Centre for Primary Health Care and Equity

Central and Eastern Sydney Primary and Community Health Cohort/Linkage Resource

# Access to measures of multidisciplinary/integrated care for participants attending general practice and impact on health service utilisation

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## Snapshot for health services

The results of this research project into utilisation of multidisciplinary/integrated care measures in Central and Eastern Sydney (CES) provide insights to inform services planning. Key findings are summarised below.

1. **There has been an increased use of Chronic Disease Management (CDM) items over time (almost double the rate over the research project period), particularly for allied health (a four-fold increase) including podiatry and practice nurse items.**

    - The uptake of CDM items was 11% for the CES cohort aged 55 years and over in 2006 and by 2014, after adjusting for the ageing of the cohort, this had increased to 19%. The increase was less in the CES cohort compared to the wider New South Wales (NSW) cohort.
    - Use of GP Management Plan (GPMP)/Team Care Arrangement (TCA) review items has also increased over time to 11% in 2014. Those in the South Eastern Sydney area had a lower rate of use of GPMP/TCA compared to the Sydney area, consistent across all years and likely linked to socio-demographic and health characteristics.
    - The largest increase in use of CDM over time has been for the allied health items, rising from 4% of the CES cohort utilising these items in 2006 to 16% in 2014. The largest increase has been for podiatry items followed by practice nurse items. More than one in every four people aged over 85 years was accessing podiatry services in 2014.

2. **Generally, the use of GPMP/TCA items in the CES cohort has been consistent with the socio-demographic and health needs of those who have chronic and complex conditions.**

    - The use of GPMP/TCA items in the CES area was associated with higher socio-demographic and health need in general. However, the GPMP/TCA review items had relatively low rates of use and the link with socio-demographic and health need was less clear.
    - A higher proportion of people with a care plan accessed allied health (40%) and use of allied health items in this group was associated with higher socio-demographic need and poorer health status.

3. **There was no evidence that GPMP/TCAs by themselves were leading to a reduction in unplanned hospital admissions, but there were associations found between the use of allied health items and reduced hospital admissions.**

    - After controlling for confounding factors such as socio-demographic need, health risk, health status and health care utilization no significant difference was found between having claimed for a GPMP/TCA at baseline or having used one of the affiliated MBS items (such as a review or allied health) and emergency and/or potentially preventable hospitalisations (PPH) in the subsequent five years.
    - However, after again controlling for confounding factors such as socio-demographic need, health risk, health status and health care utilization cohort participants who accessed five or six allied health items at baseline had lower rates of both emergency admission and PPH compared to those who had not used allied health services. Use of the review item was very marginally associated with higher PPH but not emergency admissions. The relationship with reduced hospitalisation rate was stronger for physiotherapy than podiatry.

# Executive Summary


Background

The number of people, particularly older people living with chronic health conditions and disability, is increasing in the Australian population (Australian Institute of Health and Welfare, 2016). Health service providers are grappling with the increased burden on their services due to the ongoing demands of managing these conditions that frequently have complex care needs involving multiple health care providers in both the hospital and community settings (South Eastern Sydney Local Health District, 2015b).

The CDM program, previously the Enhanced Primary Care (EPS) scheme, was introduced to the Medicare Benefits Schedule (MBS) in 2005 to provide a more structured approach to managing patients with chronic conditions and complex care needs, including those requiring ongoing care from a multidisciplinary team of health care professionals (Australian Government Department of Health, 2017a).This represents a shift towards proactively managing and coordinating care across different settings which could be considered a 'measure of multidisciplinary/integrated care'. As such, these measures can provide insight into patterns of multidisciplinary/integrated care over time.

This research project seeks to address three broad research objectives:

1. Determine if access to multidisciplinary/integrated care has increased over time.
2. Determine the characteristics of patients more likely to receive multidisciplinary/integrated care.
3. Investigate whether increased access to multidisciplinary/integrated care is associated with reduced hospital admissions and emergency department visits.

Methods

This research project used the newly established CES Primary and Community Health Cohort/ Linkage Resource (CES-P&CH) based on the 45 and Up Study to identify a community-dwelling population in NSW.

The CES cohort was based on a participant's residence at baseline. Data from the 45 and Up Study were linked to MBS data for the period 2006-2014 by the Sax Institute using a unique identifier. Data for the same period were also linked to the Admitted Patient Data Collection, Emergency Department Data Collection and Deaths Registry via the NSW Centre for Health Record Linkage (CHeReL) using probabilistic techniques.

There were 264,732 participants within the NSW cohort including 30,645 within CES recruited between 2006 and 2009 (70% in 2008). For analyses that included continuity of care variables this was restricted to 2007-2014 to account for missing scrambled MBS provider number in the earlier years (CES adjusted sample = 26,291).

A range of statistical analyses were undertaken including time-series, descriptive cross-sectional, and multivariate methods such as logistic regression, and Cox Proportional Hazards regression.

