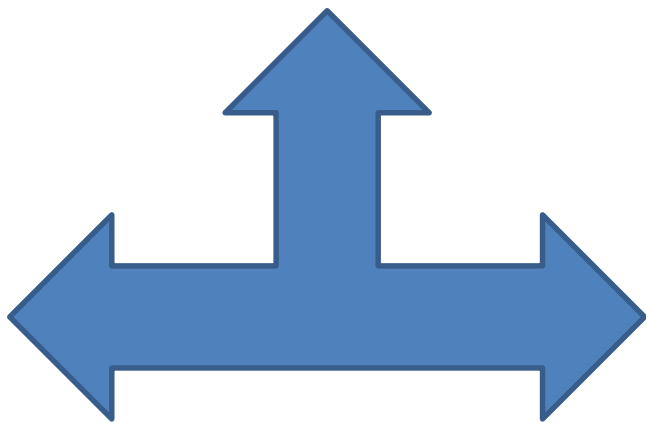
Changes in physical activity and falls in older adults following an extended period of hospitalization:
Is there a missing part to this picture?

Prof Terry Haines

Director, Allied Health Research Unit

Monash Health / Monash University

NHMRC Career Development Fellow 2014-2017





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Depressive symptoms and adverse outcomes from hospitalization in older adults: Secondary outcomes of a trial of falls prevention education

[Terry P. Haines](#), [Cylie M. Williams](#)¹, [Anne-Marie Hill](#)², [Steven M. McPhail](#)³, [D. Hill](#)⁴, [Sandy G. Brauer](#)⁵, [Tammy C. Hoffmann](#)⁶, [Chris Etherton-Beer](#)⁷

Those worried about falling had increased depressive symptoms following discharge from hospital.

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Am J Geriatr Psychiatry. Author manuscript; available in PMC 2013 May 1.

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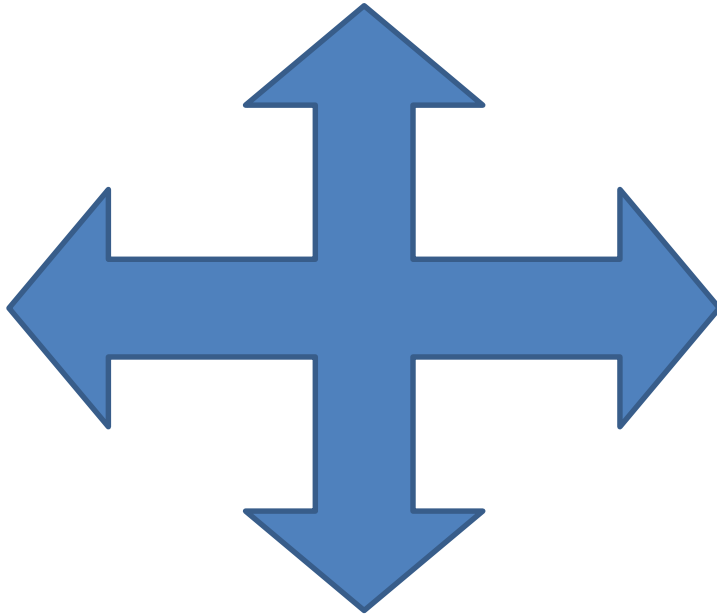
Am J Geriatr Psychiatry. 2012 May ; 20(5): 425–432. doi:10.1097/JGP.0b013e31821181c6.

Depressive Symptoms and Gait Dysfunction in the Elderly

Tamar C Brandler, M.D./M.S., Cuiling Wang, Ph.D., Mooyeon Oh-Park, M.D., Roe Holtzer, Ph.D., and Joe Verghese, M.D.*

Department of Neurology (TCB, MOP, JV), and the Department of Epidemiology and Population Health (CW), Albert Einstein College of Medicine; Ferkauf School of Psychology, Yeshiva University (RH), Bronx, New York

Community dwelling older adults with higher levels of depressive symptoms had worse gait velocity, stride and swing time variability.





Many classifications of depression

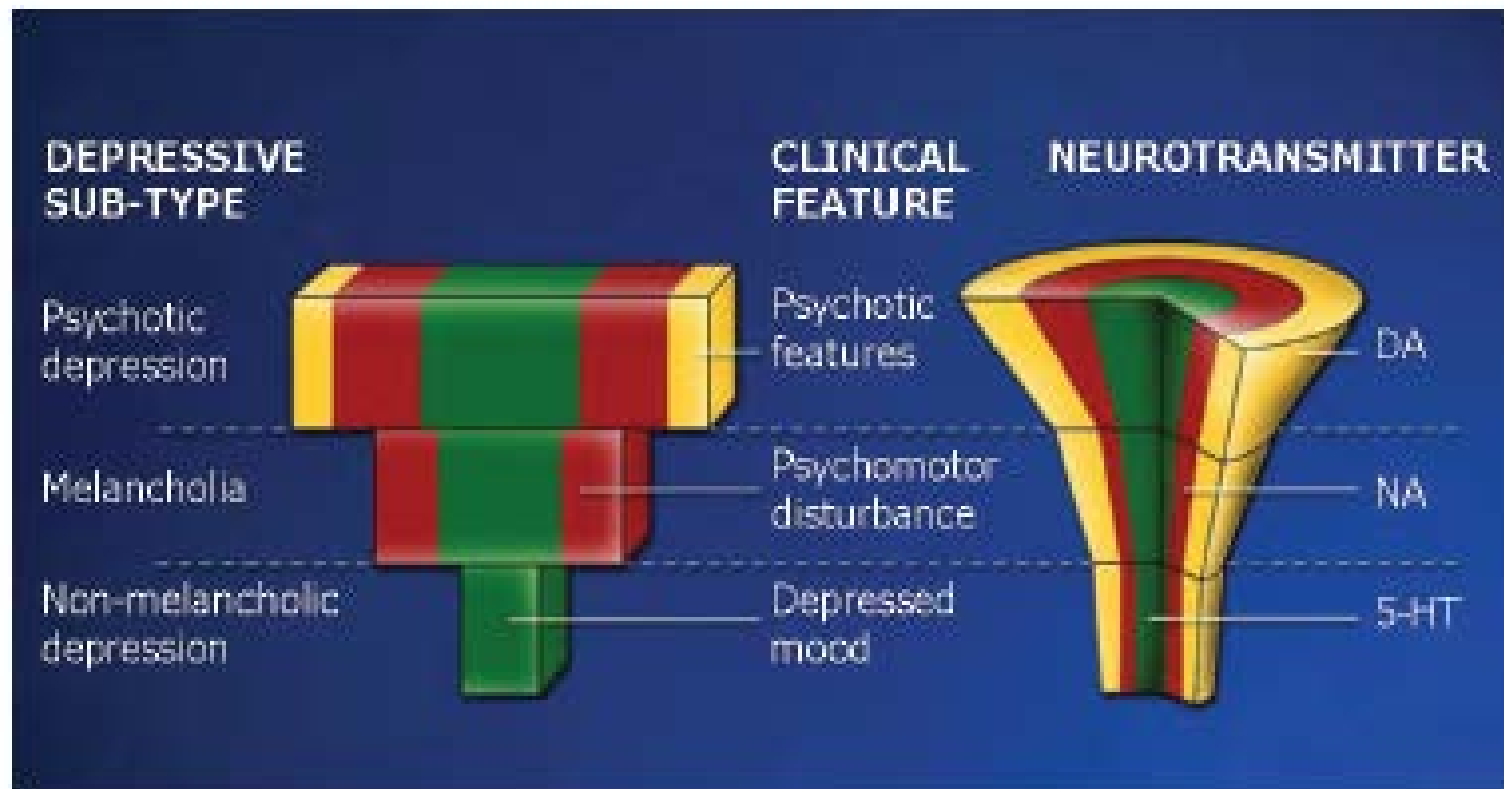


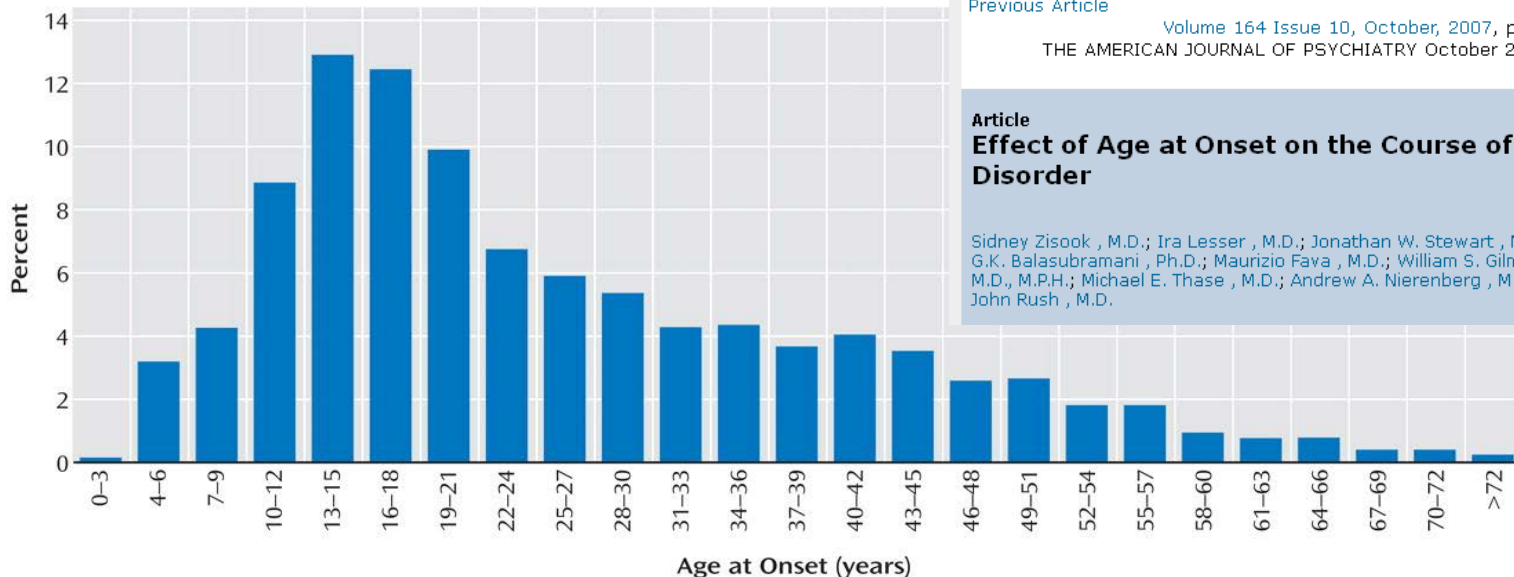
Figure 1. The Black Dog hierarchical model of depression

