AGEING WELL

Kia eke kairangi ki te taikaumātuatanga

2021 AGEING WELL YEAR IN REVIEW

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INTRODUCTION

Ageing Well - *Kia eke kairangi ki te taikaumātuatanga* - is one of eleven National Science Challenges (NSC) identified by the New Zealand Ministry of Business, Innovation, and Employment (MBIE). These NSCs are used to direct science investment on issues that matter to all New Zealanders. The vision underpinning the Ageing Well National Science Challenge (AWNSC) is *to add life to years for all older New Zealanders*. In articulating this vision, the AWNSC recognizes increases in life expectancy have not been matched by an increase in healthy life expectancy. AWNSC has established a bibliography of New Zealand research on older adults (2000-2020). This paper is a continuation of same activity, presenting a summary of 119 New Zealand-authored, peer-reviewed articles published 1 January to 31 December 2021.

METHODS

Search strategy

A systematic search for relevant publications was conducted, informed by the *Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA)* guidelines[1]. The following electronic databases were searched: Ovid Medline, Web of Science Core Collection, and Scopus. The keywords were (*ageing* OR *old adults* OR *old people* OR *elder* OR *kaumātua*) AND (*New Zealand* OR *Māori* OR *Aotearoa*) AND (*health* OR *wellbeing* OR *care* OR *frailty* OR *palliative* OR *spirituality* OR *religion* OR *housing* OR *loneliness* OR *community* OR *culture* OR *migrant* OR *fall* OR *stroke* OR *nutrition* OR *physical activity* OR *mental health* OR *peer education* OR *income* OR *retirement* OR *transport* OR *lifecourse* OR *equity* OR *medication* OR *pain*). Table 1 presents the search strategy.

Table 1. Search strategy for the Year in Review 2021

Ovid Medline	**Web of Science & Scopus**
1. aging/ or aging.mp. or ageing.mp. 2. old* adult*.mp. 3. old* people.mp. 4. elder*.mp. 5. Kaumatua.mp. 6. 1 or 2 or 3 or 4 or 5 7. New Zealand.mp. or New Zealand/ 8. Maori*.mp. 9. Aotearoa.mp. 10. 7 or 8 or 9 11. 6 and 10	1. aging OR ageing OR "old* adult*" OR "old* people" OR elder* OR Kaumatua 2. "New Zealand" OR Maori* OR Aotearoa 3. #1 AND #2 AND PUBYEAR = 2021 4. health* OR wellbeing OR well-being 5. “home care agencies” OR “home care services” OR “hospice care” OR “dental care for aged” OR “advance care planning” OR caregiv* OR “caregiver burden” OR carer*

[1] Page M J, McKenzie J E, Bossuyt P M, Boutron I, Hoffmann T C, Mulrow C D et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews BMJ 2021; 372 :n71 doi:10.1136/bmj.n71

12. limit 11 to yr="2021 -2021" 13. health*.mp. 14. wellbeing.mp. 15. well-being.mp. 16. 13 or 14 or 15 17. Home Care Agencies/ or Home Care Services/ or Hospice Care/ or Dental Care for Aged/ or Advance Care Planning/ 18. caregiver*.mp. or Caregivers/ or Caregiver Burden/ 19. carer*.mp. 20. caregiving.mp. 21. 17 or 18 or 19 or 20 22. Frailty/ or Frail Elderly/ or Geriatric Assessment/ or frail*.mp. 23. Palliative Care/ or palliative.mp. or "Hospice and Palliative Care Nursing"/ or Palliative Medicine/ 24. Terminal Care/ or dying.mp. 25. 23 or 24 26. spiritual*.mp. or Spirituality/ or Spiritual Therapies/ 27. Religion.mp. or Religion/ or "Religion and Psychology"/ 28. home.mp. 29. housing.mp. or Housing/ or Housing for the Elderly/ 30. residential.mp. 31. 28 or 29 or 30 32. “social isolation”.mp. or Social Isolation/ 33. “social* connected*”.mp. 34. loneliness.mp. or Loneliness/ 35. lonely.mp. 36. 32 or 33 or 34 or 35 37. communit*.mp. 38. Culture/ or cultur*.mp. 39. migrant*.mp. 40. Accidental Falls/ or fall*.mp. 41. stroke*.mp. or Stroke Rehabilitation/ or Stroke/ 42. nutrition.mp. 43. “physical activit*”.mp. 44. Exercise/ or exercis*.mp 45. 43 or 44 46. “mental health”.mp. or Mental Health/ 47. psychological.mp. 48. 46 or 47	6. “frail elderly” OR frail* OR “geriatric assessment” 7. "palliative care" OR palliative OR "hospice and palliative care nursing" OR “palliative medicine” OR "terminal care" OR dying 8. spiritual* OR “spiritual therapies” 9. religio* 10. home* OR hous* OR "housing for the elderly" OR residential 11. "social isolation" OR "social* connected*" OR loneliness OR lonely 12. communit* 13. cultur* 14. migrant* 15. "accident* fall*" OR fall* 16. stroke* OR "stroke rehabilitation" 17. nutrition 18. "physical activit*" OR exercis* 19. “mental health” OR psychological 20. "peer education" OR "peer group*" 21. income OR employment OR work OR volunteer* 22. retir* 23. transport OR mobility 24. lifecourse OR “life course” 25. “socioeconomic factors” OR equality OR “healthcare disparities” OR “health equity” OR equity 26. “medication errors” OR “medication adherence” OR medication* OR “medication reconciliation” OR prescription* OR “prescription drug misuse” OR “prescription drugs” OR “prescription drug overuse” OR prescrib* OR “drug prescriptions” OR polypharmacy 27. pain 28. #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14 OR #15 OR #16 OR #17 OR #18 OR #19 OR #20 OR #21 OR #22 OR #23 OR #24 OR #25 OR #26 OR #27 29. #28 AND #3

49. "peer education".mp. 50. Peer Group/ or "peer group"*.mp. 51. 49 or 50 52. Income.mp. or Income/ 53. Employment/ or employment.mp. 54. Work/ or work.mp. 55. volunteer*.mp. 56. 52 or 53 or 54 or 55 57. Retirement/ or retir*.mp. 58. transport.mp. 59. mobility.mp. 60. 58 or 59 61. lifecourse.mp. 62. "life course".mp. 63. 61 or 62 64. Socioeconomic Factors/ or equality.mp. or Healthcare Disparities/ 65. Health Equity/ or equity.mp. 66. 64 or 65 67. Medication Errors/ or Medication Adherence/ or medication*.mp. or Medication Reconciliation/ 68. prescription*.mp. or Prescription Drug Misuse/ or Prescription Drugs/ or Prescription Drug Overuse/ 69. prescrib*.mp. 70. Prescriptions/ or Drug Prescriptions/ 71. polypharmacy.mp. or Polypharmacy/ 72. 67 or 68 or 69 or 70 or 71 73. pain.mp. or Pain/ 74. 16 or 21 or 22 or 25 or 26 or 27 or 31 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 45 or 48 or 51 or 56 or 57 or 60 or 63 or 66 or 72 or 73 75. 12 and 74	

Inclusion criteria

Only articles published in English and on humans were selected. Since the purpose of this research activity was to generate a bibliography of research in the ageing area conducted in New Zealand, no filters were placed based on the type of publications. Articles identified in the search underwent a series of screening processes. Firstly, duplicate articles were removed. Assistant Research Fellow (Dr Lizhou Liu) independently selected and screened articles for potential eligibility based on titles and abstracts, and full texts. Consensus on inclusion was reached by discussion with secondary reviewer (Professor Louise Parr-Brownlie). After screening, articles were categorised under different subheadings. Both authors of this review were not blinded to the journals or authors of the included studies.

Categorisation

In a slight modification to the process used in previous years, publications were assigned to one or more of 18 categories, to reflect the primary relevance of the publication. Assignment to more than one category was used conservatively. In addition to the relevant categories, an ethnicity category (Māori, Pacific, Asian) was also assigned, if the publication *primarily* reported on one of these broad ethnic groups.

RESULTS AND DISCUSSION

Study selection

Figure 1 summarises the study selection process. The search strategy identified 1250 articles. After duplicate removals, 973 articles were screened by title and abstract. The full-text of 143 articles were then assessed for eligibility, with 119 articles finally included in this Year in Review.

