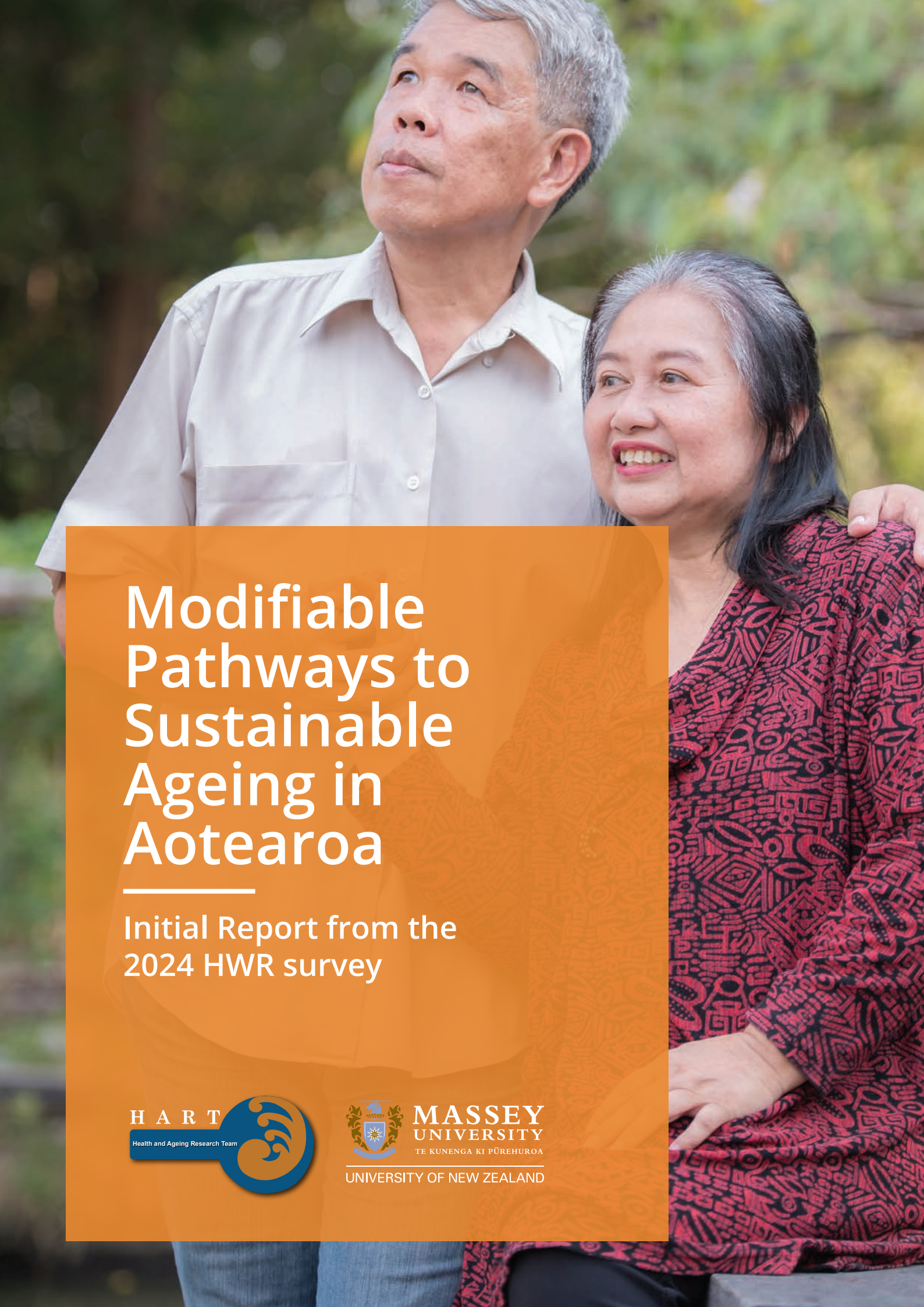


Modifiable Pathways to Sustainable Ageing in Aotearoa

Initial Report from the 2024 HWR survey

HART
Health and Ageing Research Team

MASSEY UNIVERSITY
TE KUNENGA KI PŪREHUROA
UNIVERSITY OF NEW ZEALAND

ACKNOWLEDGEMENTS

Report Author
Christine Stephens

Correspondence to
Christine Stephens
c.v.stephens@massey.ac.nz

This research was funded by the Ministry of Business, Innovation & Employment.
Endeavour fund grant MAUX2303

Health and Ageing Research Team
School of Psychology
Massey University
Private Bag 11 222
Palmerston North 4442
New Zealand

Tel: 0800 100 134
Email: hart@massey.ac.nz
Website: hart.massey.ac.nz

TABLE OF CONTENTS

Figures

Tables

EXECUTIVE SUMMARY

The unsustainable burden of care associated with population ageing is rapidly becoming an important issue in Aotearoa/NZ. This project aims to provide a robust evidence base for preventative policy that minimises frailty and enhances independence among older people, reducing the burden of community and residential care in an ageing population.

The project will identify precursors to frailty that are amenable to policy change, using longitudinal data from the New Zealand Health, Work and Retirement Study (NZHWR) This report describes initial descriptive findings from the 2018 and 2024 surveys.