Results

1. ***Increases in measures of multidisciplinary/integrated care over time***

Utilisation of care plans and team care arrangements within general practice in the CES cohort is increasing over time. In 2006 11% of the CES cohort aged 55 years and over utilised GP Management Plan/Team Care Arrangement (GPMP/TCA) Medicare items. By 2014, after adjusting for the ageing of the cohort, this had increased to 19% (almost double the rate). Age-specific rates within each calendar year show the fastest rate of increase over time is occurring within the older age groups. GPMPs and TCAs were more frequent among those with diabetes, followed by musculoskeletal and cardiovascular disease. Use of GPMP/TCA review items has also increased over time but has been consistently much lower at 11% in 2014.

The largest increase in use of CDM over time has been for the allied health items. Four per cent of the CES cohort utilised these items in 2006 rising to 16% in 2014 – a four-fold increase. The increase over time in the use of all the CDM Medicare items within the CES cohort has been slower than the increase observed at a NSW level and this difference in rate of increase has been diverging over time. Those within the South Eastern Sydney area of CES had a lower rate of CDM use compared to those within the Sydney area. This difference was consistent across all years of the research project and is likely linked to different socio-demographic and health characteristics of the populations. Unpacking the allied health items in more detail revealed that by far the largest increase in use over time has been for Podiatry items followed by the practice nurse items. Podiatry had the highest use within the oldest age groups with more than one in every four people aged over 85 years accessing podiatry services in 2014.

2. ***Characteristics associated with the use of measures of multidisciplinary/integrated care***

Approximately one in four people claimed for a GPMP/TCA item in the CES area during the baseline period (approximately 2008). In general, use of GPMP/TCA items in the CES area was associated with higher socio-demographic and health need. This is as would be expected for items aimed at the management of complex chronic conditions and suggests that the items are being used within the patient groups intended by the program. Within those who had a GPMP/TCA, less than one in three accessed a review item and there were few associations between patients' socio-demographic or health characteristics and the use of a GPMP/TCA review item. Bulk-billing status was related to use of review items, with those bulk-billed all the time or those bulk-billed most of the time more likely to have also been reviewed.

A higher proportion of people with a care plan accessed allied health (40%) and use of allied health items within this group was associated with higher socio-demographic need and poorer health status. Health insurance status was also associated with use of allied health, with those who had private health insurance but no extras coverage using these items most frequently and those with a Department of Veterans' Affairs (DVA) card using the items least frequently. Those with a DVA card would get access to allied health through the DVA scheme. This suggests that the program has been filling a need for those who do not have access to other means of support for private allied health. Overall the pattern of characteristics of those who claimed for a GPMP/TCA was similar for diabetics and those with depression/anxiety. However, there were

some differences. The profile of people with diabetes who used a care plan item was less linked to age and health status compared to those with depression/anxiety.

3. ***Is access to multidisciplinary/integrated care associated with reduced hospital admissions and emergency department visits?***

   After controlling for confounding factors such as socio-demographic need, health risk, health status and health care utilization no significant difference was found between having claimed for a GPMP/TCA at baseline or having used one of the affiliated MBS items (such as a review or allied health) and emergency and/or PPHs in the subsequent five years.

   However, after again controlling for confounding factors such as socio-demographic need, health risk, health status and health care utilization cohort participants who accessed five or six allied health items at baseline had lower rates of both emergency admission and PPH compared to those who had not used allied health services. Use of the review item was very marginally associated with higher PPH but not emergency admissions. The relationship with reduced hospitalisation rate was stronger for physiotherapy than podiatry. There were no major differences found in patterns of association of GPMP/TCA items with hospitalisation within the different chronic condition types.

<u>Conclusions and relevance to health service delivery</u>

The current research project highlights a number of trends and associations that will have relevance for planning health service delivery in the CES area. Over time there has been an increasing use of CDM items, particularly for allied health items such as podiatry as well as the practice nurse items. The increase has not been as large for the CES area compared to NSW as a whole. There may be differences in population structures underlying this (such as rate of increase of chronic conditions) but it may also be relevant to consider whether there are any systemic factors that prevent uptake of these items, for example lower rates of practice nurses.

Generally, the use of these items appeared targeted to a group whose profile of socio-demographic and health need was consistent with those who have chronic and complex conditions. However, the GPMP/TCA review items had relatively low rates of use and the link with socio-demographic and health need was less clear.

While it was difficult to test causal assumptions within this research project, there was no evidence that GPMPs/TCAs by themselves were leading to a reduction in unplanned hospital admissions. However, there were associations found between use of allied health items and reduced hospital admissions. This link may be due to a positive protective effect from more effective multidisciplinary management of chronic conditions or may reflect a difference in health status of those individuals seeking allied health care. Further research is needed to clarify this finding.