Many classifications of depression

- Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)
- Major depression
 - 1 or 2 of core symptoms
 - Depressed mood and lack of interest
 - four or more of ... for at least 2 weeks
 - Feelings of worthlessness or inappropriate guilt
 - Diminished ability to concentrate or make decisions
 - Fatigue
 - Psychomotor agitation or retardation
 - Insomnia or hypersomnia
 - Significant decrease or increase in weight or appetite
 - Recurrent thoughts of death or suicidal ideation

Many classifications of depression

- Age of onset of first episode has been suggested as another means of classifying depression



The American Journal of Psychiatry

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Previous Article [Volume 164 Issue 10, October, 2007, pp. 1539-1546](#)
THE AMERICAN JOURNAL OF PSYCHIATRY October 2007 Volume 164 Number 10 [Next Article](#)

Article
Effect of Age at Onset on the Course of Major Depressive Disorder

Sidney Zisook, M.D.; Ira Lesser, M.D.; Jonathan W. Stewart, M.D.; Stephen R. Wisniewski, Ph.D.; G.K. Balasubramani, Ph.D.; Maurizio Fava, M.D.; William S. Gilmer, M.D.; Timothy R. Dreselhaus, M.D., M.P.H.; Michael E. Thase, M.D.; Andrew A. Nierenberg, M.D.; Madhukar H. Trivedi, M.D.; A. John Rush, M.D.

Incidence / prevalence of depression

- ~8% lifetime incidence of major depressive disorder
 - Canadian Psychiatric Association. Canadian clinical practice guidelines for the treatment of depressive disorders. Can J Psychiatry 2001;46:Supp1.
- “Clinically significant” depressive symptoms in community-dwelling older adults
 - Prevalence: 8-16%
- In residential care
 - 12% - 20% major depression
 - 35% significant depressive symptoms
 - <50% are recognised as depressed by nursing and social work staff
 - Blazer D. Depression in Late Life: Review and Commentary Journals of Gerontology Medical Sciences; 2003, Vol. 58A, No. 3, 249–265

Does late age onset depression have a different aetiology?

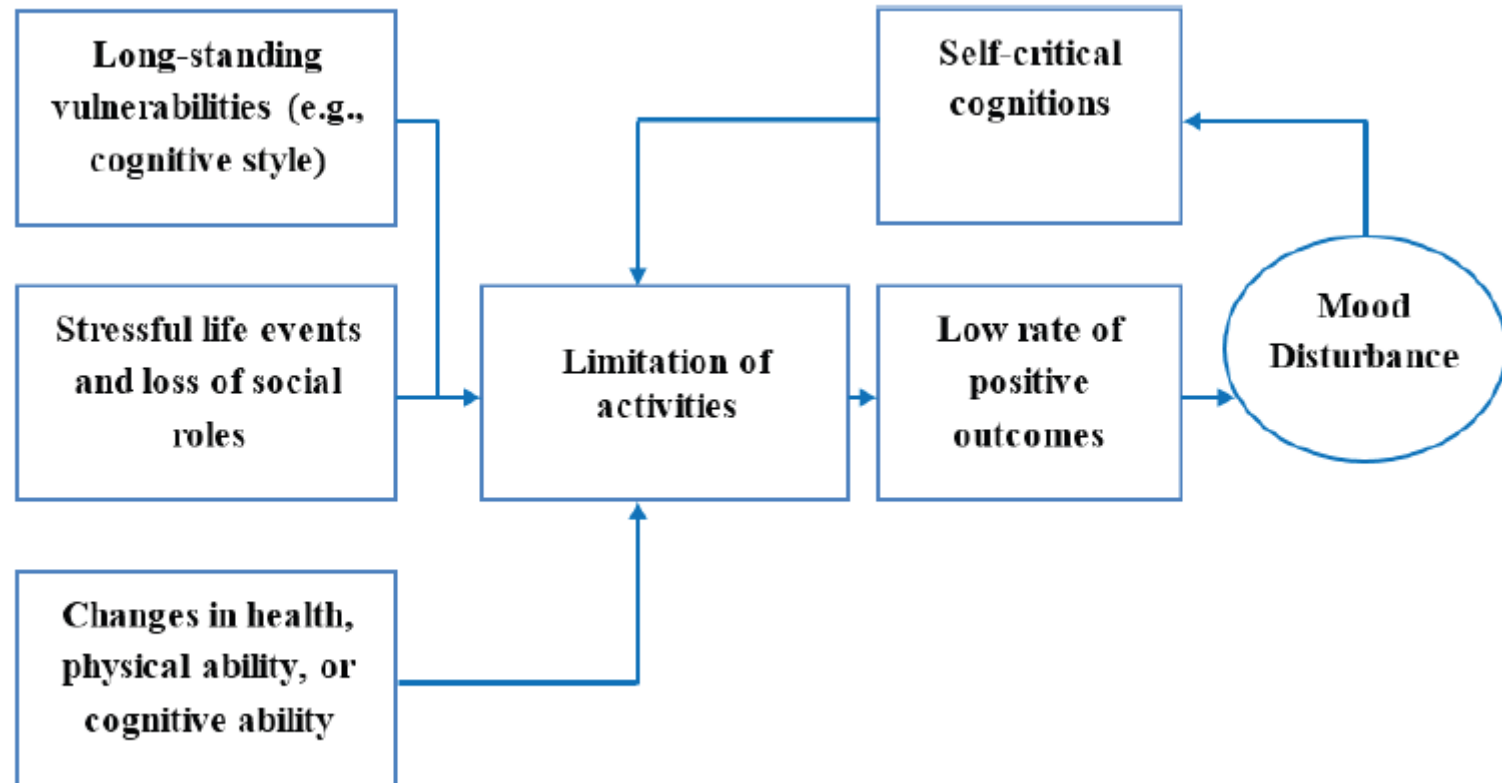
- Different causative factors to early onset
 - More vascular factors
 - Less personality abnormalities
 - Less family history
- Similar severity of symptoms
 - Baldwin R, Tomenson B. Depression in later life. A comparison of symptoms and risk factors in early and late onset cases. *Brit J Psychiat* 1995, 167 (5) 649-652
 - Brodaty et al. Early and late onset depression in old age: different aetiologies, same phenomenology. *J Affect Disord* 2001, 66(2-3) 225-236

Important additional consequences of late age onset depression

- Reduced bone mineral density
 - Possibly mediated by increased inflammatory activity (cytokine interleukin 6), leading to increased resorption and SSRI medication use
 - Haney E et al. Bone. 2010 Jan; 46(1): 13–17.
- Weight loss
- Heart disease
- Functional dependency
- Mortality

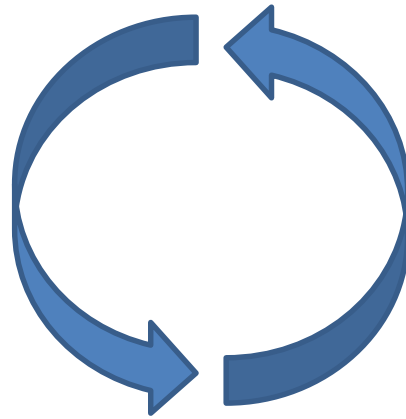
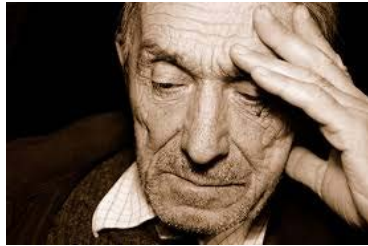


Aetiology of late age onset depression: Limitation of activities model



- Fiske, A.; Wetherell, J.L.; Gatz, M. Depression in older adults. *Annu. Rev. Clin. Psychol.* **2009**, *5*, 363–389.