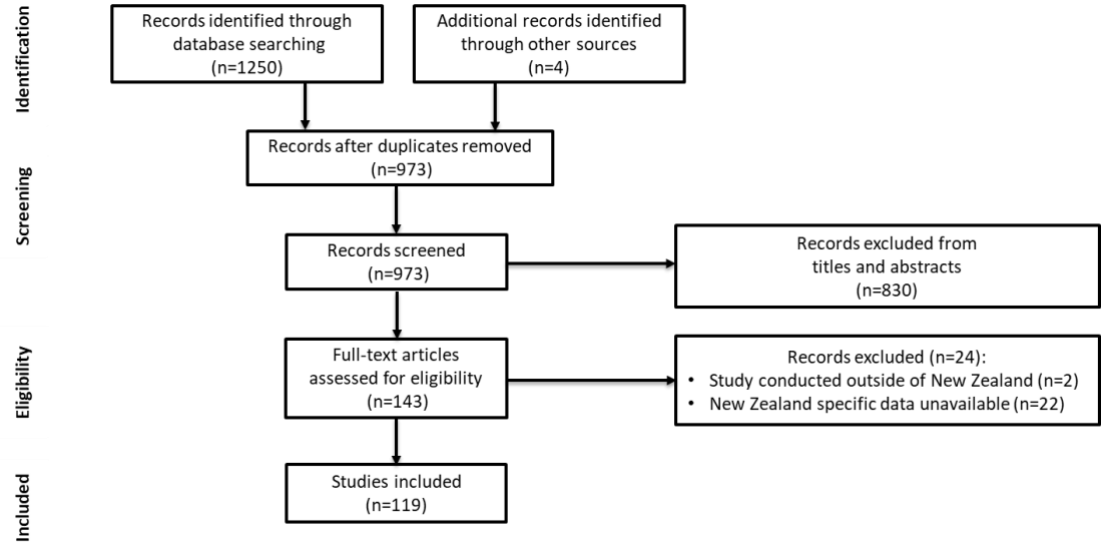

Figure 1. Study selection process

Table 2 summarises the assignment of the 119 publications to the 18 relevance categories.

Table 2. Classification of publications

Category	Number of publications*	References
Bones and joints	8	(1-8)
Cardiovascular conditions	8	(9-16)
Central nervous system conditions	15	(17-31)
End-of-life and palliative care	6	(2, 32-36)
Frailty, balance, falls	11	(37-47)

Category	Number of publications*	References
Health and social services	6	(28, 48-52)
Health, wellbeing and quality of life	9	(53-61)
Health workforce	7	(17, 20, 32, 33, 62-64)
Housing	1	(65)
Living and care facilities	16	(21, 25, 44, 63, 66-77)
Mental health	0	N/A
Nutrition	8	(45, 46, 72, 76, 78-81)
Other conditions	14	(82-95)
Prescribing	9	(14, 21, 66, 70, 96-100)
Social connection	3	(67, 101, 102)
Transport and built environment	6	(103-108)
Work and finances	0	N/A
Not otherwise classified	11	(109-119)
* 119 unique publications are classified, with 17 being assigned to two (n=16) or three (n=1) categories.		

Bones and joints

A study protocol for a randomized controlled trial (RCT) evaluating the effect of greenshell mussel on osteoarthritis biomarkers and inflammation in healthy postmenopausal women (aged 55-75years) was reported (1).

A study compared the spending and utilization at the end of life for hip fracture patients across Australia, Canada, England, Germany, New Zealand, Spain, and the United States. Resource use, costs, and the proportion of deaths in hospital showed large variability being low in New Zealand than the other countries. Important variations in end-of-life care for patients who sustained a hip fracture were noticed, with some differences explained by sex and age (2).

A pragmatic qualitative study exploring the impact of thumb carpometacarpal joint osteoarthritis found that constant pain, pain at night, functional capacity, medication burden, emotional impact, and sense of self are important outcomes and treatment targets in people with carpometacarpal joint osteoarthritis (3).

A RCT was conducted in New Zealand and Australia to compare surgical with nonsurgical treatment for fractures in the distal radius in older patients. No between-group differences in improvement in wrist pain or function at 12 months from volar-locking plate fixation (surgical treatment) over closed reduction (nonsurgical treatment) for displaced distal radius fractures in older people (4).

A retrospective review analysed the outcomes from conservative management of cervical vertebra (C2) fractures in older adults in Christchurch hospital over five years. Results revealed that despite the majority needing inpatient rehabilitation and complications related to the collar or immobility being common, three-quarters of patients were still able to return home. Walking ability declined and most needed some walking aid post fracture (5).

A study explored differences in spending and utilization of health care services for older people with frailty before and after a hip fracture across 11 high-income countries including New Zealand. It was found that there is substantial variation in health care spending and utilization for older people with frailty, both before and after a hip fracture. The United States is the most expensive country due to high prices and above average utilization of post-acute rehab care (6).

The associations between comorbidity and quality of life (QoL) outcomes after hip and knee replacement were examined. General QoL outcomes following hip and knee joint replacement, while generally high, were associated with comorbidity burden and body mass index (7).

A cost-effectiveness analysis of total hip and knee arthroplasties (THA and TKA) in the New Zealand healthcare system found that THA and TKA are highly cost-effective procedures over longer term horizons. Although preoperative status and age were associated with cost effectiveness, both THA and TKA remained cost effective in patients with less severe preoperative scores and older ages (8).

Cardiovascular conditions

A study evaluating the effect of cardiac surgery on health-related QoL in patients aged over 75 years found that cardiac surgery in older patients is associated with significantly improved physical and mental health-related QoL at 12 weeks after procedure (9).

Nationwide dispensing of cardioprotective medications during the first year following acute coronary syndrome in New Zealand was explored. Cardioprotective medication dispensing was lower than would have been the case if the current acute coronary syndrome guidelines were followed. The greatest decrease in dispensing occurred between quarter one and quarter two, which highlights a potentially important period for targeted interventions to improve adherence (10).

A qualitative study explored the lives of people living rurally with an implantable cardioverter defibrillator and suggested that implantable cardioverter defibrillator insertion did not appear to substantially negatively impact on the lives or experiences of rural recipients and their partners/carers (11).

A national registry - the All New Zealand Acute Coronary Syndrome Quality Improvement (ANZACS-QI) registry - was used to investigate the use of clinical registry-derived data in research and in assessing clinical care. It was found that first-time acute coronary syndrome patients captured in the ANZACS-QI registry had very different clinical characteristics and outcomes than those not captured. Cardiovascular registry-derived data are dependent on registry design and may not be representative of the wider patient population (12).

Another study using the national registry (ANZACS-QI) investigated the acute coronary syndrome epidemiology. It was concluded that patient characteristics and outcomes of acute coronary syndrome events recorded as primary vs. secondary codes are very different. These findings have important implications for designing studies utilizing International Classification of Diseases 10th Revision, Australian Modification (ICD10-AM) codes (13).

A RCT was carried out to evaluate the effectiveness of a SMS text messaging intervention (Text4HeartII) to improve medication adherence in people with heart disease. It was found that Text4HeartII did not improve dispensed medication or adherence to a favourable lifestyle over and above usual care. This finding contrasts with previous studies and highlights that the benefits of text interventions may depend on the context in which they are used (14).

A qualitative study explored older people's views on cardiovascular disease risk prediction and its assessment. Study results suggested that in order to inform clinical decision making for older people, consideration of an individual's wish to know their risk is important, and risk prediction tools should provide separate event types rather than just composite outcomes (15).

A nationwide retrospective study reviewed the first decade of transcatheter aortic valve implantation (TAVI) in New Zealand and identified potential inequalities. There are significant geographical and ethnic variations in TAVI rates in New Zealand with Māori had worse one-year survival than European patients following TAVI (16).

Central nervous system conditions

Dementia and cognitive impairment

A cross-sectional study was conducted to explore caregiving burnout of community-dwelling people with dementia in New Zealand and Hong Kong. This study highlighted differences in service delivery models, family structures and cultural values that may explain the cross-regional differences in dementia caregiving experience in the two countries. A standardized needs assessment for caregivers could help policymakers and healthcare practitioners to identify caregiving dyads who are at risk of burnout and provide early intervention (17).

Performance of the cognitive performance scale of the resident assessment instrument (InterRAI) for detecting dementia amongst older adults in the community was investigated. Although more research is needed to test the reliability of the study findings, older adults with a cognitive performance scale of 3 or above, but without a formal diagnosis of dementia, may be referred for further cognitive assessment (18).

A study assessed the feasibility of sleep monitoring and non-pharmacological interventions to improve the sleep of New Zealanders with mild cognitive impairment or dementia and their family carers. It was found that it is feasible to use non-pharmacological sleep interventions for people with mild cognitive impairment or dementia and their family carers. Given the limited

treatment options, further consideration of such interventions in future research and clinical practice is warranted (19).

A sample of 526 New Zealanders family carers for cognitive impairment or dementia patients were surveyed to explore the factors associated with the sleep of carers. Independent predictors for carers' reporting greater sleep disturbances included being female, caregiving at night, poorer self-rated health, and the care recipient having more disturbed sleep. Moderate-severe sleep disturbance was independently associated with poorer self-rated health and living standards, use of sleeping medications, as well as considering transitioning their family member into formal care within the year (20).

The use of antipsychotic and sedative medication in long-term care facilities providing dementia care was investigated. It was found that while gender is associated with antipsychotic medication prescription, no individual factors are significantly associated with sedative prescription (21).

The study protocol of a cross-sectional feasibility study for a multi-ethnic dementia prevalence study in New Zealand was descripted (24).

A survey of 40 health professionals who were members of the Australian and New Zealand Hip Fracture Registry Network was conducted to understand the access to rehabilitation services for older adults living with dementia or in a residential aged care facility following a hip fracture. The development of consistent decision criteria and pathways for access to hip fracture rehabilitation could provide a standard approach to access to rehabilitation, particularly for patients with cognitive impairment and/or who reside in residential aged care facilities (25).

A cross-sectional study determined the sociodemographic and clinical characteristics of patients with young onset dementia (aged below 65), and whether they differ from older (age 65+) adults with dementia. Young onset dementia patients have different needs than older adults with dementia. These differences must be considered by clinicians and organizations that provide care and support to people living with dementia (27).