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# Abbreviations

| | |
|---|---|
| AIHW | Australian Institute of Health and Welfare |
| APDC | Admitted Patient Data Collection |
| BMI | Body Mass Index |
| CDM | Chronic Disease Management (formerly Enhanced Primary Care or EPC) |
| CES | Central and Eastern Sydney |
| CESPHN | Central and Eastern Sydney Primary Health Network |
| CES-P&CH | Central and Eastern Sydney Primary and Community Health Cohort/Linkage Resource |
| CHeReL | Centre for Health Record Linkage |
| DVA | Department of Veterans' Affairs |
| ED | emergency department |
| GP | General Practitioner |
| GPMP | General Practice Management Plan |
| K10 | Kessler 10 |
| LHD | Local Health District |
| MBS | Medicare Benefits Schedule |
| NHS | National Health Service |
| NSW | New South Wales |
| PHN | Primary Health Network |
| SESLHD | South Eastern Sydney Local Health District |
| SF36 | Short Form 36 |
| SLHD | Sydney Local Health District |
| TCA | Team Care Arrangement |

# Background

The number of people, particularly older people living with chronic health conditions and disability, is increasing in the Australian population (Australian Institute of Health and Welfare, 2016). Health service providers are grappling with the increased burden on their services due to the ongoing demands of managing these conditions that frequently have complex care needs involving multiple health care providers in both the hospital and community settings (South Eastern Sydney Local Health District, 2015a). Key to the development of care for these people is ensuring access to coordinated and integrated, cost effective services that are tailored to the needs of users and providers (New South Wales Government, 2016). An important component of service development is improving primary prevention and wellness programs to reduce the need for acute care services particularly unplanned emergency admissions (South Eastern Sydney Local Health District, 2015a). Health care reforms in recent years through the restructure of public health services to Local Health Districts (LHDs) and the formation of Primary Health Networks (PHNs), include provision of better integrated and coordinated health care as key components of their health care strategies (Australian Government Department of Health, 2016; South Eastern Sydney Local Health District, 2015a).

Primary and community-based health providers are integral to the treatment and ongoing management of nearly all chronic conditions (New South Wales Government, 2016).Ensuring primary and community-based services are well placed to provide this care has required changes in the ways that these services are provided, particularly in changes from episodic to ongoing care (South Eastern Sydney Local Health District, 2015b).The latter is challenging providers to improve communication, better integrate care provision between different parts of the health care system, and coordinate care provision between multiple disciplines (New South Wales Government, 2016). Communication and coordination with multiple treating health providers is time-consuming and not currently well-supported by information technology infrastructure such as shared electronic health records (O'Malley 2011). The process of high quality care planning and agreeing upon shared health goals with patients is also often time consuming and can not necessarily be achieved in one standard appointment (Harris and Zwar, 2007).

## Chronic Disease Management program Medicare items

To recognise and facilitate the effort required by a General Practitioner (GP) in planning ongoing care and coordinating a treatment team, the Enhanced Primary Care package was introduced into the Medicare Benefits Schedule (MBS) in 1999 with specific item numbers for GPs to undertake care planning and coordinate team care arrangements (Australian Government Department of Human Services, 2016). This scheme evolved into the Chronic Disease Management (CDM) program in 2005 and additional items have been added to support the inclusion of services provided by private allied health providers (2004) and nurse practitioners (2007) in providing team care to a patient with a chronic condition (Australian Government Department of Health, 2017b).

The CDM program has the aim to support the better management of those with chronic and terminal conditions within general practice. The addition of support for private allied health care in particular may improve the equity of access to this type of care – previously this would only have been available to those with private health insurance 'extras' cover or at considerable out of pocket cost (Australian Government Department of Health, 2017b).Through promoting planning of care, ongoing monitoring of complex conditions, and supporting additional allied health care, this suite of items within the MBS has the potential to positively impact patients with chronic conditions through

better symptom control and prevention of disease progression or complications arising (Harris, 2007). The anticipated flow-on effect would be to maintain the provision of care in the community setting for a longer time period and reduce the likelihood of more expensive hospitalisations – a benefit to the patient as well as the health care system (Harris and Zwar, 2007).

### Integrated care strategies in New South Wales

In NSW the Chronic Disease Management Program was established in 2010-11 as a state-wide program to improve care coordination and self-management for those people identified as being at risk of unplanned hospitalisation/emergency department (ED) use (NSW Agency for Clinical Innovation, 2017). The evaluation of the program found variation between and within LHDs in their models of care coordination and self-management (Billot, et al., 2016). Following the CDM program evaluation, a redesign process has been undertaken to align it with the NSW integrated care program, followed by the implementation of a state-wide model for local delivery (New South Wales Government, 2016b)

The NSW Government Integrated Care Strategy has been implemented in 2014-2017. It aims to develop a health system that people can navigate easily, enhancing experiences and outcomes for people by providing connected health services and continuity of care, and offer better value, avoiding duplication of services and tests, and unnecessary hospitalisations. Locally led integration and partnerships within LHDs, Specialty Health Networks (SHNs), government and non-government organisations, hospitals, primary care and community health services are central to the implementation of the strategy across the state (New South Wales Government, 2016b). Local implementation of integrated care has included the development of the South Eastern Sydney Local Health District (SESLHD) Integrated Strategy in 2015, which uses the National Health Service (NHS) England House of Care model placing person centred and personalised care planning at the core in supporting integrated care (South Eastern Sydney Local Health District, 2015b). People with diabetes and older people with complex needs are focus populations for the implementation of the strategy (South Eastern Sydney Local Health District, 2015b).