Analysis of data from the 2018 and 2024 surveys shows:

1. Depression, Anxiety, Mental Health, and Physical Health (taking into account other significant factors including Age, Loneliness, QoL, and Living Standards) were significantly related to frailty in 2024. Those assessed as frail also recorded, on average, higher Depression and Anxiety and poorer Physical and Mental Health.
2. Those who engaged in vigorous physical exercise, refrained from smoking, were employed, had higher living standards and greater housing satisfaction in 2018 were significantly less likely to be categorised as frail 6 years later in 2024.
3. Poorer physical health explained the role of exercise, smoking, and employment. Once physical health in 2018 was accounted for, only Living Standards and Housing Satisfaction contributed additional explanation of frailty in 2024.

Frailty in older age is associated with poorer mental health. Additional longitudinal analysis is required to investigate the role of health-related behaviours in predicting physical health, which, in turn, is strongly related to subsequent frailty.

The independent contribution of housing satisfaction (which is strongly related to all housing and neighbourhood factors) and living standards (an estimation of economic wellbeing) to future frailty points to the importance of living conditions for resilience and wellbeing in older age.

INTRODUCTION

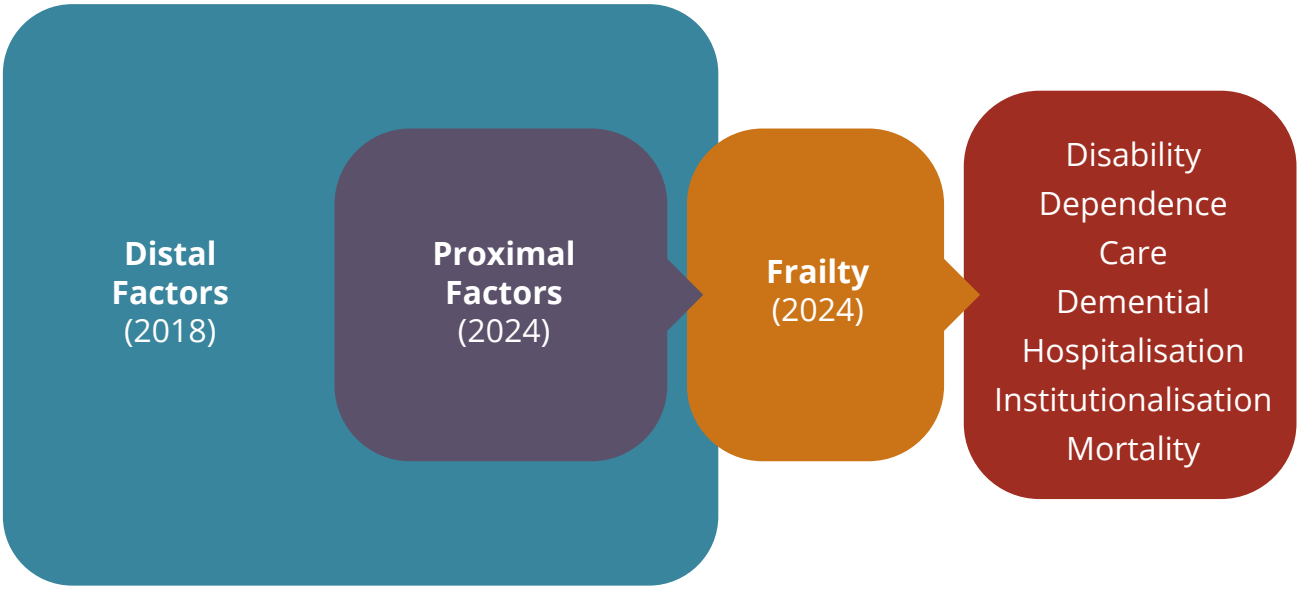
The unsustainable burden of care associated with population ageing is a well-recognised international problem and rapidly becoming apparent as an issue in Aotearoa/NZ. For example, the predicted threefold increase in people with dementia will put health-care systems and caregivers under unmanageable pressure [1]. Currently, older New Zealanders (65+, 15% of population) use 42% of DHB budgets (50% by 2025/26); residential aged care services use 60% of this expenditure [2]. Need for care rises sharply for those over 85 years of age [3]; in Aotearoa/NZ in 2018/2019, 40% of those 85+ received an interRAI assessment [4] indicating a high need for publicly funded care.

This project aims to provide a robust evidence base for policy that minimises frailty and enhances independence among older people, reducing the burden of community and residential care in an ageing population. Our approach to this issue is preventative. Current interventions aim to improve the wellbeing of already frail individuals. However, public health approaches have long focussed on the influence of health-related behaviours such as diet, exercise, tobacco and alcohol use, on later life health. More recent evidence highlights the importance of social and environmental precursors (e.g., socioeconomic status, social structural factors, housing) to late-life wellbeing, long before care is required [5]. Pathways to frailty begin early and are mediated by behavioural, social, and environmental conditions. Public policies that reduce late-life frailty through early intervention will improve quality of life and reduce care expenditure.