A RCT investigated whether augmented community telerehabilitation intervention improves physical function compared with usual care for people living with stroke. It was found that augmented community telerehabilitation intervention is not effective in improving physical function compared with the usual care (28).

The needs of Pacific families affected by age-related cognitive impairment in New Zealand were evaluated via interviews with providers from health-care organisations. It was indicated that the needs of aged Pacific people experiencing cognitive decline are often not being met (29).

A research agenda for cross-country learning (Chile, New Zealand and Germany) for resilience in health care systems was described. Two main themes were dementia and COVID-19 (30).

Stroke

A mixed methodology study was conducted to evaluate the outcomes of tenecteplase for stroke thrombolysis from alteplase in a regional stroke network. Study findings suggested that following stakeholder endorsement, a region-wide switch from alteplase to tenecteplase was successfully implemented, and there is evidence of benefit and no evidence of harm (22).

Reasons for pre-hospital delays in patients experiencing symptoms of acute stroke or transient ischaemic attack were explored. Findings of this study provided important insights that could help healthcare organisations introduce strategies to help improve access to organised stroke services (23).

The relationship between body mass index and long-term function in old New Zealand European stroke patients were examined. It was found that underweight and non-European patients may require additional supportive clinical care post-stroke (26).

A retrospective analysis suggested that routine use of tenecteplase for stroke thrombolysis is feasible and has comparable safety profile and outcome to alteplase (31).

End-of-life and palliative care

A qualitative study explored New Zealand carers' experiences of giving home-based palliative care to loved ones. The study showed that New Zealand carers' experiences of providing home-based palliative care are similar to those in international studies; country-context, ethnicity and health systems likely influence the differences (32).

New Zealand medical students' views of euthanasia/assisted dying across different year levels were examined. The quantitative findings showed students at the end of 5th year are less likely to support euthanasia/assisted dying than students at the end of 2nd year. It was suggested that this difference is most likely due to their time in medical education (33).

An analysis study was conducted to determine inclusion of palliative care in public policy documents on healthcare for older people in 13 rapidly ageing countries including New Zealand. Health care policies for older people need revising to include reference to end-of-life care and dying and ensure linkage to existing national or regional palliative care strategies. The strong policy focus on care coordination and continuity in policies for older people is an opportunity window for palliative care advocacy (34).

The impact of uncertainty on bereaved family’s experiences of care at the end of life was examined by using a survey. This study highlighted the ongoing impact on bereaved family when uncertainty is not made explicit in conversations regarding end of life for people with

heart disease. Timely and sensitive conversations regarding the uncertainty of when death may occur is an important factor in ensuring that bereaved family are not left with unresolved narratives (35).

A cohort study explored the costs of inpatient hospitalisations in the last year of life in older New Zealanders. This study illustrated that ethnic and gender disparities are still apparent at the end of life. This raises questions as to whether money at the end of life is being spent appropriately, and how it could potentially be more equitably targeted to meet the diverse needs of older people and their families (36).

International comparison of spending and utilization at the end of life for hip fracture patients was carried out in seven countries including New Zealand. Conclusions of this study have been reported in page 7 in this review under *Bones and joints* (2).

Frailty, balance and falls

Frailty of Māori, Pasifika, and non-Māori/non-Pasifika older people in New Zealand was examined in a national population study. Findings suggested that frailty index is predictive of poor outcomes in these ethnic groups (37).

Risk factors for injuries in New Zealand older adults with complex needs were investigated in another national population study. While it is important to reduce the risk of falls, it is especially important to reduce the risk of falls-related injuries (38).

A study evaluated the frailty prevalence in New Zealand haemodialysis patients and its association with hospitalisations. It was found that Pacific ethnicity is independently associated with increased risk of Edmonton Frail Scale frailty, while Fried frailty is associated with hospitalisations at six months (39).

Perspectives from Chinese clinicians and older immigrants in New Zealand were explored in a qualitative study. The perspectives of frailty that emerged are congruent with a multi-dimensional concept of frailty that has been described in both Chinese and non-Chinese medical research literature (40).

A qualitative study explored Māori perspectives on frailty in later life. Two interlinked, overarching themes emerged. The Waikare o te Waka o Meihana model provided a useful framework for structuring the thematic results (41).

A scoping review was conducted to map what the existing literature reports around frailty in Indigenous populations and to highlight the current gaps in frailty research within the Indigenous landscape (42).

A perspective pager suggested that frailty should be assessed in older patients considered for colonoscopy (43).

A study assessed the effect of a proactive primary care program on acute hospitalization and aged-residential care placement for frail older people. It was found that participants had lower aged-residential care placement and mortality in the first year, but no decrease in acute hospitalization; caution is required in interpreting these results (44).

The diet quality and nutrition inadequacy of pre-frail older adults in New Zealand were examined. Study findings suggested that the diet quality of pre-frail older adults is moderately high in variety and adequacy but poor in moderation and balance, which supported the targeted dietary interventions to ameliorate frailty (45).

Data from a longitudinal cohort study were used to determine the prevalence of frailty and examine the relationship between dietary protein intake and the transition between frailty states and mortality in advanced age. Increased protein intake was associated with lower risk of transitioning from pre-frailty to death, and this association was moderated by energy intake (46).

A socio-spatial analysis of pedestrian falls in New Zealand was conducted. The findings have equity implications for both environments and patient experience. These patterns could not have been identified without the novel use of spatially specific fall data (47).

Health and social services

Barriers and facilitators to using smart home technologies to support older adults were explored with three stakeholder groups including managers of rest homes/retirement villages, technology developers in a university setting, and older adults (age 65 years and older). The research provided practical recommendations for directions to be explored by developers and researchers in New Zealand and elsewhere (48).

A scoping review was conducted to determine the digital health technology for Indigenous older adults. It was concluded that the use of telehealth technologies among older adults is expected to rise, but effective implementation will be successful only if the patient's acceptance and culture are kept at the forefront, and if healthcare services are provided by telehealth-trained healthcare professionals (49).

A systematic review evaluated the effects of GPS alarms on health, welfare, and social provision in the care of older adults compared with non-GPS-based standard care. Evidence of the beneficial effects of GPS alarms on the health and welfare of older adults and social care provision remains insufficient (50).

Health spending and utilization among people with complex multimorbidity were compared across 11 countries including New Zealand. It was found that there is substantial variation in health care spending and utilization for a complex multimorbid persona with heart failure and diabetes. Drivers of spending vary across countries, with the United States being the most expensive country due to high prices and higher use of facility-based rehabilitative care (51).

Achievements and challenges during the development of an advance care planning program were reviewed. A local audit showed that 82% of people with an advance care plan died in a community setting, frequently their preferred place of death (52).

A two-arm, parallel RCT was conducted in four New Zealand centres to evaluate the effectiveness of telerehabilitation after stroke using readily available technology. Conclusions of this study have been reported in page 10 in this review under *Central nervous system conditions – Stroke* (28).

Health, wellbeing and quality of life

The characteristics of centenarians free of common chronic diseases were explored by using a national dataset. It was revealed that no-smoking and being socially engaged throughout older age are associated with being a centenarian free of common chronic diseases (53).

A qualitative study explored the relationship between Māori culture, landscape and the connection to health and wellbeing. A conceptual framework for Therapeutic Cultural Environments is proposed in terms of the contribution to our understanding of health and wellbeing and its implications for conceptualising therapeutic environments and a culturally appropriate model of care for Māori communities (54).

A feasibility study examined innovations in kaupapa Māori research methods to explore kaumātua understandings of ageing well. It was found that focusing directly on health did not resonate with participants. There was diffidence when kaumatua talked about their own personal health, when compared with their enthusiasm for other parts of their lives (55).

The baseline data and correlations of wellbeing outcomes of the tuakana-teina (older sibling-younger sibling) peer education programme were reported (56). The impacts of this programme on identity, wellbeing, and social connectedness was descripted (58).

The association of primary care variation and the rates of unplanned hospitalizations, functional ability, and QoL of older people was investigated in New Zealand and Netherlands. It was concluded that in the absence of substantial differences in older people's function and QoL, it remains unclear whether integrated general practitioner- (GP) or practice-related variations in admission rates represent low- or high-quality practice (57).

The longitudinal trajectories of QoL in older adulthood were explored. The trajectory profiles demonstrated that both maintaining and even improving QoL in later life is possible. This has implications for our capacity to develop nuanced policies for diverse groups of older adults (59).

Data from two population-based longitudinal cohort studies (New Zealand and United Kingdom) was used, and identified the associations of vital personality scores and healthy ageing (60).

The protocol of a focus group study exploring the expectations and experiences of health and wellbeing in a cohort of older men (≥45 years) in the Otago and Southland regions was reported (61).

Health workforce

Factors associated with caregiver distress among home care clients in New Zealand were investigated by using data from interRAI Home Care assessment. The study results suggested that caregiver distress can be relieved by promoting protective factors and aiming to reduce risk factors among home care clients in New Zealand (62).

A qualitative study evaluated the experience of internationally qualified nurses providing palliative care in a New Zealand aged residential care (ARC) facility. Ongoing education, support and role modelling to develop confidence and reduce internal struggles are required for internationally qualified nurses providing palliative care in ARC facilities (63).

A number of 622 retired Fellows of the Australian and New Zealand College of Anaesthetists were surveyed to determine the demographics and characteristics of retirement. The study results may assist current practitioners plan for retirement, and suggest strategies to help health services, departments and private groups accommodate individuals in winding down their practice (64).