### Local use of Medicare items

Within the local setting, understanding how the CDM Medicare items are being used may provide insight into the level of uptake of multidisciplinary/integrated care. A key aim of the CDM program is to provide a more structured approach to managing patients with chronic conditions as well as complex care needs – this includes the coordination of care amongst a team of health care professionals. While not addressing directly the integration of care between primary and secondary care settings, it does represent a shift towards proactively managing and coordinating care across different settings which could be considered a 'measure of multidisciplinary/integrated care' (Harris and Zwar, 2007).

However, very little is known about the utilisation of the items supported within the CDM program in the Central and Eastern Sydney (CES) area. Have they been well utilised? Are they being used for the right patients? And has there been any impact on health outcomes or hospitalisations? The 45 and Up Study provides a unique opportunity to examine such questions at a local area level within NSW. It provides a large community-dwelling sample of participants which has been found to be generally representative of the population (Banks et al., 2008).

This research project seeks to address three broad research objectives:

1. Determine if access to multidisciplinary/integrated care has increased over time
2. Determine the characteristics of patients more likely to receive multidisciplinary/integrated care
3. Investigate whether increased access to multidisciplinary/integrated care leads to reduced hospital admissions and emergency department visits.

Each of these will be addressed using the 45 and Up Study as the base for selecting a CES cohort and linking survey data for these participants to Medicare and hospital data where appropriate. Ethical Approval was granted for this research project by the NSW Population and Health Services Research Ethics Committee (Ref # 2016/06/642). The overall conduct of the 45 and Up Study was approved by the University of New South Wales Human Research Ethics Committee (HREC).

## General Methods

This research project used the newly established CES Primary and Community Health Data Linkage Resource based on the 45 and Up Study to identify a community-dwelling population in NSW.

### The 45 and Up Study

The Sax Institute's 45 and Up Study comprises more than 250,000 residents of NSW, Australia. Details of the recruitment of this cohort have been described previously ((Banks et al., 2008). Potential Study participants aged 45 years or older in NSW were randomly sampled from the Department of Human Services (formerly Medicare Australia) enrolment database. They were sent an invitation to participate, a description of the Study, a self-administered questionnaire, and a consent form. Participants joined the Study by completing the baseline questionnaire and providing consent for long-term follow up, including linkage of their questionnaire data to health records being collected by public health authorities. Recruitment occurred between 2006 and 2009, with 70% of the sample being recruited in 2008. The baseline questionnaire collected information on a range of participant characteristics (available at https://www.saxinstitute.org.au/our-work/45-up-study/questionnaires/). The response rate was 18% and participants included about 11% of the NSW population aged 45 years and over. Because of the low response rate the prevalence of characteristics or incidence of events in 45 and Up Study participants are not representative of corresponding statistics in the NSW or Australian populations of the same age range. However, the parameters for associations between two 45 and Up Study variables or between one 45 and Up Study variable and a data item from a linked data set are likely to be representative of the wider population. MBS data were supplied by the Australian Government Department of Human Services and deterministically linked to the 45 and Up Study baseline data using a unique identifier. The remaining datasets were probabilistically linked by the NSW Centre for Health Record Linkage (CHeReL), with quality audits showing fewer than 0.5% false positive links (see details of procedures at http://www.cherel.org.au/).

### Sample

The 45 and Up Study sample formed the basis of a NSW community-dwelling cohort for this research project. Two additional sub cohorts were identified for this research project:

- *CES cohort*: Participants who resided within the CES region at baseline. This area is serviced by two LHDs, Sydney (SLHD) and South East Sydney (SESLHD) which together comprise the area of the Central and Eastern Sydney Primary Health Network (CESPHN).
- *Other metropolitan cohort:* A second group was used for comparison with the rest of NSW and included other metropolitan areas of Sydney based on metropolitan Primary Health Network boundaries (Northern Sydney, Western Sydney, South Western Sydney and Nepean Blue Mountains).

The CES cohort and other metropolitan cohorts were identified within the broader NSW cohort based on a participant's residence at baseline. Data from the 45 and Up Study were linked to MBS data for the period 2006-2014 by the Sax Institute using a unique identifier. Data were also linked to the Admitted Patient Data Collection (APDC), Emergency Department Data Collection and Deaths Registry via the NSW CHeReL using probabilistic techniques. Participants were excluded only if possible data linkage errors were identified or missing/out of range data were present on key variables such as recruitment date or age. As shown in Table 1 there were 264,732 participants within the NSW cohort including 30,645 within the CES cohort.