The project will identify precursors to frailty that are amenable to policy change, using longitudinal data from the New Zealand Health, Work and Retirement Study (NZHWR) linked to life course and community data, and national datasets. This report describes initial descriptive findings from the 2018 and 2024 surveys, based on the conceptualisation of pathways shown in Figure 1.

Figure 1

Conceptual Schema for the Current Analysis.



METHOD

PROCEDURE

Data were collected as part of the New Zealand longitudinal Health, Work and Retirement study (NZHWR). Paper-based surveys and consent forms were mailed to participants. The questionnaire included eight main domains: 1) health, wellbeing, quality of life; 2) social support, family and friends; 3) caring commitments; 4) work and retirement status/attitudes; 5) financial wellbeing; 6) neighbourhood characteristics; 7) socio-demographic information; and 8) Māori identity. Participants are re-surveyed on a biennial basis.

SAMPLE

Participants in this analysis were respondents to the 2018 and 2024 waves of the NZHWR survey. Older community dwelling adults were randomly selected from the New Zealand Electoral Roll which contains data on participant age, gender, and whether the person is identified as being of Māori descent. Random population samples were drawn in 2006 (cohort aged 55-70 years at recruitment) and 2009-2010 (cohort aged 50-80 years at recruitment). From 2014, the sample was refreshed to include samples of those aged 55-65 years as the longitudinal sample aged. Oversampling of a cohort registered on the electoral roll as being of Māori descent was undertaken to ensure adequate representation of Tangata Whenua.

The 2024 sample included 6245 participants ranging in age from 54 to 94 years (*M* = 66 years) of whom 56.5% were female, and 38% identified as Māori.

The 2018 sample included only those who had also responded in 2024 (*N*= 2658). This group ranged in age from 55 to 89 years (*M*= 66.5 years); 56.5% were female, and 25% identified as Māori.

MEASURES

Frailty (2024)

Following Paulson et al. [6] we measured frailty using Fried et al.'s [7] conceptualization of frailty as a phenotype with six criteria: wasting, weakness, slowness, fatigue or exhaustion, and falls. The wasting criterion was assessed by yes (1) or no (0) responses to "Have you lost 5 or more kilograms of weight during the last year?" The weakness criterion was assessed by yes (1) or no (0) responses to "Do you have any difficulty with lifting or carrying weights over 5 kilos, like a heavy bag of groceries?" The slowness criterion was assessed by yes (1) or no (0) responses to "Do you have any difficulty with getting up from a chair after sitting for long periods?" The fatigue or exhaustion criterion was assessed by yes (1) or no (0) responses to "Do you experience severe fatigue or exhaustion?" The falls criterion was assessed using responses to "In the past six months have you had any falls including a slip or trip in which you lost your balance and landed on the floor or ground (e.g. trip over on the footpath, slip down some stairs, fall from a ladder)?" Responses ranged through: Not at all (1), Yes, once (2), Yes, twice (3), Yes, 3 or more times (4). Based on the recognition that 2 or more falls suggests decline [8], the scores on the falls item were dichotomised (1,2 (0) 3,4 (1).

According to Paulson et al., [6] these indicators, as available in survey data, offer a best-fit of the Fried et al. [7] phenotype. Individuals who scored yes to three or more of the criteria were identified as frail. The scores on the 5 items were summed (0-5) and dichotomised to form a Frailty Index: 0-2 is not frail (0) and 3-5 is frail (1).

Proximal Factors (2024):

Physical and Mental Health. The Short Form Health Survey [9] was administered to assess Mental and Physical Health. The physical and mental health component scores of the SF-12 have been normed to the New Zealand population using data from the New Zealand Health Survey [10]. Scores can range from 0 to 100, where 50 corresponds with the population average (*SD* = 10), and higher scores indicate better physical and mental health.

Anxiety. Anxiety symptoms were measured using the short form of the Geriatric Anxiety Inventory (GAI - SF)[11]. GAI-SF consists of five items aimed at assessing the experience of anxiety symptoms in the past seven days. GAI-SF utilizes a forced choice response format (agree and disagree) for each item and the overall scores ranging from 0 (minimum) to 5 (maximum). A total score is calculated by summating the responses on five items, with a score of three or above reported to be indicative of the experience of anxiety symptoms. Moreover, a score of three or greater has been reported to be 75% sensitive and 87% specific (Byrne & Pachana, 2011). In the current data analysis, the total GAI score was used.

Depression. Depression symptoms were measured using the short form of the Center for Epidemiologic Studies Depression Scale (CES-D) [12]. CES-D is exclusively designed to assess the presence of depression symptoms in older adults. The CES-D consists of 10 items evaluating the frequency of depression symptoms in the past seven days on a four-point likert scale with 0 (*rarely or none of the time)* to 3 (*all the time)*. CES-D consists of two negatively worded items, *"I felt hopeful about the future"* and *"I was happy"* which were reverse coded. A total score on CES-D is calculated by summating the responses to the ten items, with higher scores indicating higher depression symptom frequency.

