



# Cell phone and technology use by octogenarians

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## ABSTRACT

**INTRODUCTION:** Many countries, including New Zealand, have an aging population and new technologies such as cell phones may be useful for older people.

**AIM:** To examine cell phone and technology use by octogenarians.

**METHODS:** Te Puawaitanga O Nga Tapuwae Kia Ora Tonu- Life and Living in Advanced Age: A Cohort Study In New Zealand (LILACs NZ) cohort study data of Māori (aged 80–90 years, 11-year age band) and non-Māori (aged 85 years, 1-year age band) followed for 3 years was used to describe the prevalence among study participants of the use of the internet, cell phones and watching pay-per-view television. Association of these activities with living arrangement, congestive heart failure, chronic obstructive respiratory disease and participants' cognition were examined.

**RESULTS:** Technology use was relatively low among study octogenarians. Fewer Māori used cell phones and the internet (16% and 6%) than non-Māori (30% and 19%). Māori participants supported only by a pension were less likely to use cell phones than Māori with more income. More men watched pay-per-view television (e.g. SKY) than women. Living alone and having chronic lung disease were associated with not watching pay-per-view television. Participants who used the internet had higher cognition scores than others. Non-Māori women were less likely to watch pay-per-view television and non-Māori on a pension only were less likely to watch pay-per-view television than people on a higher income. Participants who lived alone were less likely to watch pay-per-view.

**CONCLUSION:** Relatively low use of technology may limit potential for health technology innovation for people of advanced age. Socioeconomic and ethnic disparities will amplify this.

**KEYWORDS:** Octogenarians; cell phone; internet; pay-per-view TV; chronic lung disease (CLD); chronic obstructive respiratory disease (CORD); congestive heart failure (CHF); living alone.

## Introduction

Like many countries, New Zealand has an aging population with an increasing proportion of people in the oldest age groups. The number of people aged  $\geq 65$  years has increased from 11% of the total population in 1991 to 13% in 2009. The number of

people aged  $\geq 65$  years is projected to increase from 550,000 in 2009 to one million in the late 2020s, when they will outnumber children. The number of people aged  $\geq 85$  years is projected to increase from 67,000 in 2009 to 144,000 in 2031, then more than double to 330,000 by 2061.<sup>1</sup>

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## WHAT GAP THIS FILLS

**What is already known:** The rate of growth of the oldest old people is climbing throughout the world and cell phones and other technologies are being used at an increasing rate.

**What this study adds:** This research examines cell phone and technology use by people aged  $\geq 80$  years, raising questions about whether it is feasible to use these technologies in a health-related context.

Long-term diseases such as asthma, diabetes or heart disease affect people's lives over a long period of time, often slowly and progressively. This places a burden on the health, economic status and quality of life of individuals, families and communities. The cost of medical care for people with chronic conditions has risen to  $>75\%$  of the \$2 trillion the USA spends on health care annually. According to the World Health Organization (WHO), chronic conditions are comparably prevalent, expensive and deadly in the rest of the world.<sup>2</sup>

However, new technologies and innovations have made tasks faster, safer and more efficient and effective. Technology that can potentially support social connectedness and consumer health focus includes cell phone and internet use. In 2013, New Zealanders aged  $\geq 65$  years were somewhat more likely to have access to a home telephone than younger generations, yet less likely to have home internet access. In that year, 75% of people aged 65–74 years and 49% of people aged  $\geq 75$  years reported home internet access, compared to 85% of people aged  $<65$  years. However, over the previous 6 years, older people's cell phone use increased at a higher rate (19%) than younger people's (6%).<sup>3</sup>

In 2012, 53% of people aged  $\geq 65$  years used the internet in USA. Among older American internet users, 70% used the internet on a typical day. After age 75 years, internet and broadband use dropped. From April 2012, internet use among this group in the USA had only reached 34%, while home broadband use climbed to 21% from 8% in 2010.<sup>3</sup> Increasing numbers of older people own a cell phone. In the same study, 69% of adults aged  $\geq 65$

years had a cell phone, up from 57% in May 2010.<sup>3</sup> Among people aged  $\geq 76$  years, 56% owned a cell phone, up from 47% in 2010.<sup>3</sup>

Social networking site use among seniors has also grown over the past few years. From April 2009 to May 2011, internet use by people aged  $\geq 65$  years grew 150%, from 13% in 2009 to 33% in 2011.<sup>2</sup> From February 2012, one-third (34%) of internet users aged  $\geq 65$  years used social networking sites such as Facebook and 18% used it on a daily basis.