For all analyses in Parts 2 and 3 that required use of the scrambled MBS provider number, the cohort was further restricted to only those recruited from 2007 onwards to allow calculation of these variables (such as continuity of care) at baseline. Prior to 2006 the scrambled provider number was incomplete in the dataset making calculation of these variables for those recruited in 2006 difficult for the two-year baseline window required. Participants were also excluded if they died within one year of recruitment to the research project. Also, as shown in Table 1 there were 26,291 participants within the CES cohort with complete data who were included in the analysis for Parts 2 and 3.

**Table 1: Sample exclusions**

| Sample characteristics | NSW | CES | SES | Sydney |
|---|---|---|---|---|
| **Missing or out of range data on age or enrolment variable** | 7 | 0 | 0 | 0 |
| **Likely data linkage error** | 104 | 11 | 8 | <5 |
| **Died within 1 year of recruitment** | 2,100 | 271 | 188 | 83 |
| **Recruited prior to 2007 (incomplete MBS data)** | | 4,072 | | |
| Total sample at baseline* | **266,943** | **30,645** | **20,337** | **10,308** |
| **Total exclusions** | | 4,354 | | |
| Sample remaining for analysis in parts 2 and 3 | | **26,291** | | |

**As at Nov 2016 when the data were received – this excludes any participants who withdrew their consent prior to this date.*

## Measures

Participant characteristics were grouped into four main categories: socio-demographic; health risk factors; health status; and health care utilisation. Table 2 provides the definitions of these variables. The outcome measures for Parts 1 and 2 were based on particular MBS items which represented measures of integrated/multidisciplinary care. The MBS measures of interest are defined in Table 3.

**Table 2: Participant characteristics – definitions and data sources**

| Domain | Characteristic | Data source | Description |
|---|---|---|---|
| Socio-Demographic | Age group | 45 and Up Study Baseline | Self-reported age at baseline |
| | Gender | 45 and Up Study Baseline | Self-reported sex |
| | Language other than English | 45 and Up Study Baseline | Whether a participant speaks a language other than English at home (yes or no) |
| | Country of birth | 45 and Up Study Baseline | Self-reported country of birth categorised as Australia or overseas |
| | Highest qualification | 45 and Up Study Baseline | Self-reported highest level of educational qualification – categorised as less than year 12; year 12; trade/diploma; university or higher |
| | Household income | 45 and Up Study Baseline | Self-reported household income category |
| | Work status | 45 and Up Study Baseline | Working status at baseline: not working; working part-time; working full-time |
| | Housing type | 45 and Up Study Baseline | Current housing type grouped as: house; flat/unit; nursing home/ residential aged care; other (including mobile home) |
| | Private health insurance | 45 and Up Study Baseline | Private health status at baseline, grouped as: none (no private health, DVA or health care card; private health with extras; private health without extras; DVA only; health care card only |
| Health Risk Factor | Smoking Status | 45 and Up Study Baseline | Smoking status at baseline: non-smoker; ex-smoker; current smoker |
| | Adequate physical activity | 45 and Up Study Baseline | Based on the amount of moderate and vigorous exercise reported: yes (adequate) – see Australian Institute of Health and Welfare (AIHW) definition; no (not adequate) |
| | Adequate fruit/vegetable consumption | 45 and Up Study Baseline | Based on self-reported fruit and vegetable consumption; yes (adequate) – at least 5 serves of vegetables and 2 serves of fruit; no (not adequate) |
| | Weekly alcohol intake | 45 and Up Study Baseline | Based on self-reported number of standard drinks each week, categorised as zero; low (<=14 drinks per week); high (>14 drinks per week) |
| | Body Mass Index (BMI) category | 45 and Up Study Baseline | Based on self-reported height and weight. Categorised as underweight (<20); normal weight (20-25); overweight (25-30); obese (>30) |
| | Treatment for high blood pressure | 45 and Up Study Baseline | Self-reported as currently taking treatment for high blood pressure (yes or no) |
| | Treatment for high cholesterol | 45 and Up Study Baseline | Self-reported as currently taking treatment for high cholesterol (yes or no) |