Falls, physical activity and the aetiology of late age onset depression



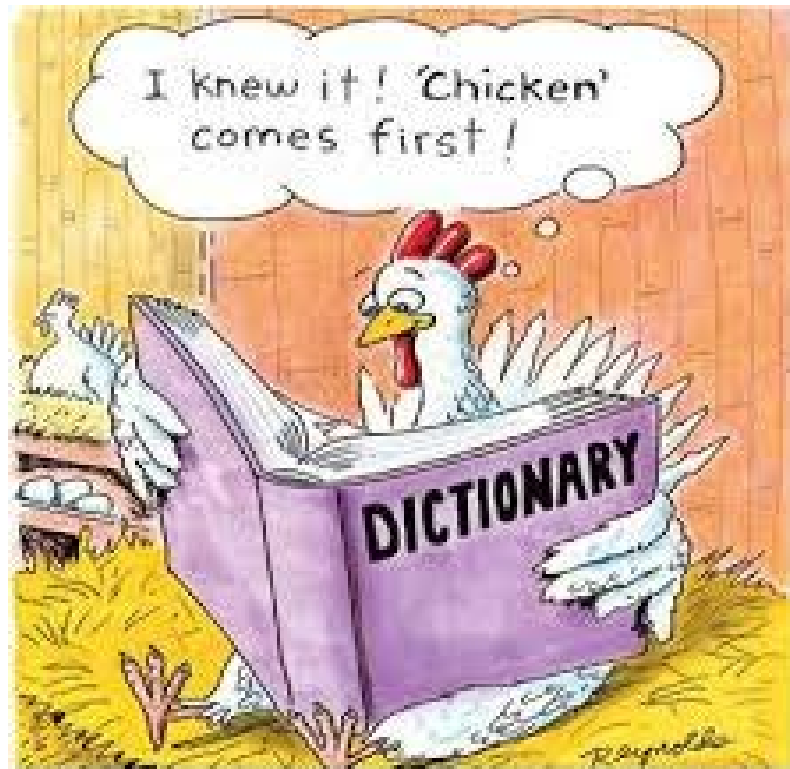
Research report

Risk factors for depression in later life; results of a prospective community based study (AMSTEL)

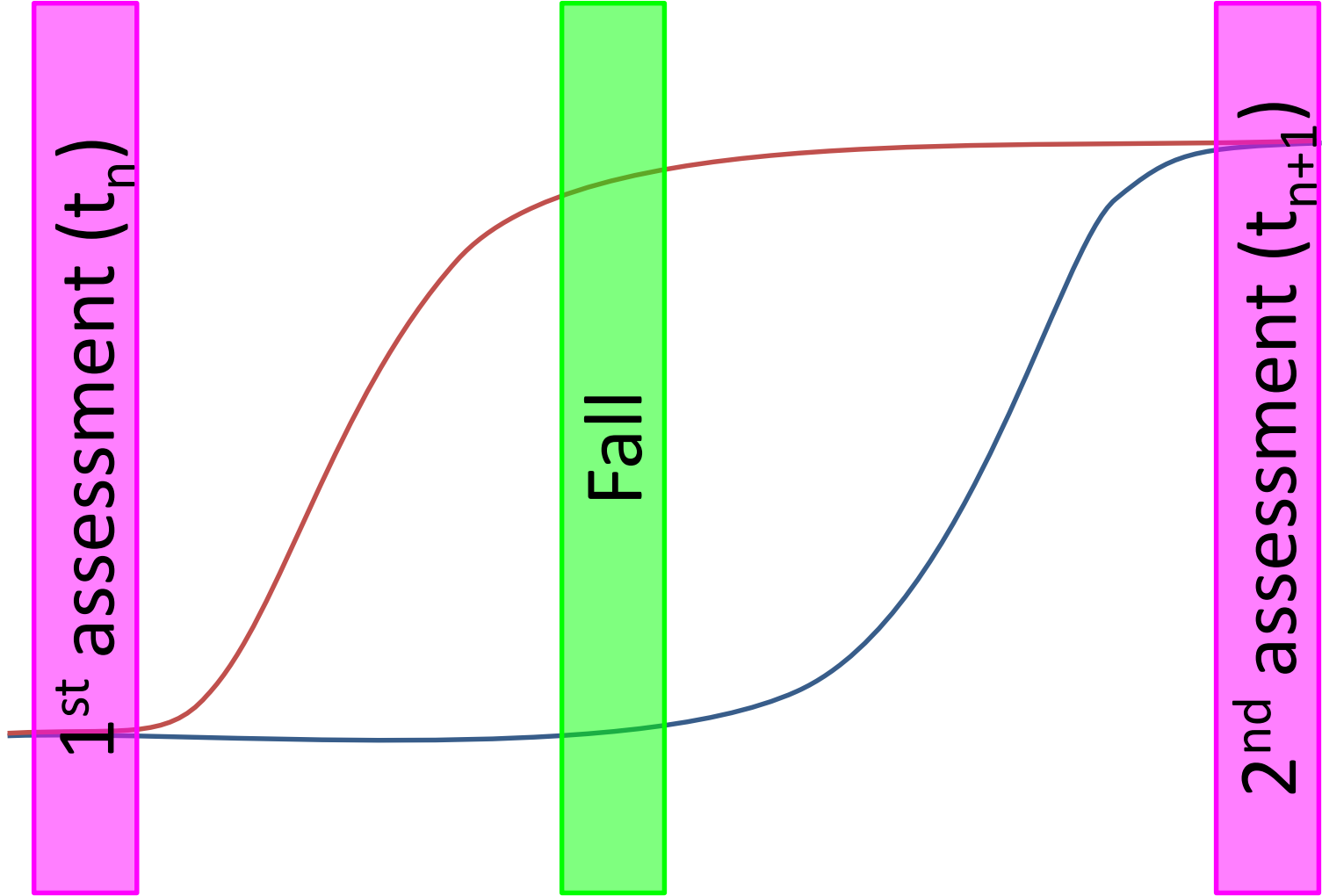
R.A. Schoevers  , A.T.F. Beekman, D.J.H. Deeg, M.I. Geerlings, C. Jonker, W. Van Tilburg

- Risk factors for newly developed depression
 - Decrease in ADL or IADL function
 - Death of spouse
 - Occurrence of new chronic disease






Chicken or egg?



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RESEARCH ARTICLE

Falls, Depression and Antidepressants in Later Life: A Large Primary Care Appraisal

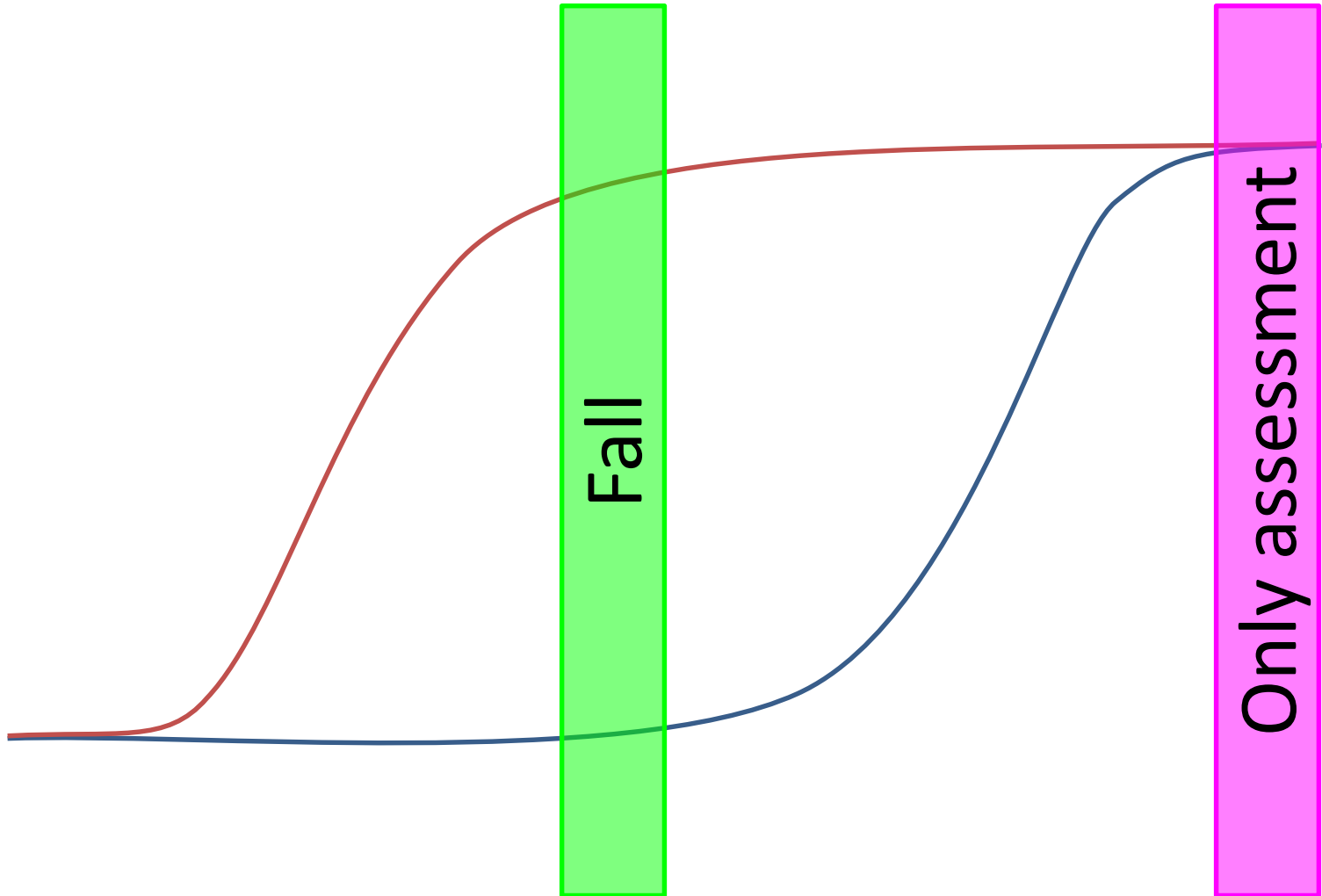
Ngairé Kerse , Leon Flicker, Jon J. Pfaff, Brian Draper, Nicola T. Lautenschlager, Moira Sim, John Snowdon, Osvaldo P. Almeida

Published: June 18, 2008 • DOI: [10.1371/journal.pone.0002423](https://doi.org/10.1371/journal.pone.0002423)

- Cross-sectional survey of 21,900 older adults
- Depression and use of depression medications (particularly SSRIs) was associated with having multiple falls and injurious falls



Chicken or egg?