The experience of burnout of caregivers of community-dwelling older people with dementia in New Zealand and Hong Kong were explored. Conclusions of this study have been reported in page 9 in this review under *Central nervous system conditions - Dementia and cognitive impairment* (17).

A survey of New Zealanders supporting a family member with cognitive impairment or dementia determined the factors associated with the sleep of carers. Conclusions of this study have been reported in page 10 in this review under *Central nervous system conditions - Dementia and cognitive impairment* (20).

New Zealand carers' experiences of providing home-based palliative care were explored. Conclusions of this study have been reported in page 11 in this review under *End-of-life and palliative care* (32).

A survey of undergraduate medical students was conducted asking whether they supported a law change to allow euthanasia/assisted dying. Conclusions of this study have been reported in page 11 in this review under *End-of-life and palliative care* (33).

Housing

Housing design that improves the independence and safety for older adults using a walker was explored. The study results provided new insights into improved housing design for older adults, which have the potential to be incorporated into existing frameworks for accessible design and universal design thereby improving the independence and safety of older adults (65).

Living and care facilities

Aged care facilities

A systematic review evaluating the effectiveness of pharmacist-led interventions suggested that pharmacist-led interventions have the potential to reduce the incidence of adverse drug events in older people living in ARC facilities (66).

A study evaluated the impact of the first wave of COVID-19 on the health and psychosocial wellbeing of Māori, Pacific Peoples and New Zealand Europeans living in ARC. There was a lower rate of loneliness in Māori but a higher rate of depression in New Zealand European ARC populations during the first wave of COVID-19 (68).

A qualitative study explored the experiences and perceptions of nursing home staff and residents of unauthorised covert administration of medication. While it was revealed that unauthorised covert administration of medications is an ongoing practice, the study results emphasised that nursing home staff and residents are aware that this practice carries ethical and clinical risks and requires a certified process to legitimise its authorised form (70).

Predictive factors for entry to ARC in octogenarian Māori and non-Māori in New Zealand were investigated. Non-Māori participants entered long-term residential care at almost twice the rate of Māori and factors differed between Māori and non-Māori (71).

A cross-sectional study involving 285 residents of 16 ARC facilities found that multiple micronutrients, including zinc, selenium and iron, are positively associated with anemia in New Zealand ARC residents (72).

A qualitative study explored the experiences of staff who chose to live in with residents in a level 3 dementia care unit during COVID-19 restrictions, and identified themes that deepen the understanding of caring for vulnerable populations during a pandemic and beyond (73).

Participatory action research (PAR) was used to understand workplace engagement of caregivers in ARC in New Zealand. Factors influencing positive changes in workplace engagement were identified that could be considered when implementing organisational change or service development in other ARC facilities (74).

The association between dentition and nutritional status of aged New Zealanders living in ARC facilities was examined. It was found that under half of the residents in ARC are at risk of malnutrition or malnourished. Untreated dental caries were associated with a higher rate of being malnourished or at risk of it. Poorer cognitive function and greater dependency were important risk indicators for malnutrition (76).

The experience of animal therapy among ARC residents was explored. Three overarching narratives were identified including animal therapy as a fleeting pleasure, residential care as a sad environment, and identity outside residential care as highly valued (77).

A study examined the use of antipsychotic and sedative medications in residents with dementia in ARC. Conclusions of this study have been reported in page 10 in this review under *Central nervous system conditions - Dementia and cognitive impairment* (21).

Access to rehabilitation services in Australian and New Zealand acute care facilities for older adults living with dementia and/or living in residential aged care facilities were evaluated. Conclusions of this study have been reported in page 10 in this review under *Central nervous system conditions – Dementia and cognitive impairment* (25).

The effects of a proactive primary care program on acute hospitalization and aged-residential care placement for frail older people were accessed in nine general practices in Auckland. Conclusions of this study have been reported in page 13 in this review under *Frailty, balance, falls* (44).

Internationally qualified nurses who provide palliative care in a New Zealand ARC facilities were interviewed about their experience. Conclusions of this study have been reported in page 16 in this review under *End-of-life and palliative care* (63).

Retirement villages

As a part of the “Retirement Villages Study”, the prevalence of loneliness and associated factors in a New Zealand retirement village’s population were investigated. It was suggested that a considerable proportion of older people living in retirement villages report feelings of loneliness, particularly those who are without partners, at risk of depression and decreased QoL and those who have moved into retirement villages to increase social connections (67).

The problems of recruiting a representative cohort of residents in retirement villages in Auckland for the "Retirement Villages Study" were reported. Authors provided some implications for future research in this area (69).

Three case studies investigated the evacuation behaviour in retirement facilities, and revealed that there is a significant gap between the data provided in this work and the Society of Fire Protection Engineers design curves used for buildings, since the design curves do not explicitly account for adults with mobility impairments (75).

Mental health

None in this category.

Nutrition

Comparative analysis of two RCTs in New Zealand and Austria revealed that increasing the protein intake to more than 20% of the total energy intake in community-dwelling seniors does not increase measures of DNA damage, change glutathione status or elevate plasma C-reactive protein (78).

A multi-study analysis across five countries including New Zealand was conducted to explore the associations between physical activity or sedentary behaviour and protein intake patterns in community-dwelling older adults. Findings from this multi-study analysis indicated there is little evidence that total protein and protein intake patterns, irrespective of energy intake, differ by physical activity or sedentary behaviour levels in older adults (79).

A study evaluated the relative validity and reproducibility of the Researching Eating, Activity, and Cognitive Health (REACH) Study food frequency questionnaire (FFQ) specifically designed to identify dietary patterns in older adults. It was found that the REACH FFQ generated dietary patterns with acceptable reproducibility and relative validity and therefore can be used to examine associations between dietary patterns and health outcomes in older New Zealand adults (80).

Dietary protein intake and transition between frailty states in New Zealand octogenarians were examined. Conclusions of this study have been reported in page 13 in this review under Frailty, balance, falls (46). Association between dietary protein intake and change in grip strength over time among octogenarians were identified (81).

A study described the diet quality of pre-frail community-dwelling older adults to extend the evidence of nutrition in frailty prevention. Conclusions of this study have been reported in page 13 in this review under *Frailty, balance, falls* (45).

The relationships between nutrient and non-nutrient factors with haemoglobin and anaemia in ARC residents were investigated. Conclusions of this study have been reported in page 17 in this review under *Living and care facilities - Aged care facilities* (72).

A study investigated the association between dentition status and nutritional status in a national survey of residents in ARC facilities. Conclusions of this study have been reported in page 18 in this review under *Living and care facilities - Aged care facilities* (76).

Other conditions

Cancer

Results from the first 6 months of a new screening scheme for colorectal cancer were examined in the Hawke's Bay region. It was suggested that bowel screening programmes need to collate kit return rates and spoilt kits with the numbers of kits that are actually sent out to ensure equity for bowel screening in New Zealand (83).

The role of patient-related and clinical factors on the age pattern in lung and colon cancer survival in New Zealand were explored in two studies. It was concluded that sex and stage at diagnosis are the most important factors of age disparities in lung cancer survival in New Zealand (87).Factors reflecting timeliness of cancer diagnosis most affected age-related disparities in colon cancer survival, probably by impacting treatment strategy (88).

QoL after oesophageal stenting in patients with palliative oesophageal cancer were evaluated in an observational study. In patients surviving longer than 30 days, there is significant improvement of overall QoL and dysphagia one-month post oesophageal stent insertion for malignant, palliative dysphagia. Stent-related adverse events were common (90).

Eye care

A case series of four patients with infectious uveitis after local injections at a tertiary referral centre was reported. Uveitis, due to infectious etiologies, needs to be carefully excluded prior to the use of local steroid and/or methotrexate injections (84).

Retrospective review over a 21-year period for endogenous endophthalmitis in Auckland was conducted. Endogenous endophthalmitis occurred at 1.9 cases per million per year. Ophthalmologists require a high index of suspicion for underlying systemic infection in any subject presenting with ocular inflammation, and need to be aware that endogenous endophthalmitis may present without pain and frequently without hypopyon (89).

A cross-sectional study evaluating barriers to access for cataract surgery in Waikato found that Māori presenting with cataract typically are younger and have lower visual acuity than New Zealand European. Longer driving distances represent a potential geographic barrier for Māori to access ophthalmic care and referral to tertiary services within the Waikato District. No significant association was found between driving distance and visual acuity (93).

The outcomes of patients with newly diagnosed neovascular age-related macular degeneration in Palmerston North were described. Patients receiving treatment for newly diagnosed neovascular age-related macular degeneration were achieving high rates of stabilisation and improvements in visual acuity, with more than half maintaining the national driving standard. The locally developed prospective database allows for real-time analysis of patient outcomes and the evaluation of the effectiveness of quality-improvement strategies (95).

Oral health

Oral health among older adults with complex needs living in the community and in ARC facilities within New Zealand was explored. Heavy and unequal oral health burdens were observed among older adults with complex needs, together with low dental service uptake. New Zealand needs an oral health policy for older adults (91).

Other

Individual participant data meta-analysis on source data from community-dwelling participants aged 80 years and older from four countries including New Zealand showed that subclinical thyroid dysfunction is not associated with functional outcomes or mortality and may therefore be of limited clinical significance (82).