| Domain | Characteristic | Data source | Description |
|---|---|---|---|
| Health Status | Physical functioning | 45 and Up Study Baseline | Based on the Short Form 36 (SF36) standard categories |
| | Psychological distress | 45 and Up Study Baseline | Based on the Kessler 10 (K10) standard categories |
| | Self-rated Good Health | 45 and Up Study Baseline | Based on the Short Form 1 (SF1) – classified as yes if responded as good, very good or excellent |
| | Self-rated good quality of life | 45 and Up Study Baseline | Based on self-rated quality of life question – classified as yes if responded as good; very good or excellent |
| | Number of chronic conditions | 45 and Up Study Baseline | Based on self-reported diagnoses for up to six chronic diseases. These conditions were classified as: diabetes; cardiovascular disease; depression/anxiety; musculoskeletal (arthritis and osteoarthritis); asthma; and cancer. |
| | Needs help for a disability | 45 and Up Study Baseline | Do you regularly need help with daily tasks because of long-term illness or disability? (yes or no) |
| | Reported a fall in the last 12 months | 45 and Up Study Baseline | Self-reported (yes or no) |
| Health care utilisation | Average number of GP visits per annum | MBS | Calculated across a 2-year period +/-1 year from date of recruitment. Only standard GP consultations included. |
| | Continuity of care with - provider | MBS | Calculated across a 2-year period +/-1 year from date of recruitment. Only standard GP consultations included. Based on the Usual Provider Index (UPI) using scrambled provider number – a participant was classified as having continuity of care if 75% or more of their visits were with the same provider. Those with less than 4 visits within this period were classified as “infrequent GP visits”. |
| | Hospitalised at baseline | APDC | Calculated across a 2-year period +/-1 year from date of recruitment. Classified as “yes” if any hospitalisation in this period. |
| | Saw a specialist at baseline | MBS | Calculated across a 2-year period +/-1 year from date of recruitment. Classified as “yes” if any specialist item in this period. |

Two main outcome measures were investigated within Part 3 to represent unplanned hospital admissions or hospital admissions that could potentially have been avoided through proactive management of chronic conditions: potentially preventable hospitable admission; and emergency department visit that led to a hospital admission (emergency admission). The definition of potentially preventable hospital admission is described elsewhere (Australian Institute of Health and Welfare, 2017).

**Table 3**: **Measures of multidisciplinary/integrated care – definitions and restrictions**

| Measure | MBS Item Number | Item Name | Intent | Restrictions |
|---|---|---|---|---|
| GPMP | 721 | Preparation of a General Practice Management Plan | To provide structured management for patients with a chronic medical condition or terminal illness.<br><br>[Current rebate 75% = 108.25] | Must have a chronic medical condition or terminal illness of 6 months or more duration.<br><br>Minimum claim period 12 months. |
| TCA | 723 | Coordination of Team Care Arrangements | To coordinate multidisciplinary care for a patient with a chronic medical condition/terminal illness who also has complex care needs.<br><br>[Current rebate 75% = 85.75] | Must have a chronic condition/terminal illness and complex care needs. In most cases a patient will already have a GPMP in place. Minimum claim period of 12 months. |
| GPMP/TCA review | 732 | Review of a GPMP or TCA | To review progress of patient and appropriateness of the GPMP and/or TCA.<br><br>[Current rebate 75% = 54.05] | Must have a GPMP and/or TCA in place. Minimum claim period 3 months. |
| Allied health | 10950-10970 | Allied health items | Access to MBS subsidised private allied health services including: podiatry; physiotherapy; chiropractor; dietitian; audiologist; speech therapist.<br><br>[Current rebate 85% = $52.95] | Must have a TCA in place or a multidisciplinary care plan prepared by a Residential Aged Care Facility with a GP contributing.<br><br>Limited to 5 claims per calendar year. |
| Practice Nurse | 10997 | Practice Nurse Monitoring | Access to MBS subsidised monitoring and support services by a nurse Practitioner or Aboriginal health practitioner on behalf of a GP.<br><br>[Current rebate 100% = $12] | Must have a GPMP or TCA in place.<br><br>Limited to 5 claims per calendar year (in addition to allied health services). |

*NOTE: Rebates current at June 2017*

Statistical analyses

Statistical analyses are outlined within Parts 1-3 of this report. All analyses were undertaken using SAS statistical software version 9.4. Statistical analyses included time-series, descriptive cross-sectional and multivariate methods such as logistic regression, and Cox Proportional Hazards regression.

# Part 1: Determine if access to multidisciplinary/integrated care has increased over time

## 1.1 Aim

The aim of this section is to examine rates of utilisation of measures of multidisciplinary/integrated care funded under the MBS CDM scheme within the CES area over the period 2006-2014. Specifically, it seeks to address the following questions:

- What proportion of those within the CES area claimed the MBS items GPMP/TCA; review of GPMP/TCA or affiliated allied health care items in the period 2006-2014?
- Have these proportions increased over time?
- How does the utilisation within CES cohort compare to NSW as a whole?
- Does utilisation of these items vary by chronic disease type?

## 1.2 Statistical Analyses

This was a time-series analysis measuring utilisation rates of the multidisciplinary/integrated care items within each calendar year for the period 2006-2014.

The population that could potentially access each measure within a calendar year (population at risk) was defined as all participants who were alive for the whole calendar year. Participants were deemed to have accessed an individual measure (population experiencing event) if they had at least one item claimed within a calendar year. Crude rates were calculated as percentages i.e. (population experiencing event/population at risk)*100.