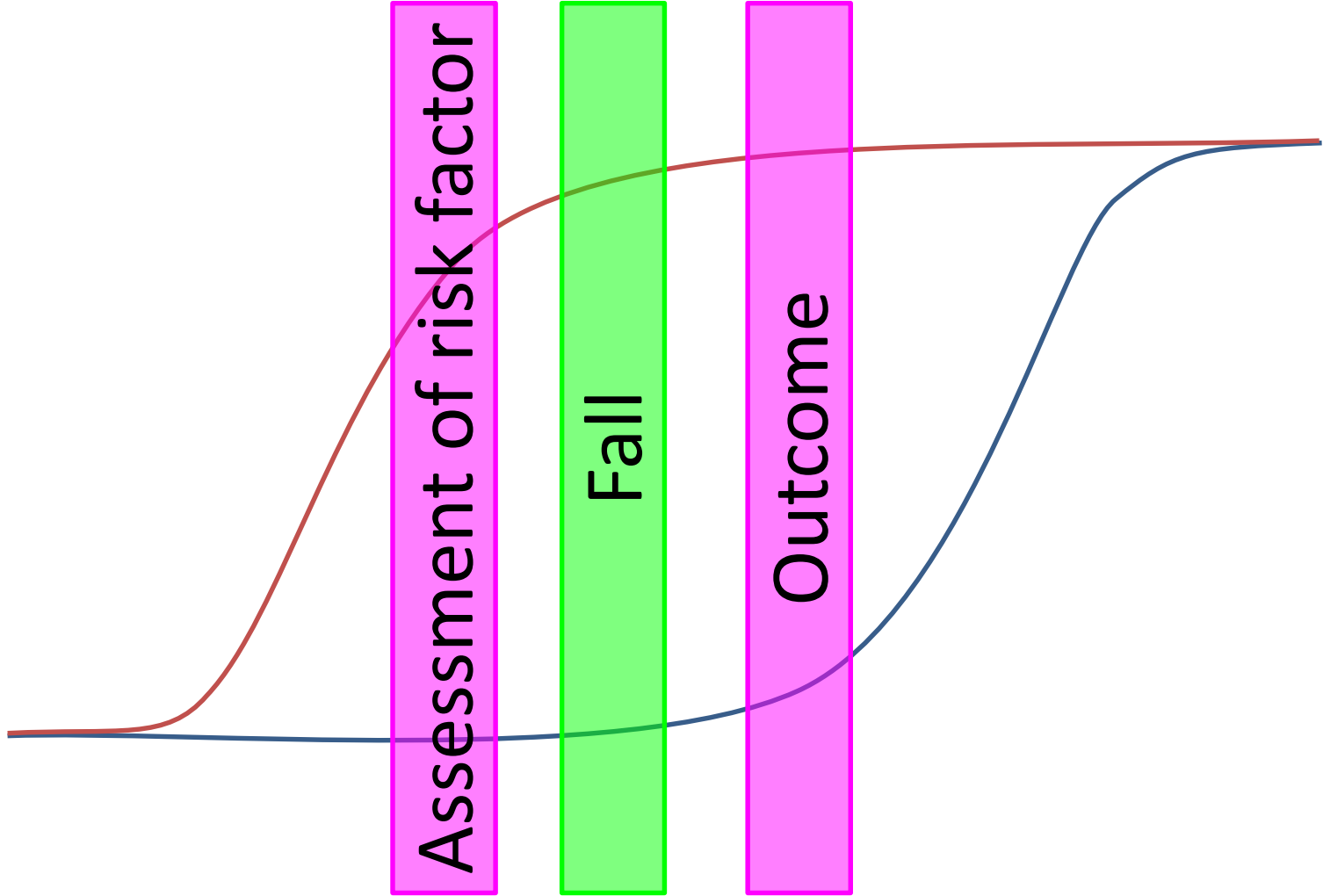
Association Between Prescribing of Cardiovascular and Psychotropic Medications and Hospital Admission for Falls or Fractures

Rupert A. Payne · Gary A. Abel · Colin R. Simpson ·
Simon R. J. Maxwell

- Retrospective cohort study
- n=39,813 patients
 - Use of SSRIs and non-SSRI tricyclics increased risk of hospital admission for falls / fractures 2 – 3 fold.

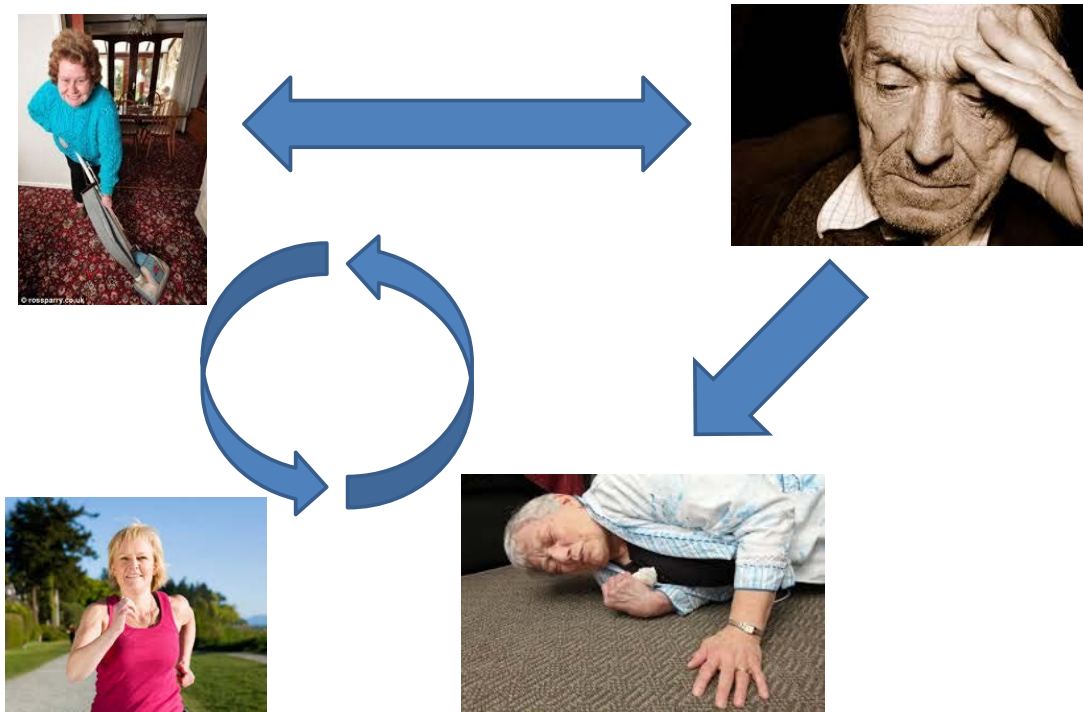


Chicken or egg?



Aim

- To investigate the temporal relationships between falls, physical activity and symptoms of depression amongst older adults





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Author Section Issue
Article Type Special Issue Page

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Volume 3, Issue 3

Healthcare 2015, 3(3), 478-502; doi:10.3390/healthcare3030478

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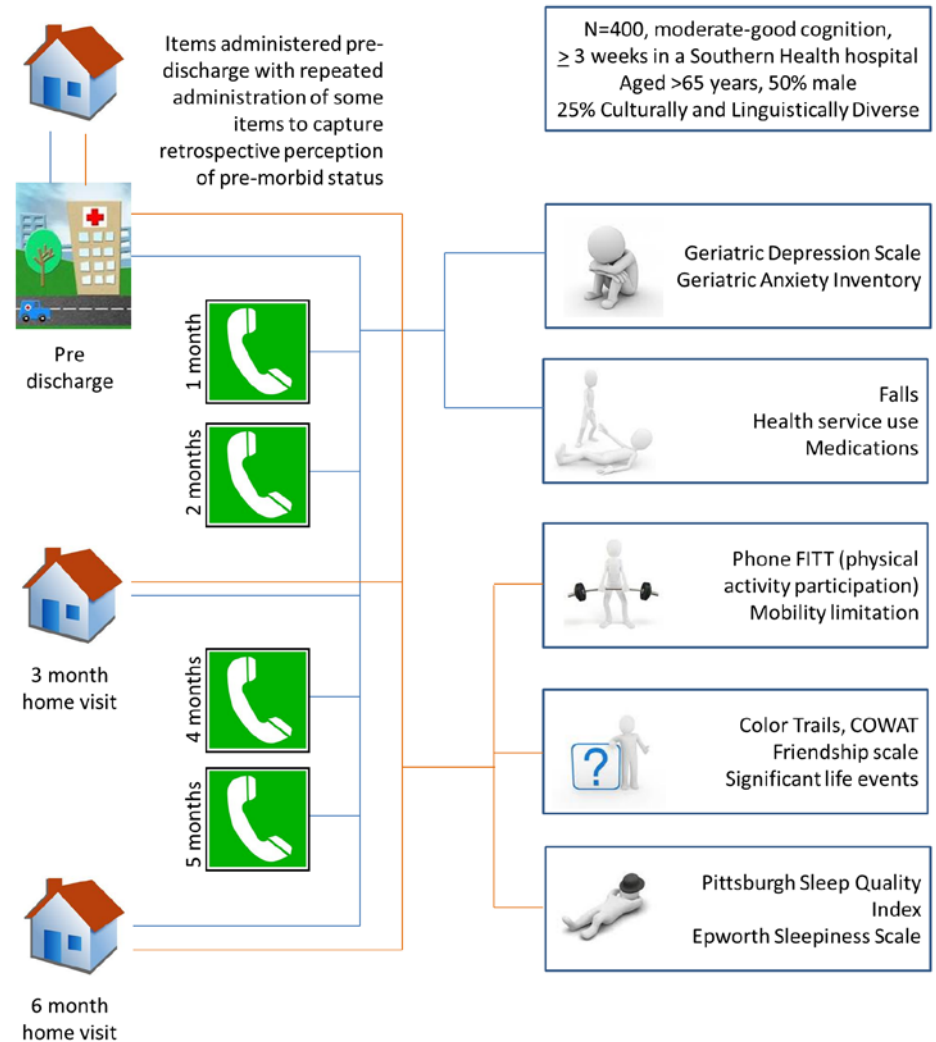
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Anxiety and Depression during Transition from Hospital to Community in Older Adults: Concepts of a Study to Explain Late Age Onset Depression