Loneliness was measured with the 6-item De Jong Gierveld Loneliness Scale, a short version of the 11-item De Jong Gierveld Loneliness Scale [13]. The scale measures emotional, social, and overall loneliness and is easy to use in surveys. The scale includes three negatively worded items and three positively worded items. Participants indicate each item by selecting "Yes", "More or less", or "No". Summing positive and neutral answers to negatively worded items provides an emotional loneliness score, while summing negative and neutral answers to positive items assigns a social loneliness score, both ranging from 0 to 3, with higher scores signifying higher loneliness. Combining the subscale scores provides an overall

loneliness score ranging from 0 to 6 (Gierveld & Tilburg, 2010).

Quality of Life (QOL) was evaluated using the self-enumerated (CASP-12) [14]. The 12-item scale includes four negatively framed statements, for example 'I feel left out of things' and eight positively framed statements, for example 'I look forward to each day'. The participant indicates how often the specific statements applies to them using a 4-point Likert scale ranging from 'often', to 'never'. Item scores are rescaled using a 0-3 marking schedule and summed giving a possible score range of between 0 -30. A higher overall score reflected a greater self-perception of Quality of Life.

Living standards. The short form version of the Living Standards Capabilities for Elders was based on the capabilities approach (LSCAPE-6)[15]. The LSCAPE-6 consists of six items measuring capabilities to achieve desired health care access, social interaction, social contribution, enjoyment of daily activities, sense of financial security, and restriction of autonomy on a 5-point scale (1 = not at all true for me and 5 = definitely true for me). Sample items include "I can afford to go to a medical specialist if I need to", "My choices are limited by money", and "I am able to visit people whenever I wish". Scores are summed providing a range of 5-30, where higher scores mean higher living standards.

Distal Factors (2018):

Education was measured as level of qualification and dichotomised as University/Tertiary level (1) compared to Secondary and no qualifications (0) (no qualifications cf secondary and tertiary level gave similar results).

Employment was dichotomised as Working (1) or Non-working (0) (Hours of work gave similar results).

Physical Exercise was assessed on the basis of responses to Vigorous exercise where responses to "hardly ever" and "1–3 times a month," were combined (0) compared to "once a week," or "more often than once a week." (1).

Current Smoking was dichotomised as yes (1) or no (0).

Alcohol Consumption The AUDIT-C [16] comprises three alcohol consumption questions that assess the past year's frequency of drinking, quantity typically consumed, and frequency of consuming 6 or more drinks on one occasion. Scores range from 0 to 4 on each item, with a combined score ranging from 0 to 12. Higher scores mean more hazardous levels.

Housing Tenure was dichotomised as home-owner (1) or renter (0).

Housing Condition was assessed by summing the results of yes/no responses to 3 items from the NZ census:

Housing and Neighborhood Factors were assessed in terms of indicators of housing satisfaction, neighborhood satisfaction, access to facilities in neighborhood, and neighborhood trust [17]. Participants responded to 8 items assessing satisfaction with their home (example item: '*My home meets all my needs*'; Cronbach's alpha in current sample = .92), 1 item assessing satisfaction with their neighborhood and 3 items assessing access to facilities in the neighborhood (example item: '*I am close enough to important facilities*') on a scale of 1 'no, definitely not' to 5 'yes, definitely', (Cronbach's alpha in current sample = .80). Neighborhood trust was assessed with the 6 item subscale of the Neighborhood Social Cohesion tool [18]; example item: '*People in this area would do something if a house was being broken into*') on a scale of 1 'strongly disagree' to 5 'strongly agree' (Cronbach's alpha in current sample = .76). Total scores for each environment factor were calculated as mean component item ratings (score ranges 1-5) with higher scores meaning better perceptions of the environment.

Social Support was measured with the Social Provisions Scale [19], which assesses interpersonal relationships in six dimensions: attachment, social integration, reassurance of worth, reliable alliance, guidance, and opportunity for nurturance. Items are rated on a 4-point scale (1 = *strongly disagree* and 4 = *strongly agree*) and can be combined into a composite score (range: 24-96), where higher scores indicate greater relational provisions.

RESULTS

1. PROXIMAL FACTORS AND FRAILTY

Within the 2024 data set factors expected to be related to frailty (Depression, Anxiety, Mental Health, Loneliness, QoL, Physical Health and Living Standards) were compared using Pearson's *r* bivariate correlations. As shown in Table 1, all these factors were significantly related to Frailty. Physical Health was, unsurprisingly, the most strongly associated with Frailty, with QoL and Depression also moderately strongly correlated.

The wellbeing variables were also significantly correlated with each other. Accordingly, they were entered into a regression equation, which controlled for Age, and the relationships among the variables. As seen in Table 2, Age was significantly associated with Frailty at step 1 but was no longer significant when the variance in frailty explained by all wellbeing variables was accounted for at step 2. Variables that were significantly associated with Frailty (p <.05) were Depression, Anxiety, Mental Health and Physical Health.

This final model was significant (Chi Square = 1575.191(8); p<.001). The variables together explained a good proportion of the variance in Frailty but not all (Nagelkerke R Square = .488).

The importance of these findings is the strong associations with mental health at the time of a frailty assessment. Figure 2 illustrates the direction of the relationships of each of the significant variables with frailty. Those assessed as frail also recorded, on average, higher Depression and Anxiety and poorer Physical and Mental Health.

Table 1

Correlations (Pearson's r) between frailty, loneliness, depression, anxiety, QoL, mental health, physical health, and living standards in 2024 (N = 6245).