An individual participant data meta-analysis of five cohorts of octogenarians found that anaemia in the very old is a common condition associated with worse functional ability, cognitive function, depressive symptoms, and self-rated health, and a more rapid decline in functional ability over time (85).

Individual-level patient data from 11 health systems were used to compare the differences in health outcomes for high-need high-cost patients across high-income countries including New Zealand. There are meaningful differences in health system outcomes for patients with hip conditions and congestive heart failure (86).

Health-related outcomes over 24 and 36 months in an older cohort of dialysis patients were used to determine the predictors of health deterioration in this group. It was found that Māori and Pacific people report better outcomes on dialysis. Social and/or clinical interventions aimed at improving social satisfaction, sense of community, and help with usual activities may impact favourably on the experiences for older dialysis patients (92).

Treatment patterns and characteristics of patients with chronic obstructive pulmonary disease who initiated multiple-inhaler triple therapy were described. Study findings suggested that prescription behaviour among general practitioners is largely consistent with treatment guidelines (94).

Prescribing

The study protocol for a RCT assessing deprescribing of anticholinergic and sedative drugs in a cohort of frail older people living in the community was reported (96).

A study identified drug combinations contributing to delirium risk in adults aged 65 and older using a case-time-control design. The association rule method applied to a case-time-control design is a novel approach to identifying drug combinations contributing to delirium with adjustment for any temporal trends in exposures. The study provides new insight into the combination of medicines linked to delirium (97).

The process of developing a pharmacist-facilitated medicines review intervention for Māori older adults, structured around the principles of Te Tiriti o Waitangi, to support the implementation of a culturally safe, pro-equity intervention, was reported (98).

A narrative review examined ethnic variation in the quality use of medicines between Māori and non-Māori older adult populations. This review identified that inequities in quality medicines use exist and provides a starting point to develop pro-equity solutions (99).

A qualitative study exploring stakeholder views on developing pharmacist-facilitated medicines review services for community-dwelling Māori older adults in New Zealand. The right of Māori to experience equitable health outcomes needs to be included in policy and also operationalised in relation to medicines review services through improved utilisation of pharmacist skills and improving Māori older adults' autonomy and control (100).

The effectiveness of a SMS text messaging intervention (Text4HeartII) to improve medication adherence in people with heart disease was evaluated. Conclusions of this study have been reported in page 9 in this review under *Cardiovascular conditions* (14).

Antipsychotic and sedative medication use in long-term care facilities providing dementia care was evaluated. Conclusions of this study have been reported in page 10 in this review under *Central nervous system conditions - Dementia and cognitive impairment* (21).

The efficacy and effectiveness of pharmacist-led interventions to reduce adverse drug events in older people living in ARC facilities were explored. Conclusions of this study have been reported in page 16 in this review under *Living and care facilities - Aged care facilities* (66).

Unauthorised covert administration of medication in nursing homes was examined. Conclusions of this study have been reported in page 16 in this review under *Living and care facilities - Aged care facilities* (70).

Social connection

A qualitative study addressed the topics of social connection, wellbeing, and identity among older lesbian, gay, bisexual, transgender, and queer adults in New Zealand (101).

A qualitative study exploring what matters to older people when discussing social connectedness. Key structural ways to improve social connectedness should focus on factors that enable cohesion between levels of connection, including stable neighbourhoods serviced with accessible public transport, liveable pensions and inclusivity of cultural diversity (102).

Loneliness in New Zealand retirement village residents were described. Conclusions of this study have been reported in page 17 in this review under *Living and care facilities - Retirement villages* (67).

Transport and built environment

Views of New Zealand transport practitioners on inclusive access to transport were explored in a survey. It is recommended that inclusive access in transport policy is improved with measures that link policy and design choices to outcomes, ultimately benefitting the health of all people, and that of older and disabled people in particular (103).

Perspectives of the adult children of older drivers on driving cessation were investigated. Families identified accessible local information and services, alternative transport, and community-based programs for drivers and families as assistance most needed (104).

A qualitative study explored the role infrastructure plays in enhancing or undermining wellbeing for diverse communities in New Zealand. Findings suggested the signs of policy and practice abandonment and neglect, and articulated a vision for more inclusive, equitable transport infrastructure that enables the wellbeing of people differently challenged by urban environments (106).

The preference and use of natural elements in older adults' domestic green environments were explored. The findings have implications for landscape garden design and plant selection but also present a challenge for encouraging more native species in domestic environments (105).

Experiences of urban park use by older adults with disability were investigated. Meaningful collaboration between park designers, city councils and people with disability is required to maximize the public health benefits of parks and make parks inviting and accessible for users of all ages, cultures and abilities (107).

A qualitative study evaluated the experiences of Māori and non-Māori 85-90-year olds in New Zealand in home gardening. Home gardens are 'more than therapeutic'; while they are protective of health and wellbeing, they are also enabling places for the expression and performance of agency in advanced age (108).

Work and finances

None in this category.

Not otherwise classified

Total population retrospective analysis of unintentional fatal drowning among people aged 65 years and older in Australia, Canada and New Zealand (2005-2014) was conducted (109).
A study explored kaumātua concerns and reactions to COVID-19. Drawing on rich kōrero from our first round of interviews, the study findings assisted Māori communities, policy makers and health providers (110).

A framework for understanding spirituality and healthy ageing in New Zealand was developed and was suggested to be a useful approach to examining what can be an ineffable personal experience and challenge to society's provision of aged care and healthy ageing (111).

The associations between body composition and muscle strength in older adults in Auckland were examined. It was concluded that body fat percentage should be considered when measuring associations between muscle mass and muscle strength in older adults (112).

A study analysed the portrayal of older people and COVID-19 by mainstream New Zealand news media. Study findings provided suggestions for promoting equitable media coverage of older New Zealanders' in the context of pandemics (113).

The discussion outcomes of the meeting of a panel of experts reviewing the available information on adult cases of pertussis in Australia, Hong Kong, New Zealand, Singapore, South Korea, and Taiwan, were present (114).

Barriers to implementing age-friendly initiatives were explored in a qualitative study. New Zealand is in the early stages of becoming age-friendly. Findings from this study provided a place-based New Zealand perspective and have influenced central government social policy and practice development, culminating in resources supporting local government and communities to successfully implement age-friendly initiatives (115).

The association between chronic inflammation and accelerated ageing was examined. The findings provided initial support for the utility of suPAR in studying the role of chronic inflammation in accelerated ageing and functional decline (116).

A survey evaluated the perceptions of water competencies, drowning risk and aquatic participation among older adults. Implications of lower perceived swimming and floating competence and less frequent participation in aquatic activities on risk of drowning were discussed (117).

Ten-year trajectories of alcohol consumption in older adult New Zealanders were investigated. Five drinking profiles emerged, indicating that older adults engage with alcohol in diverse ways. Two of these patterns indicated potentially hazardous use, which highlights the need for screening and intervention in this age group (118).

A study provided an overview of the history of learning and educational policies and programmes affecting older adults in New Zealand over the past 50 years. Trends in government policy with special reference to the 'New Zealand Positive Ageing Strategy' and the 'Better Later Life' strategy and their implications for older adult's learning were discussed (119).

Ethnicity

In addition to classification into primary categories, when relevant, publications were assigned to a broad ethnicity category (Māori, Pacific, Asian). Many publications involved, or were relevant to one or more ethnic groups, but the ethnicity category was used only when the publication was *primarily* addressing one of these groups (Table 3).

Table 3. References relating primarily to a broad ethnic group

Ethnicity	Number of publications	References
Māori	7	(41, 54, 56, 58, 98, 100, 110)
Pacific	1	(29)
Asian	1	(40)

REFERENCES

1. Abshirini M, Coad J, Wolber FM, von Hurst P, Miller MR, Tian HS, et al. Effect of Greenshell(TM) mussel on osteoarthritis biomarkers and inflammation in healthy postmenopausal women: a study protocol for a randomized double-blind placebo-controlled trial. Trials. 2021;22(1).

2. Blankart CR, van Gool K, Papanicolas I, Bernal-Delgado E, Bowden N, Estupiñán-Romero F, et al. International comparison of spending and utilization at the end of life for hip fracture patients. Health Services Research. 2021;56(S3):1370-82.

3. Buhler M, Chapple CM, Stebbings S, Potiki-Bryant K, Baxter GD. Impact of Thumb Carpometacarpal Joint Osteoarthritis: A Pragmatic Qualitative Study. Arthritis Care & Research. 2021;73(3):336-46.

4. Combined R, Observational Study of Surgery for Fractures in the Distal Radius in the Elderly Study G, Lawson A, Naylor JM, Buchbinder R, Ivers R, et al. Surgical Plating vs Closed Reduction for Fractures in the Distal Radius in Older Patients: A Randomized Clinical Trial. JAMA Surgery. 2021;156(3):229-37.

5. Common KV, Hanger HC. A broken neck: outcomes from conservative management of C2 fractures in older adults. New Zealand Medical Journal. 2021;134(1547):93-101.

6. Papanicolas I, Figueroa JF, Schoenfeld AJ, Riley K, Abiona O, Arvin M, et al. Differences in health care spending and utilization among older frail adults in high-income countries: ICCONIC hip fracture persona. Health Services Research. 2021;56 Suppl 3:1335-46.