Aislinn F. Lalor ^{1,2} , Ted Brown ^{2,3} , Lauren Robins ^{1,2} , Den-Ching Angel Lee ^{1,2} , Daniel O'Connor ⁴ , Grant Russell ⁵ , Rene Stolwyk ⁶ , Fiona McDermott ^{2,7} , Christina Johnson ⁴ and Terry P. Haines ^{1,2,*}



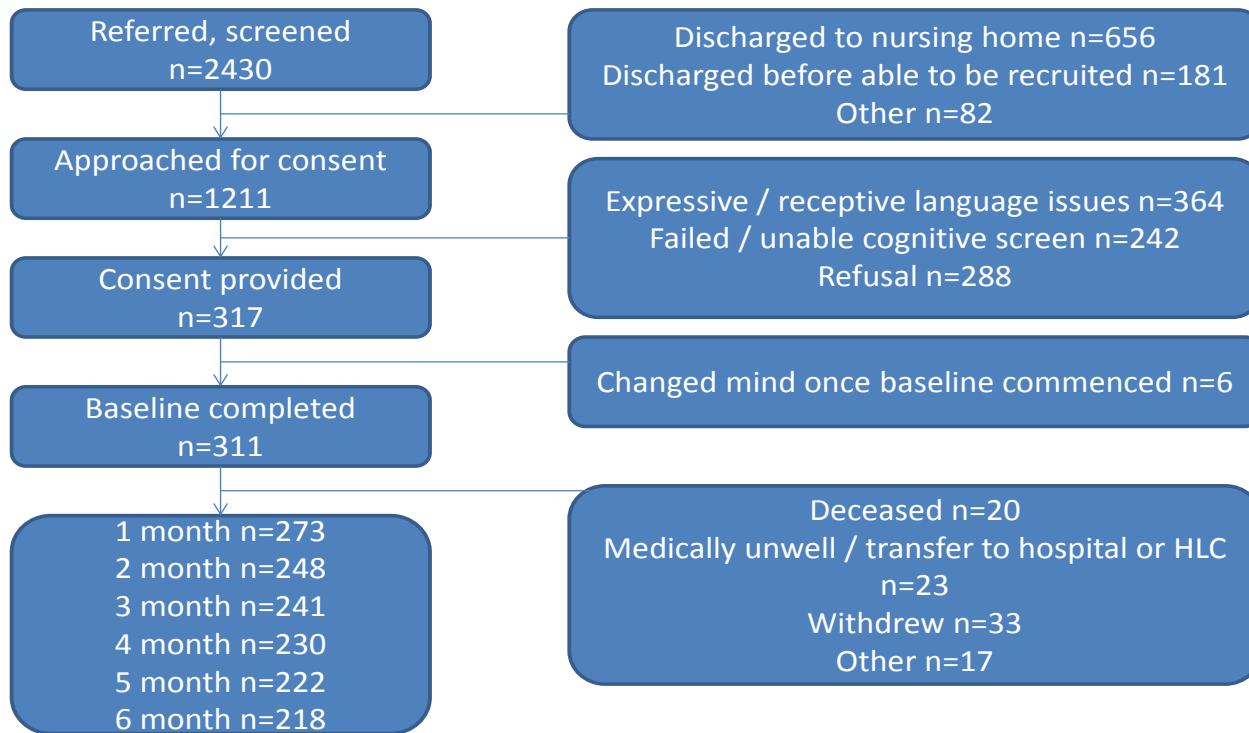
Prospective cohort method



Participant inclusion criteria

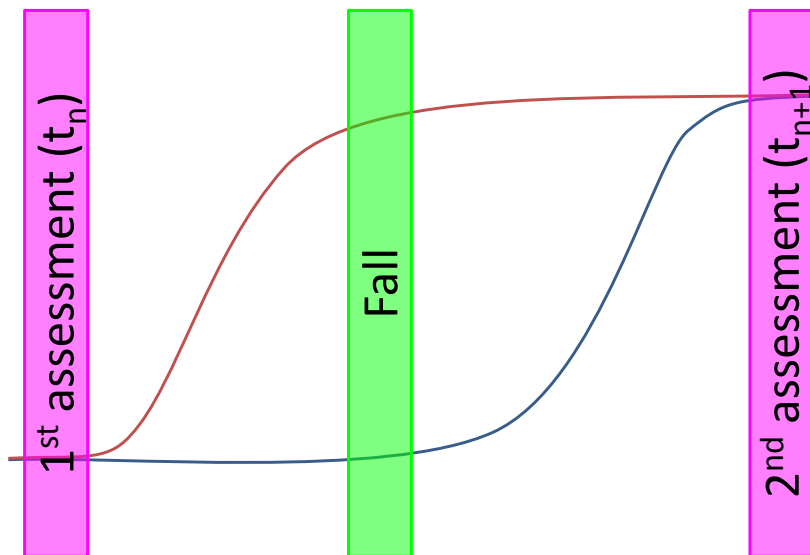
- Adults >65 years
- Cognitively intact
 - 6 item Cognitive Impairment Test
- ≥ 2 weeks in hospital
 - Monash Health, Peninsula Health
 - Jan 2013 – Sept 2014
- Not being discharged to nursing home

Participant flow



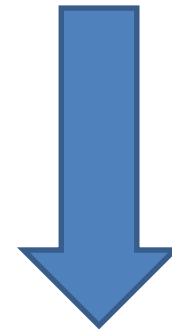
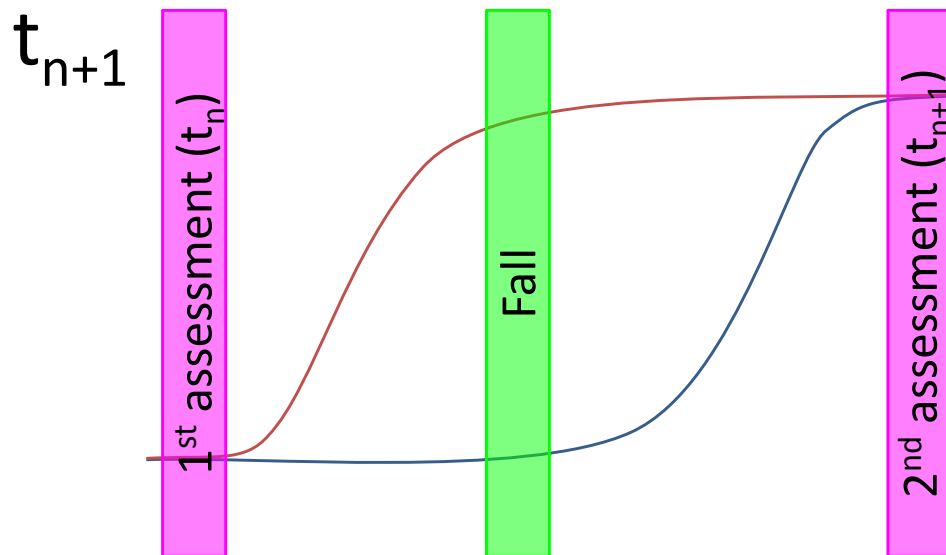
Analysis 1

- Correlation between change in depression symptoms ($t_n - t_{n+1}$) and falls reported over the past month at t_{n+1}



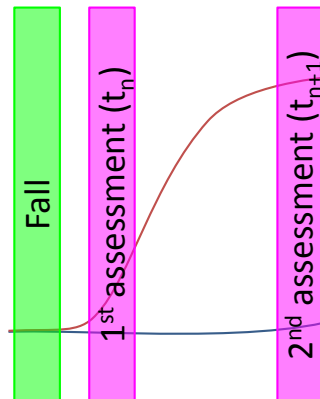
Analysis 2

- Correlation between raw score for depression symptoms at t_n and falls recorded over the past month at t_{n+1}



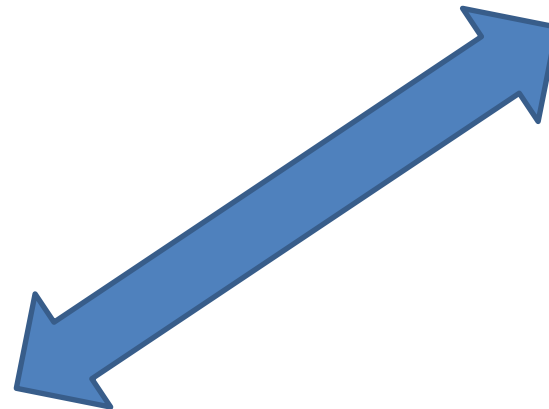
Analysis 3

- Correlation between falls reported over the past month (t_n) and change in depression symptoms over the following month ($t_n - t_{n+1}$)