	Frailty Index	Loneliness	Depression	QoL	Mental Health	Physical Health	Living Standards	Anxiety
Frailty Index	1	.215**	.396**	-.397**	-.343**	-.513**	-.251**	.246**
Loneliness	.215**	1	.556**	-.570**	-.470**	-.185**	-.345**	.407**
Depression	.396**	.556**	1	-.726**	-.767**	-.384**	-.402**	.590**
QoL	-.397**	-.570**	-.726**	1	.640**	.454**	.517**	-.481**
Mental Health	-.343**	-.470**	-.767**	.640**	1	.226**	.348**	-.532**
Physical Health	-.513**	-.185**	-.384**	.454**	.226**	1	.298**	-.146**
Living Standards	-.251**	-.345**	-.402**	.517**	.348**	.298**	1	-.262**
Anxiety	.246**	.407**	.590**	-.481**	-.532**	-.146**	-.262**	1

*. p<.05 (2-tailed. **. p<.001 (2-tailed.

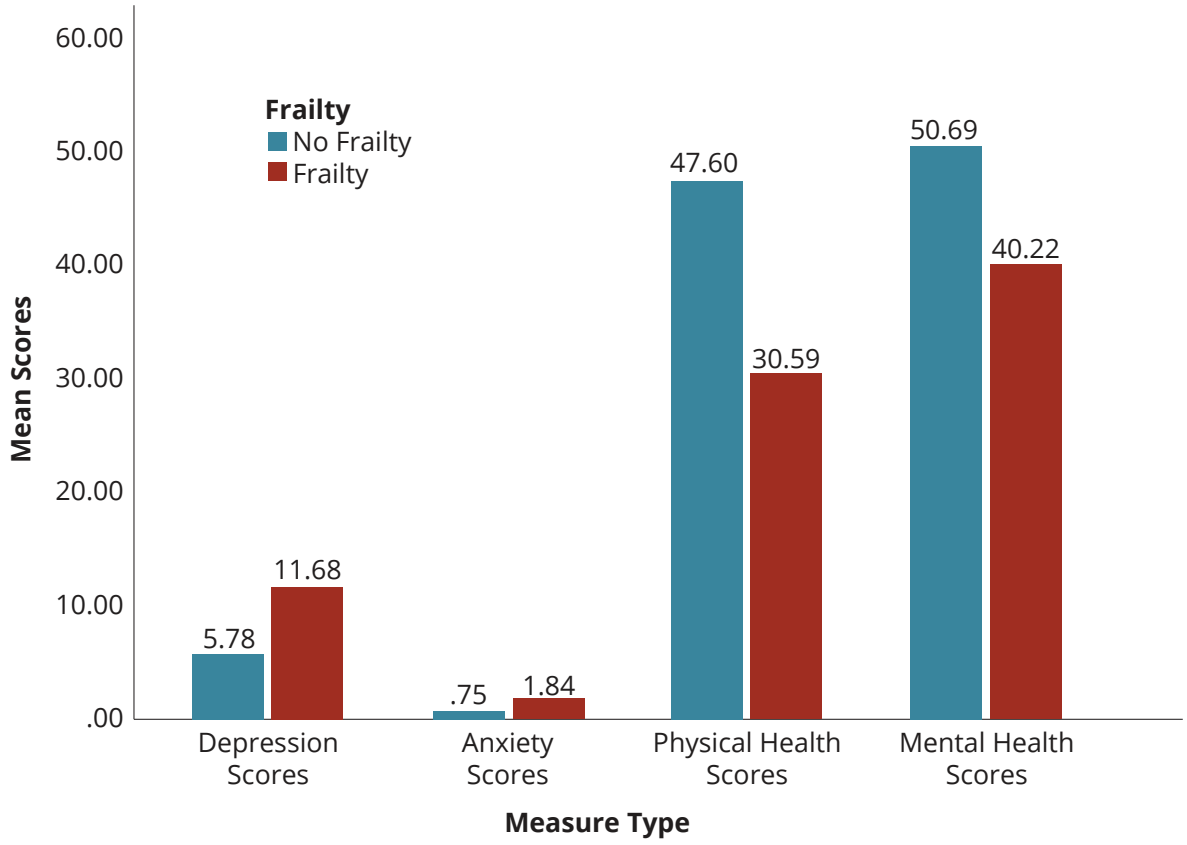
Table 2

Regression of Frailty Index (2024) on QoL, Loneliness, Living Standards, Mental Health, Physical Health, Depression, and Anxiety (2018), controlling for Age in 2024. (N = 5400).

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1	Age	.020	.006		1	<.001	1.020
Step 2	Age	.002	.007	.079	1	.779	1.002
	QoL	-.023	.014	2.669	1	.102	.977
	Loneliness	-.054	.035	2.426	1	.119	.947
	Depression	.058	.018	9.771	1	.002	1.059
	Living Standards	-.018	.010	3.649	1	.056	.982
	Mental Health	-.039	.007	28.838	1	<.001	.962
	Physical Health	-.125	.006	518.079	1	<.001	.882
	Anxiety	.127	.038	11.025	1	<.001	1.136
	Constant	5.063	.785	41.578	1	<.001	158.015

Figure 2

Mean Scores for Depression, Anxiety, Physical Health and Mental Health by levels of Frailty.