7. Snell DL, Dunn JA, Jerram KAS, Hsieh CJ, DeJong G, Hooper GJ. Associations between comorbidity and quality of life outcomes after total joint replacement. Quality of Life Research. 2021;30(1):137-44.

8. Wilson RA, Gwynne-Jones DP, Sullivan TA, Abbott JH. Total Hip and Knee Arthroplasties Are Highly Cost-Effective Procedures: The Importance of Duration of Follow-Up. Journal of Arthroplasty. 2021;36(6):1864-+.

9. Anderson M, Parke R, Jull A. Effect of Cardiac Surgery on Health-Related Quality of Life in Patients Aged 75 Years or Older: A Prospective Study. Heart, Lung & Circulation. 2021;30(2):282-7.

10. Butchard M, Kerr AJ, Grey C, Wu B, Hider P. Nationwide dispensing of cardioprotective medications during the first year following acute coronary syndrome (ANZACS-QI 56). New Zealand Medical Journal. 2021;134(1531):36-54.

11. Doolan-Noble F, Noller G, Nixon G, Stokes T. 'I'm still here, that's probably the best part'. Lives of those living rurally with an implantable cardioverter defibrillator: a qualitative study. Rural & Remote Health. 2021;21(1):5659.

12. Earle NJ, Kerr AJ, Legget M, Wu BP, Doughty RN, Poppe KK. Acute coronary syndrome registry enrolment status: differences in patient characteristics and outcomes and implications for registry data use (ANZACS-QI 36). European Heart Journal-Quality of Care and Clinical Outcomes. 2021;7(6):542-7.

13. Kerr AJ, Wang TKM, Jiang Y, Grey C, Wells S, Poppe KK. The importance of considering both primary and secondary diagnostic codes when using administrative health data to study acute coronary syndrome epidemiology (ANZACS-QI 47). European Heart Journal - Quality of Care and Clinical Outcomes. 2021;7(6):548-55.

14. Maddison R, Jiang YN, Stewart R, Scott T, Kerr A, Whittaker R, et al. An Intervention to Improve Medication Adherence in People With Heart Disease (Text4HeartII): Randomized Controlled Trial. Jmir Mhealth and Uhealth. 2021;9(6).

15. Taylor DA, Wallis KA, Feki S, Moala SS, Latu M, Fanueli EF, et al. Cardiovascular disease risk prediction in older people: a qualitative study. British Journal of General Practice. 2021;71(711):e772-e9.

16. Wong B, Armstrong G, El-Jack S, To A. A Decade of Transcatheter Aortic Valve Implantation in New Zealand: Growth and Inequalities. Heart Lung and Circulation. 2021;30(4):540-6.

17. Chan CY, Cheung G, Martinez-Ruiz A, Chau PYK, Wang K, Yeoh EK, et al. Caregiving burnout of community-dwelling people with dementia in Hong Kong and New Zealand: a cross-sectional study. BMC Geriatrics. 2021;21(1):261.

18. Gee S, Croucher M, Cheung G. Performance of the cognitive performance scale of the resident assessment instrument (Interrai) for detecting dementia amongst older adults in the community. International Journal of Environmental Research and Public Health. 2021;18(13).

19. Gibson R, Dowell A, Jones L, Gander P. Non-pharmacological interventions a feasible option for addressing dementia-related sleep problems in the context of family care. Pilot and Feasibility Studies. 2021;7(1).

20. Gibson R, Gander P. Factors associated with the sleep of carers: A survey of New Zealanders supporting a family member with cognitive impairment or dementia. Dementia. 2021;20(3):919-35.

21. Ma'u E, Burton J, Fussell E. Antipsychotic and sedative medication use in long-term care facilities providing dementia care. New Zealand Medical Journal. 2021;134(1537):56-65.

22. Mahawish K, Gommans J, Kleinig T, Lallu B, Tyson A, Ranta A. Switching to Tenecteplase for Stroke Thrombolysis: Real-World Experience and Outcomes in a Regional Stroke Network. Stroke. 2021:E590-E3.

23. Mahawish KM, Greenblatt D. Pre-hospital delays in patients experiencing symptoms of acute stroke or transient ischaemic attack. New Zealand Medical Journal. 2021;134(1542):29-37.

24. Martinez-Ruiz A, Yates S, Cheung G, Dudley M, Krishnamurthi R, Fa'alau F, et al. Living with Dementia in Aotearoa (LiDiA): a cross-sectional feasibility study protocol for a multiethnic dementia prevalence study in Aotearoa/New Zealand. BMJ Open. 2021;11(5):e046143.

25. Mitchell R, Fajardo Pulido D, Ryder T, Norton G, Brodaty H, Draper B, et al. Access to rehabilitation services for older adults living with dementia or in a residential aged care facility following a hip fracture: healthcare professionals' views. Disability & Rehabilitation. 2021;43(6):834-45.

26. Nair S, Chen S, Gupta D, Smith AJ, McGregor AL. Higher BMI Confers a Long-Term Functional Status Advantage in Elderly New Zealand European Stroke Patients. Journal of Stroke & Cerebrovascular Diseases. 2021;30(5):105711.

27. Ryan B, Martinez Ruiz A, Rivera-Rodriguez C, Curtis M, Cheung G. Sociodemographic and Clinical Characteristics of 1350 Patients With Young Onset Dementia: A Comparison With Older Patients. Alzheimer Disease & Associated Disorders. 2021;35(3):200-7.

28. Saywell NL, Vandal AC, Mudge S, Hale L, Brown P, Feigin V, et al. Telerehabilitation After Stroke Using Readily Available Technology: A Randomized Controlled Trial. Neurorehabilitation and Neural Repair. 2021;35(1):88-97.

29. Symon V, Richards R, Norris P, Mapusua T, Hale L. The needs of Pacific families affected by age-related cognitive impairment in New Zealand: interviews with providers from health-care organisations. Journal of Primary Health Care. 2021;13(4):317-22.

30. Uribe FL, Arteaga O, Bruchhausen W, Cheung G, Cullum S, Fuentes-García A, et al. Dementia and covid-19 in chile, new zealand and germany: A research agenda for cross-country learning for resilience in health care systems. Sustainability (Switzerland). 2021;13(18).

31. Zhong CS, Beharry J, Salazar D, Smith K, Withington S, Campbell BCV, et al. Routine Use of Tenecteplase for Thrombolysis in Acute Ischemic Stroke. Stroke. 2021:1087-90.

32. McKinlay E, Vaipuna K, O'Toole T, Golds H, Adams A. Doing what it takes: a qualitative study of New Zealand carers' experiences of giving home-based palliative care to loved ones. New Zealand Medical Journal. 2021;134(1533):21-32.

33. Nie LK, Smith-Han K, Iosua E, Walker S. New Zealand medical students' views of euthanasia/assisted dying across different year levels. Bmc Medical Education. 2021;21(1).

34. Pivodic L, Smets T, Gott M, Sleeman KE, Arrue B, Cardenas Turanzas M, et al. Inclusion of palliative care in health care policy for older people: A directed documentary analysis in 13 of the most rapidly ageing countries worldwide. Palliative Medicine. 2021;35(2):369-88.

35. Robinson J, Pilbeam C, Goodwin H, Raphael D, Waterworth S, Gott M. The impact of uncertainty on bereaved family's experiences of care at the end of life: a thematic analysis of free text survey data. BMC Palliative Care. 2021;20(1).

36. Scott OW, Gott M, Edlin R, Moyes SA, Muru-Lanning M, Kerse N. Costs of inpatient hospitalisations in the last year of life in older New Zealanders: a cohort study. BMC Geriatrics. 2021;21(1):514.

37. Abey-Nesbit R, Peel NM, Matthews H, Hubbard RE, Nishtala PS, Bergler U, et al. Frailty of Maori, Pasifika, and Non-Maori/Non-Pasifika Older People in New Zealand: A National Population Study of Older People Referred for Home Care Services. Journals of Gerontology Series A-Biological Sciences & Medical Sciences. 2021;76(6):1101-7.

38. Abey-Nesbit R, Schluter PJ, Wilkinson TJ, Thwaites JH, Berry SD, Allore H, et al. Risk factors for injuries in New Zealand older adults with complex needs: a national population retrospective study. BMC Geriatrics. 2021;21(1):630.

39. Bloomfield K, Wu Z, Chan L, de Zoysa JR. Frailty prevalence in Aotearoa New Zealand haemodialysis patients and its association with hospitalisations. New Zealand Medical Journal. 2021;134(1546):95-108.

40. Cheung G, Gee S, Jamieson H, Berger U. What Is Frailty? Perspectives from Chinese Clinicians and Older Immigrants in New Zealand. Journal of Cross-Cultural Gerontology. 2021;36(2):201-13.

41. Gee S, Bullmore I, Cheung G, Bergler U, Jamieson H. It's about who they are and what they can do: Maori perspectives on frailty in later life. New Zealand Medical Journal. 2021;134(1535):17-24.

42. Lewis ET, Howard L, Cardona M, Radford K, Withall A, Howie A, et al. Frailty in Indigenous Populations: A Scoping Review. Frontiers in Public Health. 2021;9:785460.

43. Oberndorfer T, Jurawan R. Frailty should be assessed in older patients considered for colonoscopy. New Zealand Medical Journal. 2021;134(1539):74-6.