Analysis

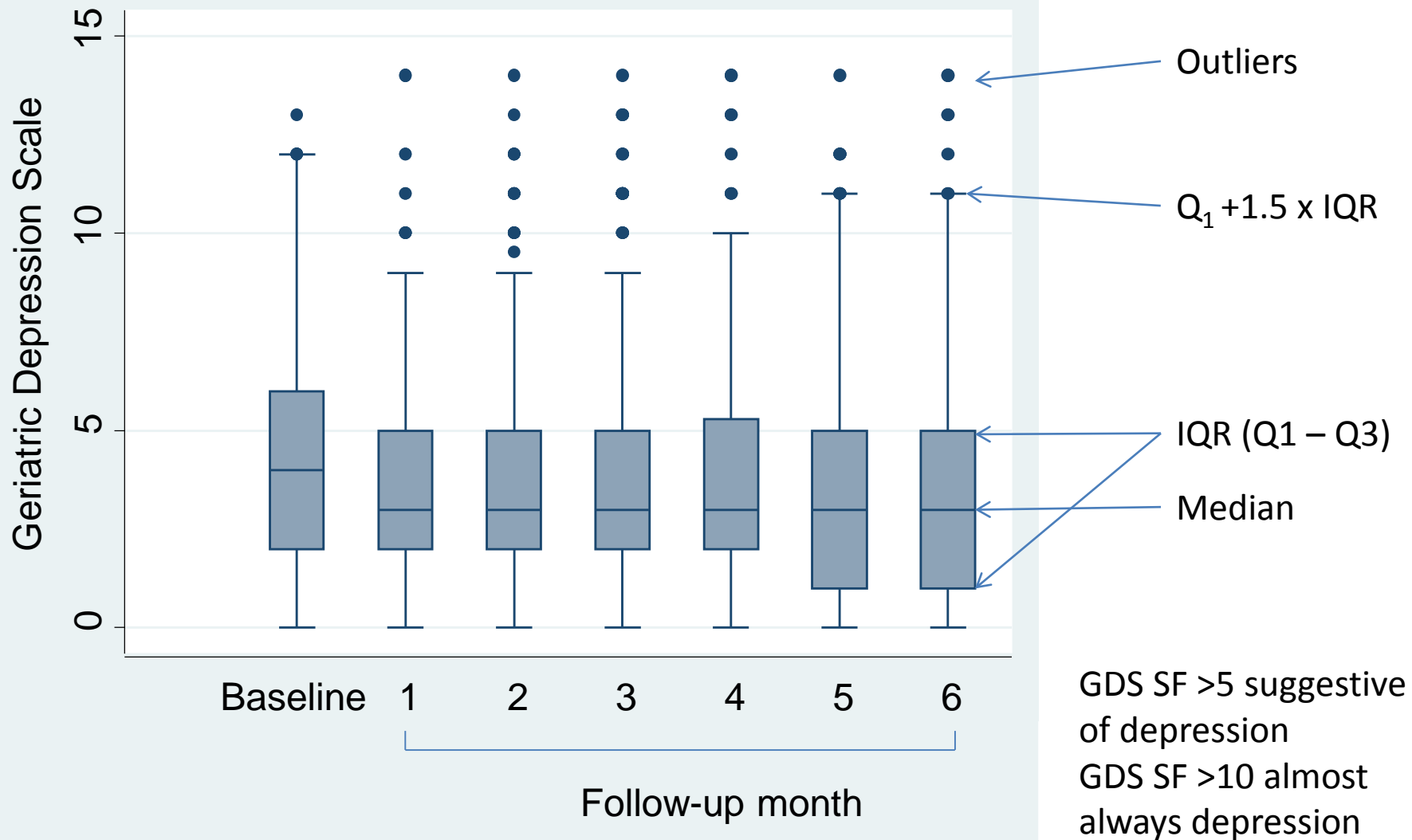
- Comparable analyses using physical activity subscales and depression symptom scores



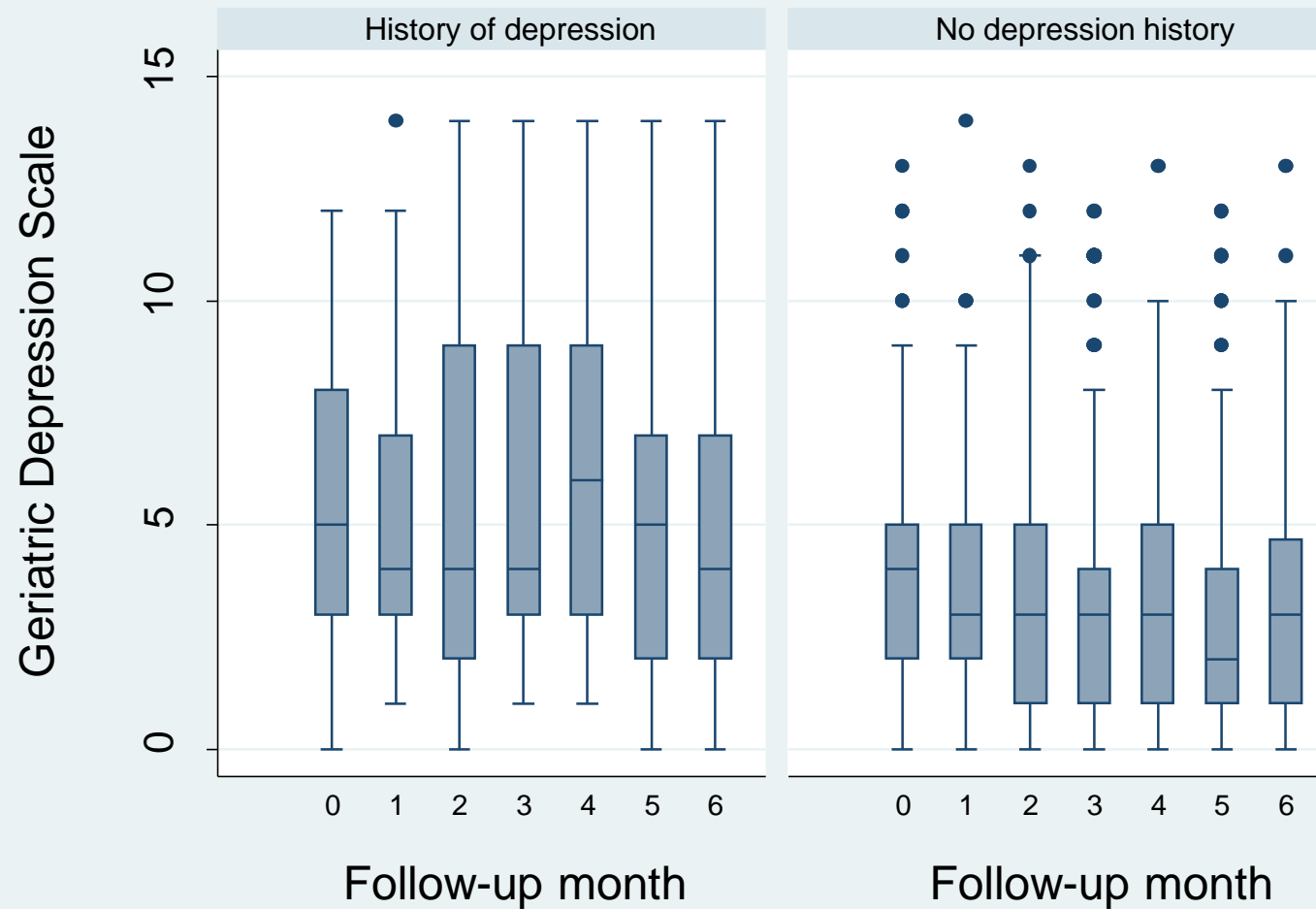
Demographics at baseline

	Mean (sd) or number (%)		Mean (sd) or number (%)
Age	78.4 (7.7)	Past GP Dx of depression	51 (17%)
Gender (female)	180 (58%)	Faller while in hospital	33 (11%)
Mobility		Usual activities	
No problems	45 (15%)	No problems	113 (38%)
Slight problems	114 (39%)	Slight problems	90 (31%)
Moderate problems	87 (30%)	Moderate problems	41 (14%)
Sever problems	41 (14%)	Sever problems	16 (5%)
Cannot walk	8 (3%)	Unable	34 (12%)
Self-care (eg. washing)		Pain / discomfort	
No problems	152 (52%)	No pain / discomfort	150 (51%)
Slight problems	84 (28%)	Slight	81 (27%)
Moderate problems	36 (12%)	Moderate	44 (15%)
Sever problems	15 (5%)	Severe	19 (6%)
Unable	8 (3%)	Extreme	1 (0%)