In addition to traditional means such as telephone and handwritten letters, communication by voice mail, cellular phone, fax machines and more recently email has been adopted by older generations. Studies of older adults' attitudes towards computers and the use of automated teller machines (ATMs) show that older adults are open to new technologies.<sup>4</sup>

Text messaging can be beneficial in the self-management of long-term conditions by providing information to patients or their carers about their condition; by monitoring illness; by improving adherence to treatment and medications; or as a channel of peer-to-peer networking and support.<sup>5</sup> Most related research has engaged with older people aged up to 80 years. We are curious as to the communication technology use of people in the oldest age groups.

This study aims to report technology use by people in advanced age (octogenarians) in New Zealand.

## Methods

To examine the prevalence of technology use in this study, we used data from the Te Puawaitanga O Nga Tapuwae Kia Ora Tonu, Life and Living in Advanced Age cohort study in New Zealand (LiLACS NZ). LiLACS NZ is a population-based cohort study of Māori aged 80–90 years and non-Māori aged 85 years living in the Bay of Plenty and Lakes District Health Board regions (excluding Taupo) in 2010.<sup>6</sup> Measures of socioeconomic status and living arrangements, health and social activity were ascertained by trained interviewers in face-to-face interviews. General practice and hospital and self-report were used to establish health diagnoses

Table 1. Demographic characteristics of Māori participants using technology

		Men	Women	Age (mean years, sd)	Other income	Pension only
Use internet	No	87 (87.0)	131 (85.1)	82.4 (2.7)*	111 (83.5)	101 (87.8)
	Yes	13 (13.0)	23 (14.9)	81.1 (1.9)	22 (16.5)	14 (12.2)
Use cell phone	No	54 (54.0)	100 (64.9)	82.7 (2.8)*	69 (51.9)	80 (69.6)*
	Yes	46 (46.0)	54 (35.1)	81.6 (2.1)	64 (48.1)	35 (30.4)
Watch pay-per-view TV	No	33 (33.0)	79 (51.3)*	82.3 (2.6)	61 (45.9)	50 (43.5)
	Yes	67 (67.0)	75 (48.7)	82.2 (2.6)	72 (54.1)	65 (56.5)

\*Significant difference – unadjusted. Data are presented as *n* (%) unless otherwise stated.

according to established algorithms,<sup>7,8</sup> and the Modified Mini-Mental State Examination (3MS), a validated cognition screening test, was used to establish level of cognition.<sup>9,10</sup>

Participants were asked about their use of information technologies including internet, cell phone and watching Sky television (TV), and responses were recorded.

### Data analysis

Descriptive statistics were used to describe the use of information technologies. We examined associations between technology use and living arrangements, health conditions (congestive heart failure (CHF), chronic lung disease (CLD)), participants' cognition (using the 3MS) and self-identified income measured by receipt of New Zealand's superannuation pension (universally available to New Zealanders aged ≥65 years) as their only income, compared with having more than one income source.<sup>11</sup> For each question relating to internet use, cell phone use and watching Sky TV, a logistic regression model was constructed containing the independent variable of interest (living alone, CHF, CLD, cognition), controlled for age, sex and income. We report the ethnic groups separately as they differed in technology use and socioeconomic patterns.

### Results

The sample included 635 participants, with full data obtained from interviews in 2010. Of Māori participants, 106 (16.69%) lived alone, 77 (12%) had CHF and 87 (13.70%) had CLD.