Age-adjusted rates were calculated using direct standardisation based on the age structure of the NSW cohort in 2006 as the standard population. In order to account for the fact that the population would transition out of the younger age groups over time, the analysis was restricted to those aged 55 years and over within each calendar year.

## 1.3 Results

### *Use of multidisciplinary/ integrated care over time in the CES area*

The change in patterns of claims for use of GPMP/TCAs and affiliated allied health/practice nurse monitoring are summarised in Figure 1. The proportion of 45 and Up Study participants aged 55 years and older with a claim for one or more of these items have increased between 2006 and 2014 in the CES area.

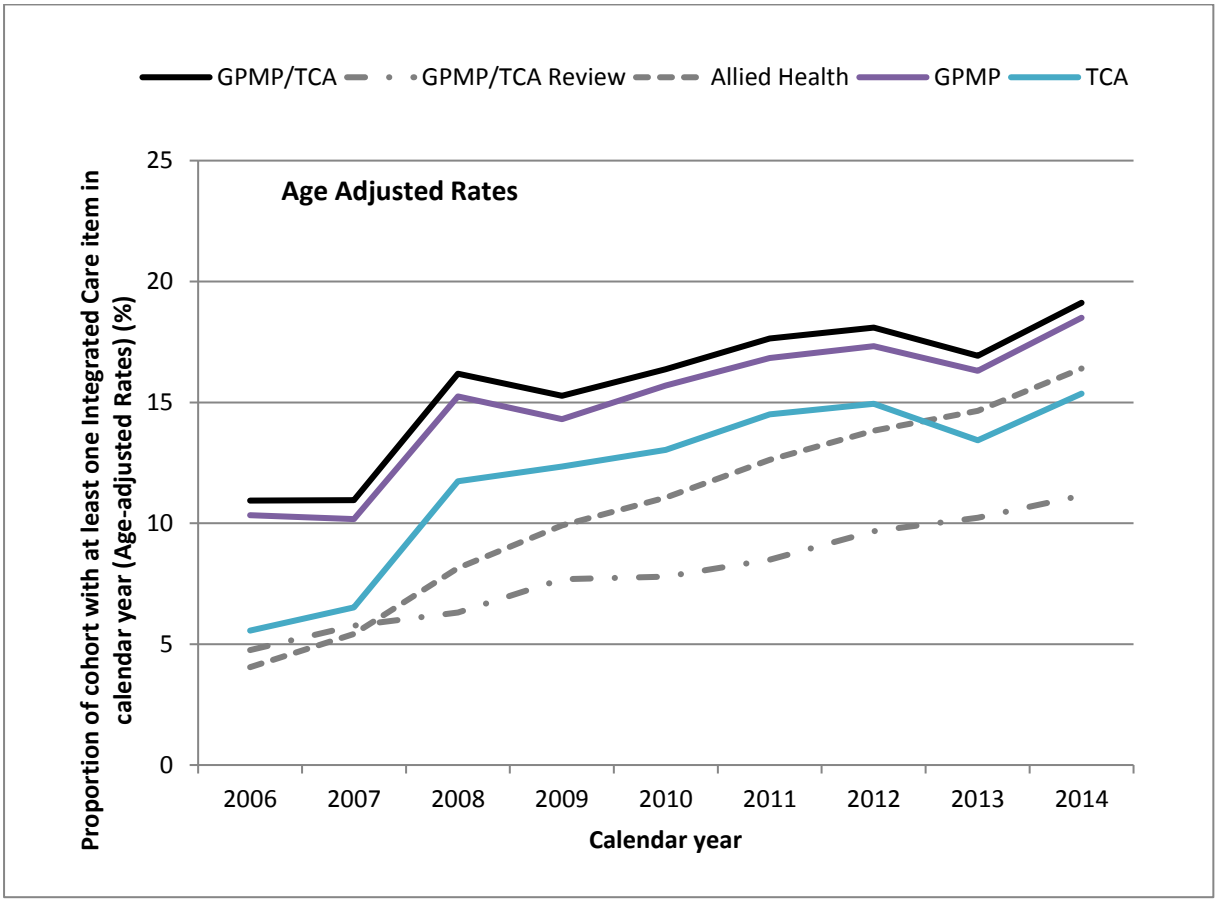
GPMP review items have had consistently much lower utilisation than those items for preparation of a GPMP/TCA.

- 10.9% in 2006 increasing to 19.1% in 2014 for preparation of a GPMP/TCA.
- 4.8% in 2006 increasing to 11.1% in 2014 for a review of a GPMP/TCA.

Use of the allied health items has increased at the greatest rate over time.

- 4.0% claimed allied health care items in 2006 increasing to 16.4% in 2014 - a four-fold increase even after adjusting for the ageing of the cohort.