2. DISTAL FACTORS AND FRAILTY

Correlations between Wellbeing Factors in 2018 and Frailty in 2024.

To examine the relationships between wellbeing-related factors in 2018 and experiences of Frailty assessed in 2024, bivariate correlations (Pearson's *r*) were examined (see Table 3).

Depression, Anxiety, Mental Health and Physical Health were moderately strongly related to Frailty 6 years later.

Living Standards and Housing Satisfaction were also moderately strongly related to later Frailty. The other assessments of neighbourhood and housing quality (Housing Condition, Neighbourhood Accessibility, Safety and Social Cohesion) were related to Housing Satisfaction. Other health related variables were significantly, but weakly, related to future Frailty.

Table 3

Correlations between Frailty Assessment in 2024 and Predictors in 2018 (n =5960).

	Frailty24	Depression	Anxiety	Physical Health	Mental Health	Education	Living Standard	Housing Cond.	Housing Sat.	Tenure
Frailty24	1									
Depression	.40**	1								
Anxiety	.25**	.59**	1							
Physical Health	-.51**	-.38**	-.15**	1						
Mental Health	-.34**	-.77**	-.53**	.23**	1					
Education	-.08**	-.07**	-.05**	.10**	.03	1				
Living Standard	-.30**	-.36**	-.24**	.32**	.33**	.12**	1			
Housing Cond.	.20**	.25**	.15**	-.18**	-.25**	-.01	-.48**	1		
Housing Sat.	-.26**	-.38**	-.22**	.26**	.33**	.02	.50**	-.60**	1	
Tenure	-.09**	-.11**	-.08**	.07**	.14**	.04*	.27**	-.17**	.17**	1
Neighb Access	-.12**	-.23**	-.12**	.16**	.21**	.01	.26**	-.26**	.44**	.02
Neighb Safety	-.16**	-.28**	-.20**	.13**	.24**	.05*	.38**	-.36**	.55**	.15**
Neighb SocCoh	-.13**	-.25**	-.19**	.12**	.190**	.02	.35**	-.32**	.42**	.12**
Social Support	-.18**	-.40**	-.27**	.18**	.32**	.15	.37**	-.22**	.40**	.12**
Exercise	.14**	.13**	.08**	-.23**	-.10**	-.06**	-.14**	.08**	-.12**	-.03
Alcohol Use	-.04*	.01	-.01	.02	-.00	-. 02	.10**	-.00	.03	-.01
Smoking	.12**	.11**	.08**	-.12**	-.10**	-.08**	-.16**	.08**	-.10**	-.13**
Employment18	-.07**	-.10**	-.09**	.05**	.11**	.133	.08**	.07**	-.02	.00
Marital Status	-.11**	-.11**	-.02	.13**	.09**	.03	.27**	-.15**	.15**	.22**

*. $p<.05$ (2-tailed. **. $p<.001$ (2-tailed.

	Neighb Access	Neighb Safety	Neighb SocCoh	Social Support	Exercise	Alcohol	Smoking	Employment18
Frailty24								
Depression								
Anxiety								
Physical Health								
Mental Health								
Education								
Living Standard								
Housing Cond.								
Housing Sat.								
Tenure								
Neighb Access	1							
Neighb Safety	.43**	1						
Neighb SocCoh	.23**	.505	1					
Social Support	.27**	.346	.37**	1				
Exercise	-.06*	-.074	-.07**	-.10**	1			
Alcohol Use	-.02	.005	.08**	.01	-.02	1		
Smoking	-.03	-.068	-.04	-.09**	.10**	.09**	1	
Employment18	.01	.00	-.05	.06*	-.08**	.06*	-.04	1
Marital Status	.01	.13**	.14**	.22**	-.06*	.08**	.09**	.08**

Health Behaviour and Social Factors in 2018 as predictors of Frailty in 2024.

A set of health behaviour (Smoking, Exercise, Alcohol use) and social (Living Standard, Housing Satisfaction, Social Support, Employment, Marital Status) predictor variables from 2018 were entered into a regression model after controlling for the effect of Age. The results of the regression equation are shown in Table 4.

The final model was significant (Chi Square = 237.270(10); p<.001). The variables together explained less than 25% of the variance in Frailty (Nagelkerke R Square = .23).

Age remained a significant predictor of Frailty in 2024. Of those variables measured in 2018, Exercise, Smoking, Employment, Living Standards, and Housing Satisfaction were significantly associated with Frailty in 2024. This means that people who engaged in vigorous physical exercise, refrained from smoking, were employed, had higher living standards and greater housing satisfaction in 2018 were significantly less likely to be categorised as frail 6 years later.

Accounting for Physical Health in 2018.

Because physical health is strongly related to frailty, and poor physical health is a possible explanation for non-employment or lack of vigorous exercise, another equation was run to account for this explanation. The results of this equation are shown in Table 5.

At the first step, the significance of Age was reduced and Physical Health in 2018 was strongly related to Frailty in 2024. The level of variance accounted for was already higher than the previous equation (Nagelkerke R Square = .29).