44. Robinson TE, Boyd ML, North D, Wignall J, Dawe M, McQueen J, et al. Proactive primary care model for frail older people in New Zealand delays aged-residential care: A quasi-experiment. Journal of the American Geriatrics Society. 2021;69(6):1617-26.

45. Tay E, Barnett D, Leilua E, Kerse N, Rowland M, Rolleston A, et al. The Diet Quality and Nutrition Inadequacy of Pre-Frail Older Adults in New Zealand. Nutrients. 2021;13(7):13.

46. Teh R, Mendonca N, Muru-Lanning M, MacDonell S, Robinson L, Kerse N. Dietary Protein Intake and Transition between Frailty States in Octogenarians Living in New Zealand. Nutrients. 2021;13(8):19.

47. Watkins A, Curl A, Mavoa S, Tomintz M, Todd V, Dicker B. A socio-spatial analysis of pedestrian falls in Aotearoa New Zealand. Social Science & Medicine. 2021;288:113212.

48. Alzahrani T, Hunt M, Whiddett D. Barriers and facilitators to using smart home technologies to support older adults: Perspectives of three stakeholder groups. International Journal of Healthcare Information Systems and Informatics. 2021;16(4).

49. Choukou MA, Maddahi A, Polyvyana A, Monnin C. Digital health technology for Indigenous older adults: A scoping review. International Journal of Medical Informatics. 2021;148:104408.

50. Ehn M, Richardson MX, Landerdahl Stridsberg S, Redekop K, Wamala-Andersson S. Mobile Safety Alarms Based on GPS Technology in the Care of Older Adults: Systematic Review of Evidence Based on a General Evidence Framework for Digital Health Technologies. Journal of Medical Internet Research. 2021;23(10):e27267.

51. Figueroa JF, Papanicolas I, Riley K, Abiona O, Arvin M, Atsma F, et al. International comparison of health spending and utilization among people with complex multimorbidity. Health Services Research. 2021;56(S3):1317-34.

52. Goodwin J, Shand B, Wiseman R, Brough N, McGeoch G, Hamilton G, et al. Achievements and challenges during the development of an advance care planning program. Australasian Journal on Ageing. 2021;40(3):301-8.

53. Barak Y, Leitch S, Glue P. The Great Escape. Centenarians' exceptional health. Aging-Clinical & Experimental Research. 2021;33(3):513-20.

54. Marques B, Freeman C, Carter L, Zari MP. Conceptualising therapeutic environments through culture, indigenous knowledge and landscape for health and well-being. Sustainability (Switzerland). 2021;13(16).

55. Muru-Lanning M, Lapsley H, Dawes T. Ko ngā kaumātua ngā poupou o tō rātou ao: kaumātua and kuia, the pillars of our understanding. AlterNative. 2021;17(2):246-53.

56. Oetzel JG, Ruru S, Zhang Y, Simpson ML, Nock S, Meha P, et al. Enhancing Well-Being and Social Connectedness for Maori Elders Through a Peer Education (Tuakana-Teina) Programme: A Cross-Sectional Baseline Study. Frontiers in Public Health. 2021;9:775545.

57. Palapar L, Kerse N, Wilkinson-Meyers L, Lumley T, Blom JW. Primary Care Variation in Rates of Unplanned Hospitalizations, Functional Ability, and Quality of Life of Older People. Annals of Family Medicine. 2021;19(4):318-31.

58. Simpson ML, Oetzel J, Nock S, Greensill HI, Meha P, Reddy R, et al. Maori Becoming Peer Educators in Later Life: Impacts on Identity, Well-being, and Social Connectedness. Journals of Gerontology Series B-Psychological Sciences & Social Sciences. 2021;76(6):1140-50.

59. Szabo A, Hyde M, Towers A. One slope does not fit all: longitudinal trajectories of quality of life in older adulthood. Quality of Life Research. 2021;30(8):2161-70.

60. Wertz J, Israel S, Arseneault L, Belsky DW, Bourassa KJ, Harrington H, et al. Vital personality scores and healthy aging: Life-course associations and familial transmission. Social Science & Medicine. 2021;285:114283.

61. Xiao H, Doolan-Noble F, Liu L, White A, David Baxter G. Ageing well in older men in Otago and Southland of New Zealand: a focus group study protocol. Physical Therapy Reviews. 2021;26(5):323-7.

62. Abey-Nesbit R, Van Doren S, Ahn S, Iheme L, Peel NM, Declercq A, et al. Factors associated with caregiver distress among home care clients in New Zealand: Evidence based on data from interRAI Home Care assessment. Australasian Journal on Ageing. 2021.

63. Angus E, Reid K, Yamit S, Coe G, Ryan B, Crichton S. Experience of internationally qualified nurses providing palliative care in a New Zealand aged residential care facility. International Journal of Palliative Nursing. 2021;27(10):515-23.

64. Khursandi DS, Eley V. 'Quit while you are ahead - and smell the roses!' A survey of retired Fellows of the Australian and New Zealand College of Anaesthetists. Anaesthesia and Intensive Care. 2021;49(5):379-88.

65. Kuboshima Y, McIntosh J. Housing design that improves the independence and safety for older adults using a walker. Applied Ergonomics. 2021;97:103539.

66. Ali S, Salahudeen MS, Bereznicki LRE, Curtain CM. Pharmacist-led interventions to reduce adverse drug events in older people living in residential aged care facilities: A systematic review. British Journal of Clinical Pharmacology. 2021;87(10):3672-89.

67. Boyd M, Calvert C, Tatton A, Wu Z, Bloomfield K, Broad JB, et al. Lonely in a crowd: loneliness in New Zealand retirement village residents. International Psychogeriatrics. 2021;33(5):481-93.

68. Cheung G, Bala S, Lyndon M, Mau E, Rodriguez CR, Waters DL, et al. Impact of the first wave of COVID-19 on the health and psychosocial well-being of Maori, Pacific Peoples and New Zealand Europeans living in aged residential care. Australasian Journal on Ageing. 2021.

69. Connolly MJ, Hikaka J, Bloomfield K, Broad J, Wu ZQ, Boyd M, et al. Research in the retirement village community-The problems of recruiting a representative cohort of residents in Auckland, New Zealand. Australasian Journal on Ageing. 2021;40(2):177-83.

70. Garratt SM, Jonas MF, Peri K, Kerse N. To crush, or not to crush? Unauthorised covert administration of medication in nursing homes. International Journal of Older People Nursing. 2021;16(5).

71. Holdaway M, Wiles J, Kerse N, Wu Z, Moyes S, Connolly MJ, et al. Predictive factors for entry to long-term residential care in octogenarian Maori and non-Maori in New Zealand, LiLACS NZ cohort. BMC Public Health. 2021;21(1):34.

72. MacDonell SO, Miller JC, Harper MJ, Reid MR, Haszard JJ, Gibson RS, et al. Multiple Micronutrients, Including Zinc, Selenium and Iron, Are Positively Associated with Anemia in New Zealand Aged Care Residents. Nutrients. 2021;13(4):25.

73. Moir C, Lesa R, Ritchie L. A unique disaster response in aged residential dementia care: Can the experience inform future care models? Journal of Clinical Nursing. 2021.

74. Prentice J, Weatherall M, Grainger R, Levack W. 'Tell someone who cares': Participation action research on workplace engagement of caregivers in aged residential care, NZ. Australasian Journal on Ageing. 2021;40(2):e109-e15.

75. Rahouti A, Lovreglio R, Nilsson D, Kuligowski E, Jackson P, Rothas F. Investigating Evacuation Behaviour in Retirement Facilities: Case Studies from New Zealand. Fire Technology. 2021;57(3):1015-39.

76. van Kuijk M, Smith MB, Ferguson CA, Kerse NM, Teh R, Gribben B, et al. Dentition and nutritional status of aged New Zealanders living in aged residential care. Oral Diseases. 2021;27(2):370-7.

77. Wong G, Breheny M. The experience of animal therapy in residential aged care in New Zealand: A narrative analysis. Ageing and Society. 2021;41(11):2641-59.

78. Draxler A, Franzke B, Cortolezis JT, Gillies NA, Unterberger S, Aschauer R, et al. The Effect of Elevated Protein Intake on DNA Damage in Older People: Comparative Secondary Analysis of Two Randomized Controlled Trials. Nutrients. 2021;13(10).

79. Lourida I, Boer JMA, Teh R, Kerse N, Mendonca N, Rolleston A, et al. Association of Daily Physical Activity and Sedentary Behaviour with Protein Intake Patterns in Older Adults: A Multi-Study Analysis across Five Countries. Nutrients. 2021;13(8):27.

80. Mumme KD, Conlon CA, von Hurst PR, Jones B, de Seymour J, Heath ALM, et al. Relative Validity and Reproducibility of a Food Frequency Questionnaire for Assessing Dietary Patterns and Food Group Intake in Older New Zealand Adults: The Researching Eating, Activity, and Cognitive Health Study. Journal of the Academy of Nutrition and Dietetics. 2021;121(12):2389-400.e10.

81. Wham C, Moyes SA, Rolleston A, Adamson A, Kerse N, Teh R. Association between dietary protein intake and change in grip strength over time among adults of advanced age: Life and Living in Advanced Age: A Cohort Study in New Zealand (LiLACS NZ). Australasian Journal on Ageing. 2021;40(4):430-7.