Comparing Māori and non-Māori, Māori were significantly less likely to use the internet or a cell phone, although there was no significant difference between the groups in their probability of watching SKY TV. Overall, 36 (5.67%) Māori and 122 (19%) non-Māori used the internet, 100 Māori (15.74%) and 190 non-Māori (29.92%) used a cell phone and 142 (22.36%) Māori and 190 (22.92%) non-Māori watched SKY television.

Table 1 shows significant differences in use of the internet and cell phones with older Māori being less likely to use technology, unadjusted for age, sex or income. In this unadjusted model, people on a pension only were less likely to use cell phones and more men watched pay-per-view TV than women. Table 2 shows a model for Māori adjusted for age, sex and the pension being the only source of income. This multivariable regression analysis shows that Māori who lived alone and Māori who had CLD were significantly less likely to watch SKY TV. Māori who used the internet had higher cognition scores and age remained significant in the model.

In Table 3, all participants were non-Māori and enrolled in the year of their 85<sup>th</sup> birthday, so age had no association with other variables. Non-Māori women were less likely to watch SKY TV and non-Māori people of both sexes on a pension only were less likely to watch Sky TV. Table 4 shows that when combined in a multivariable model, people who lived alone were less likely to watch SKY TV, but gender and income were no longer significantly associated with the outcomes modelled. Adjusting for other variables, a higher cognition score (3MS score) was associated with using the internet.

Table 2. Associations between health and cognition and technology use among Māori participants

		Lives alone	CHF	CLD	3MS score	Total
Use internet	No	88 (83.0)	68 (88.3)	74 (85.1)	86.4 (14.1)*	218 (85.8)
	Yes	18 (17.0)	9 (11.7)	13 (14.9)	93.4 (6.1)	36 (14.2)
Use cell phone	No	68 (64.2)	50 (64.9)	53 (60.9)	86.1 (14.9)	154 (60.6)
	Yes	38 (35.9)	27 (35.1)	34 (39.1)	89.4 (10.7)	100 (39.4)
Watch pay-per-view TV	No	67 (63.2)*	38 (49.4)	46 (42.2)*	89.0 (12.2)	112 (44.1)
	Yes	39 (36.8)	39 (50.7)	41 (29.7)	86.2 (14.2)	142 (55.9)
Total		106 (41.7)	77 (30.4)	87 (35.2)	87.4 (13.4)	

\*significant – adjusted for age and sex and if pension was the only income. Sd = standard deviation. Data are presented as *n* (%) unless otherwise stated. CHF, congestive heart failure; CLD, chronic lung disease; 3MS, Modified Mini-Mental State Examination.

Table 3. Demographic characteristics of non-Māori participants using technology

		Men	Women	Other income	Pension only
Use internet	No	115 (63.5)	144 (72.0)	175 (65.1)	82 (75.2)
	Yes	66 (36.5)	56 (28.0)	94 (34.9)	27 (24.8)
Use cell phone	No	84 (46.4)	107 (53.5)	134 (49.8)	55 (50.5)
	Yes	97 (53.6)	93 (46.5)	135 (50.2)	54 (49.5)
Watch pay-per-view TV	No	78 (43.1)	112 (56.3)*	124 (46.1)	65 (60.2)*
	Yes	103 (56.9)	87 (43.7)	145 (53.9)	43 (39.8)

\*Significant, unadjusted.

Table 4. Adjusted associations between health and cognition and technology use for non-Māori participants

		Lives alone	CHF	CLD	3MS score	Total
Use internet	No	137 (72.1)	49 (71.0)	70 (70.0)	91.0 (10.8)*	259 (68.0)
	Yes	53 (27.9)	20 (29.0)	30 (30.0)	94.7 (4.8)	122 (32.0)
Use cell phone	No	105 (55.3)	32 (46.4)	45 (45.0)	91.1 (9.9)	191 (50.1)
	Yes	85 (44.7)	37 (53.6)	55 (55.0)	93.2 (8.9)	190 (49.9)
Watch pay-per-view TV	No	115 (60.9)*	30 (43.5)	56 (56.0)	92.5 (7.5)	190 (50.0)
	Yes	74 (39.2)	39 (56.5)	44 (44.0)	91.8 (11.1)	190 (50.0)
Total		190 (49.9)	69 (18.1)	100 (26.5)	92.2 (9.5)	

\*Significant adjusted for age and sex and if pension was only income. Sd = standard deviation. Data are presented as *n* (%) unless otherwise stated. CHF, congestive heart failure; CLD, chronic lung disease; 3MS, Modified Mini-Mental State Examination.