When the social and health behaviour variables were entered the model remained significant (Chi Square = 296.302 (p= <.001) and the Nagelkerke R Square increased to .35. The only other variables significantly contributing to this increase were Living Standards and Housing Satisfaction.

Once the influence of current physical health was accounted for, the health-related behaviours no longer predicted later frailty. Because health-related behaviours and physical health are already strongly correlated in older age, further longitudinal analysis is required to assess at which stage health-related behaviours may influence future physical health.

Table 4

Regression of Frailty in 2024 on predictor variables from 2018 controlling for Age (N =1811).

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1	Age	.048	.011	21.078	1	<.001	1.049
Step 2	Age24	.045	.014	11.104	1	<.001	1.046
	Education	-.299	.200	1.135	1	.287	.828
	Marital Status	-.188	.177	.002	1	.962	1.966
	Exercise	.676	.198	11.669	1	<.001	1.966
	Smoking	.511	.227	5.057	1	.025	1.667
	Employment18	-.546	.182	9.051	1	.003	.579
	Living Standards	-.079	.014	29.906	1	<.001	.926
	Housing Satisfaction	-.086	.016	27.489	1	<.001	.924
	Social Support	-.016	.009	3.448	1	.063	.984
	Alcohol	-.034	.036	.928	1	.335	.966
	Constant	.139	1.246	.012	1	.911	1.149

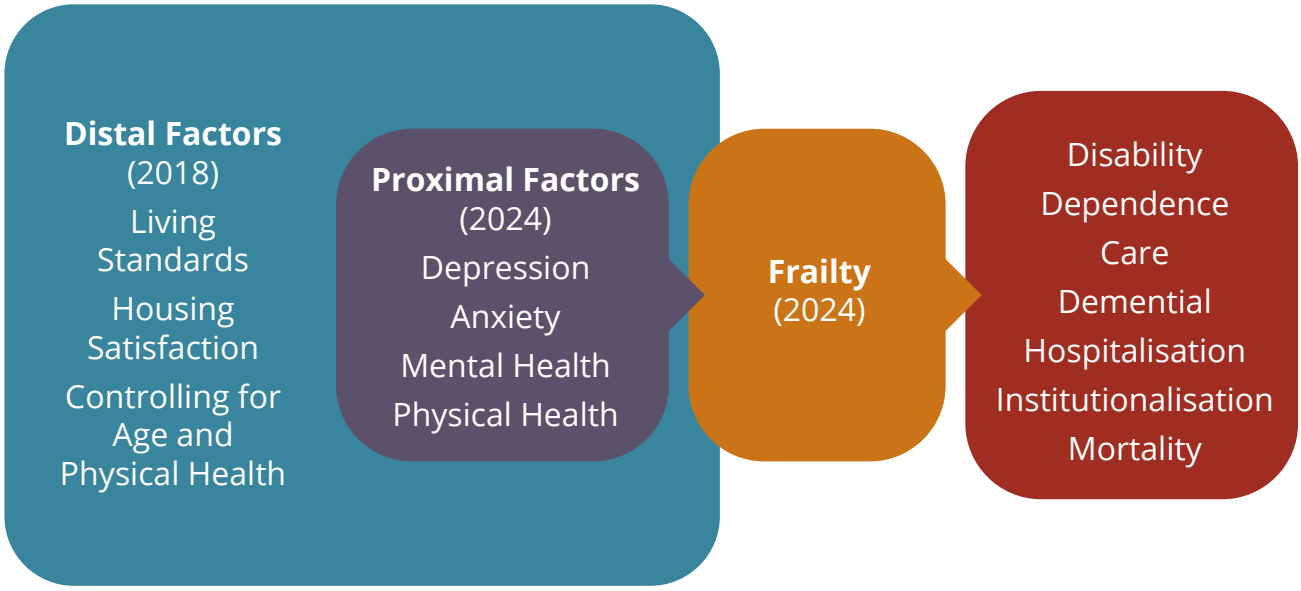
Table 5

Regression of Frailty in 2024 on predictor variables from 2018 controlling for Age and Physical Health (N =1811).

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1	Age24	.036	.014	6.965	1	.008	1.037
	Physical Health	-.120	.009	181.108	1	<.001	.887
Step 2	Age24	.046	.017	7.622	1	.006	1.047
	Physical Health	-.098	010	97.368	1	<.001	.907
	Education	-.144	.236	.372	1	.542	.866
	Marital Status	-.135	.216	.391	1	.532	.874
	Exercise	.014	.233	.004	1	.952	1.014
	Smoking	.196	.292	.454	1	.501	1.217
	Employment18	-.240	.217	1.233	1	.269	.787
	Living Standards	-.060	.018	11.235	1	<.001	.942
	Housing Satisfaction	-.062	.016	8.565	1	.003	.940
	Social Support	-.009	.010	.719	1	.397	.991
	Alcohol	-.072	.044	2.751	1	.097	.930
	Constant	3.647	1.555	5.497	1	.019	38.341

Figure 3

Distal and Proximal Factors related to Frailty in 2024.