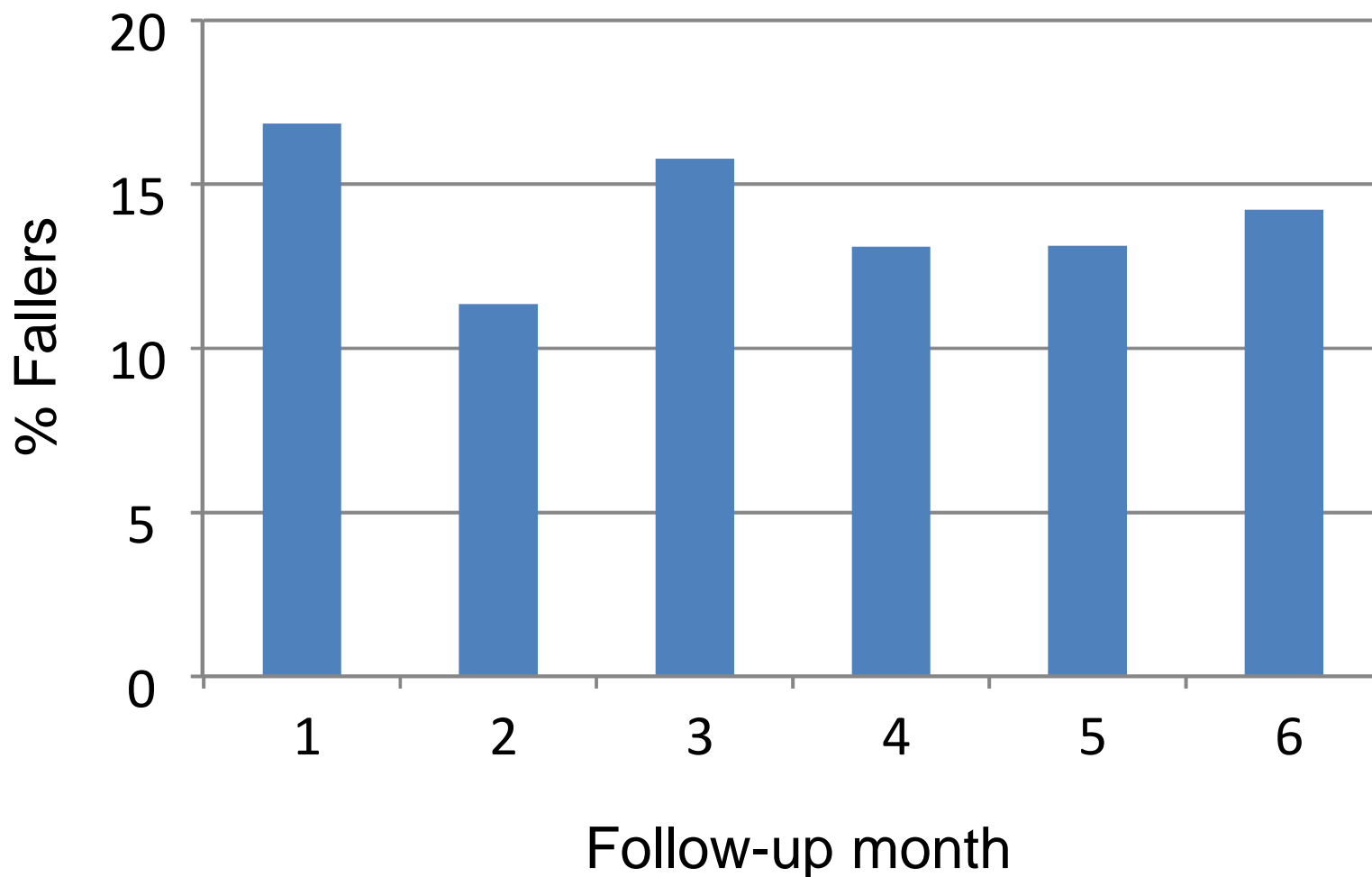
GDS over time



GDS over time by past history of depression

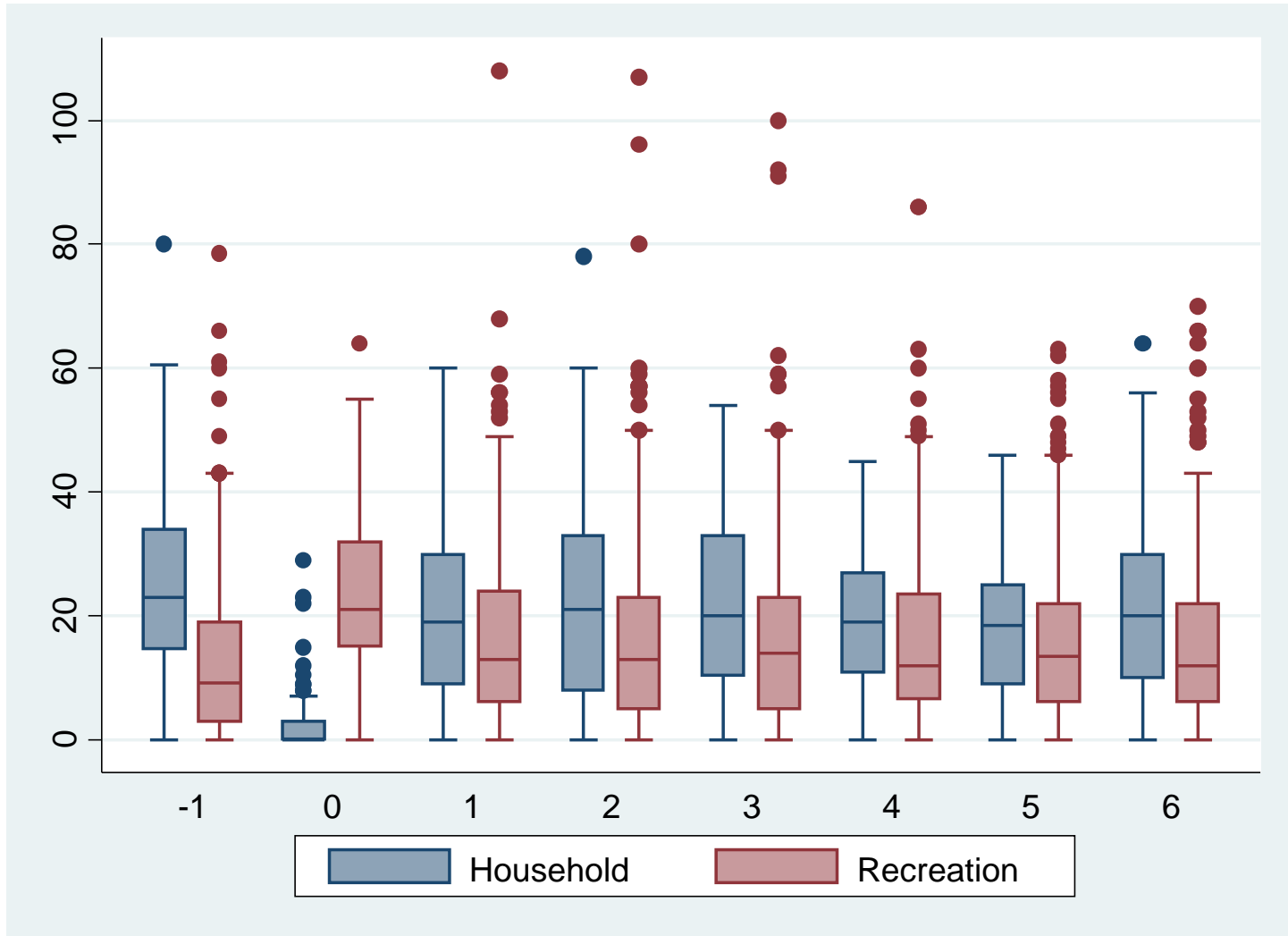


% Fallers by month of follow-up



Risk of falls: Male – Odds ratio (robust 95%CI) = 2.16 (1.40, 3.35), $p=0.001$

Physical activity over time



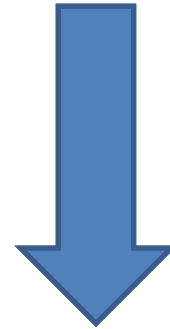
Analysis 1

- Association between depression symptoms at t_n and falls reported over the past month at t_n
- Odds ratio (robust 95% CI), p-value:
1.23 (1.17, 1.28), $p < 0.001$



Analysis 2

- Association between raw score for depression symptoms at t_n and falls recorded over the past month at t_{n+1}
- Odds ratio (robust 95% CI), p-value:
1.19 (1.12, 1.27), $p < 0.001$



Analysis 3

- Association between falls reported over the past month (t_n) and change in depression symptoms over the following month ($t_n - t_{n+1}$)
- Odds ratio (robust 95% CI), p-value:
1.03 (0.96, 1.11), $p=0.39$



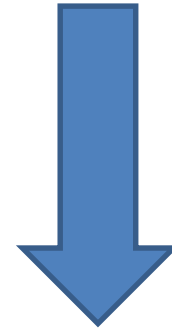
Analysis 1

- Association between depression symptoms at t_n and Phone FITT household at t_n
- Coef (robust 95% CI), p-value:
-0.06 (-0.08, -0.05), $p < 0.001$



Analysis 2

- Association between raw score for depression symptoms at t_n and change in Phone FITT household over the next month $t_n - t_{n+1}$
- Coef (robust 95% CI), p-value:
-0.01 (-0.02, 0.00), $p=0.12$



Analysis 3

- Association between phone FITT household measured at t_n and change in depression symptoms over the following month ($t_n - t_{n+1}$)
- Coef (robust 95% CI), p-value:
-0.01 (-0.01, 0.00), $p=0.14$



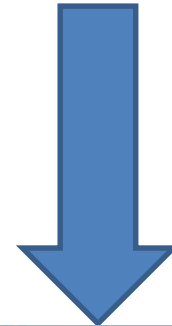
Analysis 1

- Association between depression symptoms at t_n and Phone FITT household at t_n
- Coef (robust 95% CI), p-value:
-0.03 (-0.05, -0.02), $p < 0.001$