## Discussion

The rates of technology use in this study are lower than that for the general population and are lowest for people who live alone, implying that this group may be missing the opportunity for

communication, health information and other benefits of technology use. Women had the lowest rates of technology use. Both Māori and non-Māori women were more likely to live alone and be supported only by the pension.<sup>11,12,13</sup> Older women who live alone are an easily identifiable group who

may benefit from more social and health engagement.

We found that Māori were less likely to use the internet or cell phones. This concurs with other research showing Māori are more likely to live in homes without telecommunications, including the internet.<sup>12</sup> In the 2013 socioeconomic indicators from The Ministry of Health, 69.4% of Māori males and 68.6% of Māori females had access to the internet. For non-Māori males, 84.3% had access to the internet as did 83.2% of non-Māori females.<sup>13</sup> This could be regarded positively as Māori may spend more time face-to-face with others because social and community activities are more important.

More than half of both Māori and non-Māori groups watched pay TV. Other studies conducted in New Zealand show that TV is still the preferred entertainment modality in New Zealand homes when participants come from a lower socioeconomic background. A study conducted by the Ministry of Culture and Heritage showed that 84% of non-Māori and 80% of Māori watched live TV.<sup>14</sup> Of people aged  $\geq 55$  years, 84% watched TV. We add that people of advanced age watch not just TV but pay-per-view TV to fulfil their entertainment needs.<sup>12</sup>

A Denmark study emphasised the utility of daily text messaging about medication reminders as well as requests for peak flow measurement and medication dosages. Text messaging was a convenient, reliable, cheap and secure way to increase adherence to asthma medications and help control asthma symptoms.<sup>15</sup> Text messaging is also successful in smoking cessation and mental health strategies.<sup>16</sup> The pathway to disparity in health outcomes for Māori is complex, and disparity in access to cell phones may represent lower access to such forms of health-care innovation. This may be confounded by socioeconomic inequalities.<sup>17, 18</sup> We found that the use of text messaging in a health-related context; for example, follow-up blood tests or peer-peer support, may not be feasible due to ethnic and age-related disparities in cell phone and internet use. However, if cell phones became more 'age friendly', such as having a larger screen and numbers and simpler icons, then this platform for monitoring of health conditions may be more relevant. Further work is needed before cell phone-based interventions can be used in the very elderly.

Furthermore, people whose only source of income is a government pension are less likely to be able to afford cell phones and internet, so they are less able to use them in a health-related context. Follow-up studies could look at implementing cell phone and computers in screening and management of health conditions for the very elderly.

Higher cognitive abilities predict successful outcomes in computer training,<sup>19</sup> and younger people are more likely to be using computers.<sup>20</sup> We show similar effects in the very old. Computer use presents special challenges to older adults, ranging from difficulties using the mouse due to psychomotor deficits, to problems finding specific computer icons due to executive and memory function that decline with age,<sup>21</sup> even though older adults are relying more on internet use. In our study, the internet was used by the minority of participants aged in their 80s. However, there is increasing evidence to support the 'use it or lose it' notion that remaining mentally active helps to preserve cognitive function. Therefore, promoting computer and internet use is important in the aging population, and older people might appreciate messages that the use of internet and cell phones can make hard or mobility-dependant tasks easier, that the technology is available 24/7, that it helps to maintain relationships and to ease depression and isolation and it may be able to make your 'voice' louder by contributing to polls and similar things.<sup>22-24</sup>

## Conclusion

This study adds to the literature on technology use by older people. Correlates of cell phone use differed between Māori and non-Māori. Careful thinking is needed before implementing health innovations reliant on cell phones for the very old. Trends in use of technology should be followed over time.

## Competing interests

The authors declare no potential, perceived or real conflicts of interest.

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