82. Du Puy RS, Poortvliet RKE, Mooijaart SP, den Elzen WPJ, Jagger C, Pearce SHS, et al. Outcomes of Thyroid Dysfunction in People Aged Eighty Years and Older: An Individual Patient Data Meta-Analysis of Four Prospective Studies (Towards Understanding Longitudinal International Older People Studies Consortium). Thyroid. 2021;31(4):552-62.

83. O'Connor L, Braithwaite-Flores A, Jagroop-Dearing A, Dearing CG. Bowel screening in New Zealand: are men and Pacific peoples being left behind? Kotuitui-New Zealand Journal of Social Sciences Online. 2021.

84. Ong APC, Sims JL, Niederer RL. Infectious Uveitis after Local Steroid and/or Methotrexate Injections at A Tertiary Referral Center in New Zealand: A Case Series. Ocular Immunology and Inflammation. 2021.

85. Palapar L, Kerse N, Rolleston A, den Elzen WPJ, Gussekloo J, Blom JW, et al. Anaemia and physical and mental health in the very old: An individual participant data meta-analysis of four longitudinal studies of ageing. Age & Ageing. 2021;50(1):113-9.

86. Papanicolas I, Riley K, Abiona O, Arvin M, Atsma F, Bernal-Delgado E, et al. Differences in health outcomes for high-need high-cost patients across high-income countries. Health Services Research. 2021;56 Suppl 3:1347-57.

87. Pilleron S, Maringe C, Charvat H, Atkinson J, Morris E, Sarfati D. Age disparities in lung cancer survival in New Zealand: The role of patient and clinical factors. Lung Cancer. 2021;157:92-9.

88. Pilleron S, Maringe C, Charvat H, Atkinson J, Morris EJA, Sarfati D. The impact of timely cancer diagnosis on age disparities in colon cancer survival. Journal of Geriatric Oncology. 2021;12(7):1044-51.

89. Samalia PD, Welch S, Polkinghorne PJ, Niederer RL. Endogenous Endophthalmitis: A 21-Year Review of Cases at a Tertiary Eye Care Centre. Ocular Immunology and Inflammation. 2021.

90. Schauer C, Sekra A, Hassan I, Wu YT, Wang MTM, Wei H, et al. Quality of life after oesophageal stenting in patients with palliative oesophageal cancer. New Zealand Medical Journal. 2021;134(1545):106-19.

91. Schluter PJ, Askew DA, McKelvey VA, Jamieson HA, Lee M. Oral Health Among Older Adults With Complex Needs Living in the Community and in Aged Residential Care Facilities within New Zealand. Journal of the American Medical Directors Association. 2021;22(6):1177-83.e1.

92. Shettigar R, Samaranayaka A, Schollum JBW, Wyeth EH, Derrett S, Walker RJ. Predictors of Health Deterioration Among Older New Zealanders Undergoing Dialysis: A Three-Year Accelerated Longitudinal Cohort Study. Canadian Journal of Kidney Health and Disease. 2021;8.

93. Wilkinson B, McKelvie J. Evaluating barriers to access for cataract surgery in Waikato: analysis of calculated driving distance and visual acuity. New Zealand Medical Journal. 2021;134(1536):105-12.

94. Xu XM, Milea D, Rojas AAN, Braganza A, Holbrook T, Marett B, et al. A Real-World Analysis of Treatment Patterns and Clinical Characteristics Among Patients with COPD Who Initiated Multiple-Inhaler Triple Therapy in New Zealand. International Journal of Chronic Obstructive Pulmonary Disease. 2021;16:1835-50.

95. Yap A, Kho A, Ah-Chan J. The outcomes of patients with newly diagnosed neovascular age-related macular degeneration in Palmerston North. New Zealand Medical Journal. 2021;134(1534):46-50.

96. Bergler U, Ailabouni NJ, Pickering JW, Hilmer SN, Mangin D, Nishtala PS, et al. Deprescribing to reduce polypharmacy: study protocol for a randomised controlled trial assessing deprescribing of anticholinergic and sedative drugs in a cohort of frail older people living in the community. Trials [Electronic Resource]. 2021;22(1):766.

97. Chyou TY, Nishtala PS. Identifying frequent drug combinations associated with delirium in older adults: Application of association rules method to a case-time-control design. Pharmacoepidemiology & Drug Safety. 2021;30(10):1402-10.

98. Hikaka J, Jones R, Hughes C, Connolly MJ, Martini N. Utilising te Tiriti o Waitangi to approach health intervention development and research: pharmacist-facilitated medicines review interventions for Maori older adults. Journal of Primary Health Care. 2021;13(2):124-31.

99. Hikaka J, Jones R, Hughes C, Connolly MJ, Martini N. Ethnic Variations in the Quality Use of Medicines in Older Adults: Maori and Non-Maori in Aotearoa New Zealand. Drugs & Aging. 2021;38(3):205-17.

100. Hikaka J, Jones R, Hughes C, Connolly MJ, Martini N. Developing pharmacist-facilitated medicines review services for community-dwelling Maori older adults in New Zealand - A qualitative study exploring stakeholder views. Health & Social Care in the Community. 2021;29(2):564-73.

101. Betts D. Excluding the queer unwanted: Perspectives from older LGBTQ+ adults in New Zealand. Journal of Gay and Lesbian Social Services. 2021;33(4):475-92.

102. Morgan T, Wiles J, Park HJ, Moeke-Maxwell T, Dewes O, Black S, et al. Social connectedness: What matters to older people? Ageing and Society. 2021;41(5):1126-44.

103. Burdett BRD, Witten K, Willing E, Ameratunga S. Inclusive access in transport policy and practice: Views of New Zealand transport practitioners. Case Studies on Transport Policy. 2021;9(4):1593-9.

104. Connor J, Brookland R, Samaranayaka A. Older Drivers and Their Future Mobility: Views and Involvement of Their Adult Children. Journal of Applied Gerontology. 2021;40(1):55-66.

105. Freeman C, Buttery Y, Waters DL, Van Heezik Y. Older adults' domestic green environments: the preference for flowers. Landscape Research. 2021;46(7):897-915.

106. Meher M, Spray J, Wiles J, Anderson A, Willing E, Witten K, et al. Locating transport sector responsibilities for the wellbeing of mobility-challenged people in Aotearoa New Zealand. Wellbeing, Space and Society. 2021;2.

107. Perry M, Cotes L, Horton B, Kunac R, Snell I, Taylor B, et al. "Enticing" but Not Necessarily a "Space Designed for Me": Experiences of Urban Park Use by Older Adults with Disability. International Journal of Environmental Research & Public Health [Electronic Resource]. 2021;18(2):11.

108. Wiles J, Miskelly P, Stewart O, Rolleston A, Gott M, Kerse N. Gardens as resources in advanced age in aotearoa NZ: More than therapeutic. Social Science & Medicine. 2021;288:113232.

109. Clemens T, Peden AE, Franklin RC. Exploring a Hidden Epidemic: Drowning Among Adults Aged 65 Years and Older. Journal of Aging & Health. 2021;33(10):828-37.

110. Dawes T, Muru-Lanning M, Lapsley H, Hopa N, Dixon N, Moore C, et al. Hongi, Harirū and Hau: Kaumātua in the time of COVID-19. Journal of the Royal Society of New Zealand. 2021;51(S1):S23-S36.

111. Egan R, Blank ML. A framework for understanding spirituality and healthy ageing: perspectives from Aotearoa New Zealand. Journal of Religion, Spirituality and Aging. 2021;33(2):112-26.

112. Hiol AN, von Hurst PR, Conlon CA, Mugridge O, Beck KL. Body composition associations with muscle strength in older adults living in Auckland, New Zealand. PLoS ONE [Electronic Resource]. 2021;16(5):e0250439.

113. Morgan T, Wiles J, Williams L, Gott M. COVID-19 and the portrayal of older people in New Zealand news media. Journal of the Royal Society of New Zealand. 2021;51(S1):S127-S42.

114. Nam LH, Chiu CH, Heo JY, Ip M, Jung KS, Menzies R, et al. The need for pertussis vaccination among older adults and high-risk groups: a perspective from advanced economies of the Asia Pacific region. Expert Review of Vaccines. 2021;20(12):1603-17.

115. Neville S, Napier S, Shannon K, Adams J. Beginning on an age-friendly journey: Barriers to implementing age-friendly initiatives. Australasian Journal on Ageing. 2021;40(4):e287-e93.

116. Rasmussen LJH, Caspi A, Ambler A, Danese A, Elliott M, Eugen-Olsen J, et al. Association Between Elevated suPAR, a New Biomarker of Inflammation, and Accelerated Aging. Journals of Gerontology Series A-Biological Sciences & Medical Sciences. 2021;76(2):318-27.

117. Stanley T, Moran K. Perceptions of water competencies, drowning risk and aquatic participation among older adults. International Journal of Aquatic Research and Education. 2021;13(2).

118. Szabo A, Towers A, Sheridan J, Newcombe D. Ten-Year Trajectories of Alcohol Consumption in Older Adult New Zealanders. Journals of Gerontology Series B-Psychological Sciences & Social Sciences. 2021;76(3):496-506.

119. Tobias R. The Learning and Education of Older Adults in Aotearoa New Zealand. Education in the Asia-Pacific Region2021. p. 125-47.