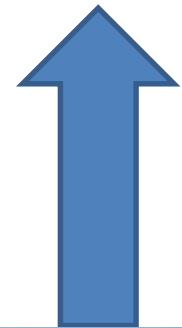
Analysis 2

- Association between raw score for depression symptoms at t_n and change in Phone FITT household over the next month $t_n - t_{n+1}$
- Coef (robust 95% CI), p-value:
0.00 (-0.01, 0.01), $p=0.97$

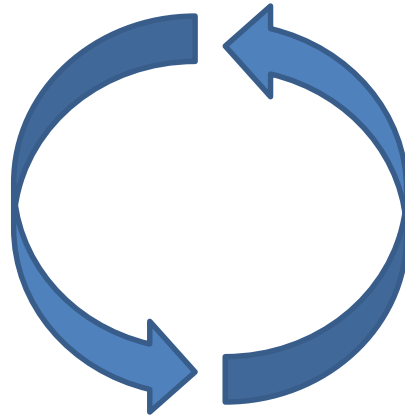


Analysis 3

- Association between phone FITT household measured at t_n and change in depression symptoms over the following month ($t_n - t_{n+1}$)
- Coef (robust 95% CI), p-value: 0.01 (-0.01, 0.01), $p=0.99$



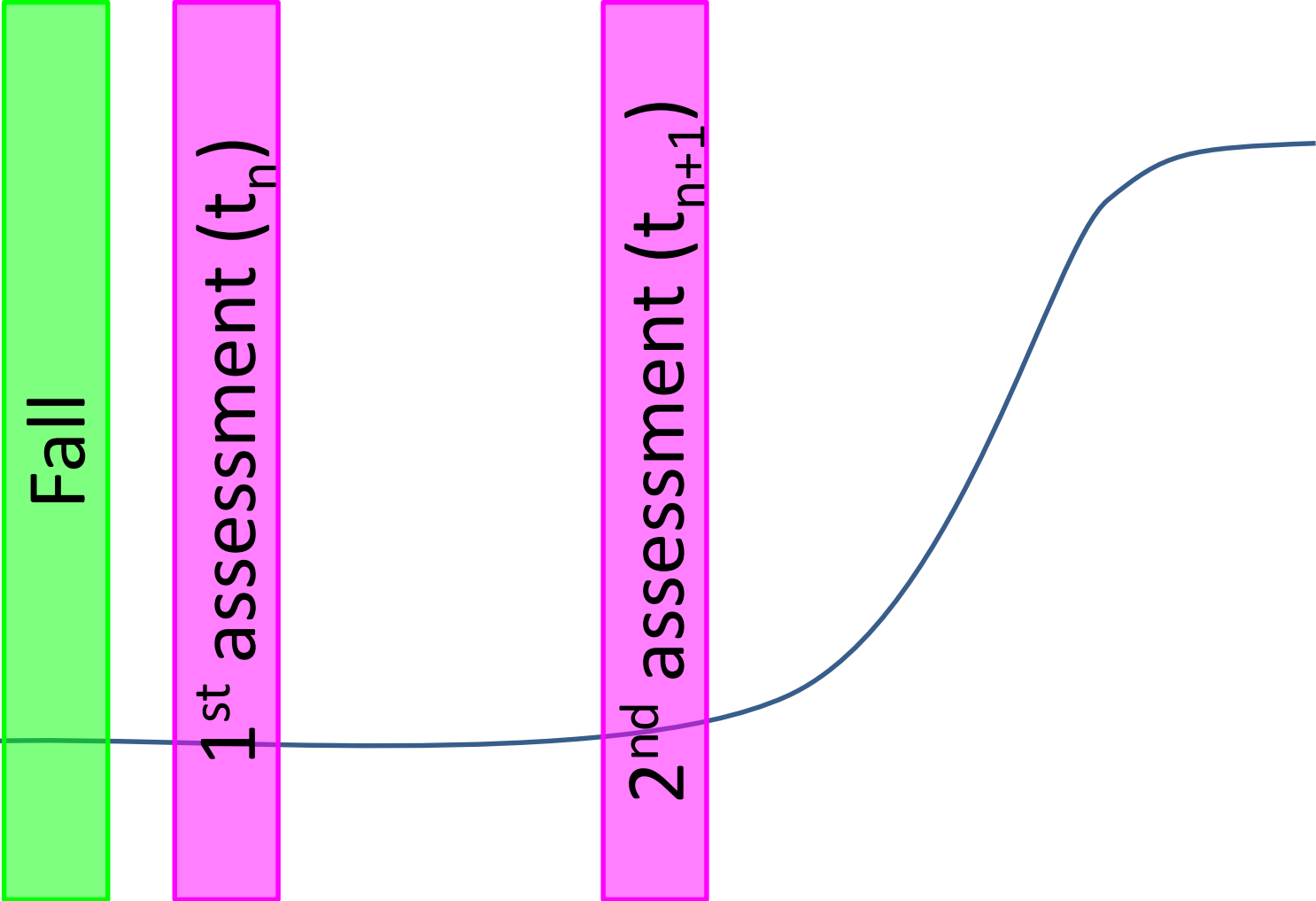
Discussion



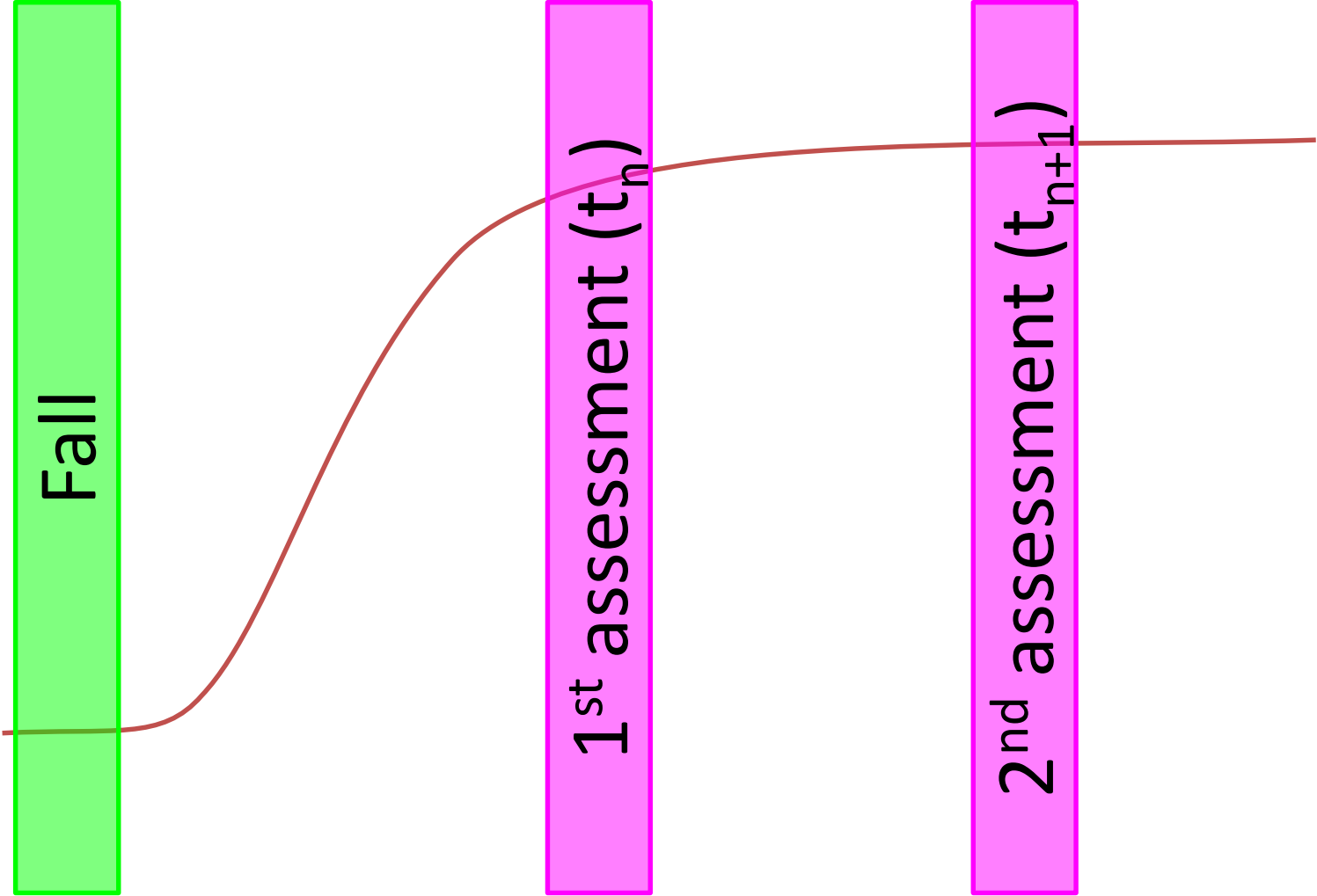
Recommendations

- Although falls, physical activity and depression all appear to be inter-related, only raw depressive symptoms was found to have a prior temporal relationship with falls.
 - Increases likelihood that depressive symptoms are causally related to falls.

Limitations



Limitations



Limitations

- Possibility of confounding factor X
 - ?Impact of using anti-depressant medications
 - ?Social support
 - ?Other life changing events
- Loss to follow-up
- Self-report physical activity

Recommendations

- Consider more than just the physical health of older adults who have had a long hospital stay
 - They have recently had a potentially life-changing event which can lead to depressive symptoms
 - Once established, higher levels of depressive symptoms can lead to falls in this population