CONCLUSION

Frailty is strongly associated with poorer Mental and Physical Health in older age. Six years before frailty assessment, Physical Health is a strong predictor of future frailty, and there is support for current understandings that health related behaviours such as smoking, and exercise, contribute to poor physical health. More sophisticated longitudinal analysis will be used to establish these pathways.

The independent contribution of Housing Satisfaction (which is strongly related to all housing and neighbourhood factors) and Living Standards (an estimation of economic wellbeing) to future frailty points to the importance of living conditions for resilience and wellbeing in older age.

REFERENCES

1. Ienca, M., Vayena, E., & Blasimme,A. (2018). Big data and dementia: charting the route ahead for research, ethics, and policy. *Frontiers in Medicine, 5*, 13.
2. New Zealand Ministry of Health (2016). *DHB spending on services for older people.* Available from: http://www.health.govt.nz/nz-health-statistics/health-statistics-and-data-sets/older-peoples-health-data-and-stats/dhb-spending-services-older-people.
3. New Zealand Ministry of Health, *Health and Independence Report* (2015). Ministry of Health: Wellington, New Zealand.
4. interRAI™ New Zealand. (2019). *interRAI™ Annual Report 2018/19*. https://www.interrai.co.nz/news/annual-report-201819/.
5. Van der Linden, B.W.A., et al.(2020). Life course socioeconomic conditions and frailty at older ages. *The Journals of Gerontology: Series B*, **75**(6), 1348-1357.
6. Paulson, D., & Lichtenberg, P. A. (2015). The Paulson–Lichtenberg Frailty Index: evidence for a self-report measure of frailty. *Aging & mental health*, *19*(10), 892-901.
7. Fried LP, Tangen CM, Walston J, Newman AB, Hirsch C, Gottdiener J, Seeman T, Tracy R, Kop WJ, Burke G, McBurnie MA; Cardiovascular Health Study Collaborative Research Group. (2001). Frailty in older adults: evidence for a phenotype. *Journals of Gerontology, Biological and Medical Science, A. 56*(3):M146-56.
8. Jehu, D. A., Davis, J. C., Falck, R. S., Bennett, K. J., Tai, D., Souza, M. F., ... & Liu-Ambrose, T. (2021). Risk factors for recurrent falls in older adults: A systematic review with meta-analysis. *Maturitas*, *144*, 23-28.
9. Ware, J. E., Kosinski, M., Turner-Bowker, D. M., & Gandek, B. (2002). *SF-12v2™: How to score version 2 of the SF-12® health survey*. Quality Metrics.
10. Frieling, M. A., Davis, W. R., & Chiang, G. (2013). The SF-36v2 and SF-12v2 health surveys in New Zealand: norms, scoring coefficients and cross-country comparisons. *Australian and New Zealand Journal of Public Health, 37*(1), 24-31. https://doi.org/10.1111/1753-6405.12006
11. Pachana, N. A., Byrne, G. J., Siddle, H., Koloski, N., Harley, E., & Arnold, E. (2006). Development and validation of the Geriatric Anxiety Inventory. *International Psychogeriatrics*, *19*(01), 103. https://doi.org/10.1017/s1041610206003504
12. Andresen, E. M., Malmgren, J. A., Carter, W. B., & Patrick, D. L. (1994). *Screening for depression in well older adults: Evaluation of a short form of the CES-D*. *10*(2), 77–84
13. Gierveld, J. D. J., & Tilburg, T. V. (2006). A 6-Item scale for overall, emotional, and social loneliness: Confirmatory tests on survey data. *Research on Aging*, *28*(5), 582–598. https://doi.org/10.1177/0164027506289723
14. Wiggins, R. D., Netuveli, G., Hyde, M., Higgs, P., & Blane, D. (2008). The evaluation of a self-enumerated scale of quality of life (CASP-19) in the context of research on ageing: A combination of exploratory and confirmatory approaches. *Social Indicators Research*, *89*, 61-77. https://doi.org/10.1007/s11205-007-9220-5
15. Breheny, M., Stephens, C., Alpass, F., Stevenson, B., Carter, K., & Yeung, P. (2013). Development and validation of a measure of living standards for older people. *Social Indicators Research, 114*(3), 1035-1048.
16. Bush, K., Kivlahan, D. R., McDonell, M. B., Fihn, S. D., & Bradley, K. A. (1998). The AUDIT alcohol consumption questions (AUDIT-C): An effective brief screening test for problem drinking. *Archives of Internal Medicine*, *158*(16), 1789–1795. doi:10.1001/archinte.158.16.1789
17. Stephens, C., & Allen, J. (2022). Older people as active agents in their neighborhood environments: Moving house can improve quality of life. *The Gerontologist*, *62*(1), 56-65.

18. Stafford, M., Bartley, M., Sacker, A., Marmot, M., Wilkinson, R., Boreham, R., & Thomas, R. (2003). Measuring the social environment: social cohesion and material deprivation in English and Scottish neighbourhoods. *Environment and Planning A: Economy and Space, 35*(8), 1459-1475. https://doi.org/10.1068/a35257

19. Cutrona, C. E., & Russell, D. W. (1987). The provisions of social relationships and adaptation to stress. *Advances in personal relationships*, *1*(1), 37-67.