**FIGURE 1: PROPORTION OF 45 AND UP STUDY PARTICIPANTS AGED 55 YEARS AND OVER RESIDING IN CES AREA AT BASELINE WITH AT LEAST ONE MULTIDISCIPLINARY/INTEGRATED CARE ITEM BY CALENDAR YEAR (2006-2014) BY TYPE OF MEDICARE ITEM (AGE ADJUSTED RATES)**




### *Utilisation of multidisciplinary/ integrated care items in the CES area compared to NSW*

The rate of use of CDM Medicare items within the CES area for those aged 55 years and over was similar to that of NSW in 2006 for both GPMP/TCA items and allied health items (Figures 2 and 4) .

- In 2006, 10.9% of CES participants claimed for a GPMP/TCA compared to 11.3% in NSW (RR = 0.97; 95%CI: 0.93-1.01).
- In 2006, 4.0% of CES participants claimed for an allied health item compared to 4.1% in NSW (RR =0.98; 95% CI: 0.91-1.05).

The use of GPMP/TCA review items was slightly higher in NSW compared to CES in 2006 (Figure 3).

- In 2006, 4.8% of CES participants claimed for a GPMP Review compared to 5.9% in NSW (RR =0.81; 95% CI: 0.75-0.86).

While use of these items in CES has increased over time, the increase has been at a faster rate in NSW compared to CES for all items. In 2014, the use of GPMP/TCA, allied health, and GPMP/TCA review items were significantly lower in CES compared to NSW.

- In 2014, 19.1 % of CES participants claimed for a GPMP/TCA compared to 22.4% in NSW (RR = 0.85; 95% CI: 0.83-0.89) (Figure 2).

- In 2014, 11.1 % of CES participants claimed for a GPMP/TCA Review compared to 16.0% in NSW (RR = 0.70; 95% CI:0.67-0.72) (Figure 3).
- In 2014, 16.4% of CES participants claimed for an allied health item compared to 20.8% in NSW (RR = 0.79; 95% CI:0.76-0.82) (Figure 4).

**Figure 2: PROPORTION OF 45 AND UP STUDY PARTICIPANTS AGED 55 YEARS AND OVER WITH AT LEAST ONE GPMP/TCA ITEM IN A CALENDAR YEAR (2006-2014) BY AREA OF RESIDENCE AT BASELINE (AGE ADJUSTED RATES)**

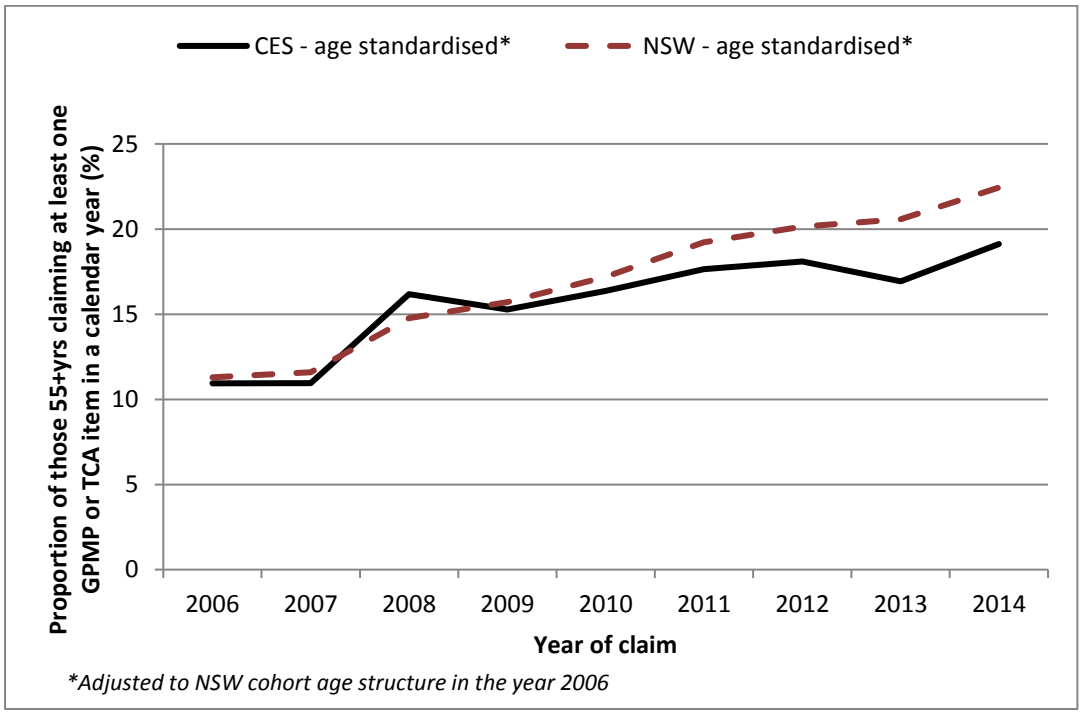



**Figure 3: PROPORTION WITH AT LEAST ONE GPMP/TCA REVIEW ITEM IN A CALENDAR YEAR BY AREA OF RESIDENCE AT BASELINE (CRUDE AND ADJUSTED RATES)**

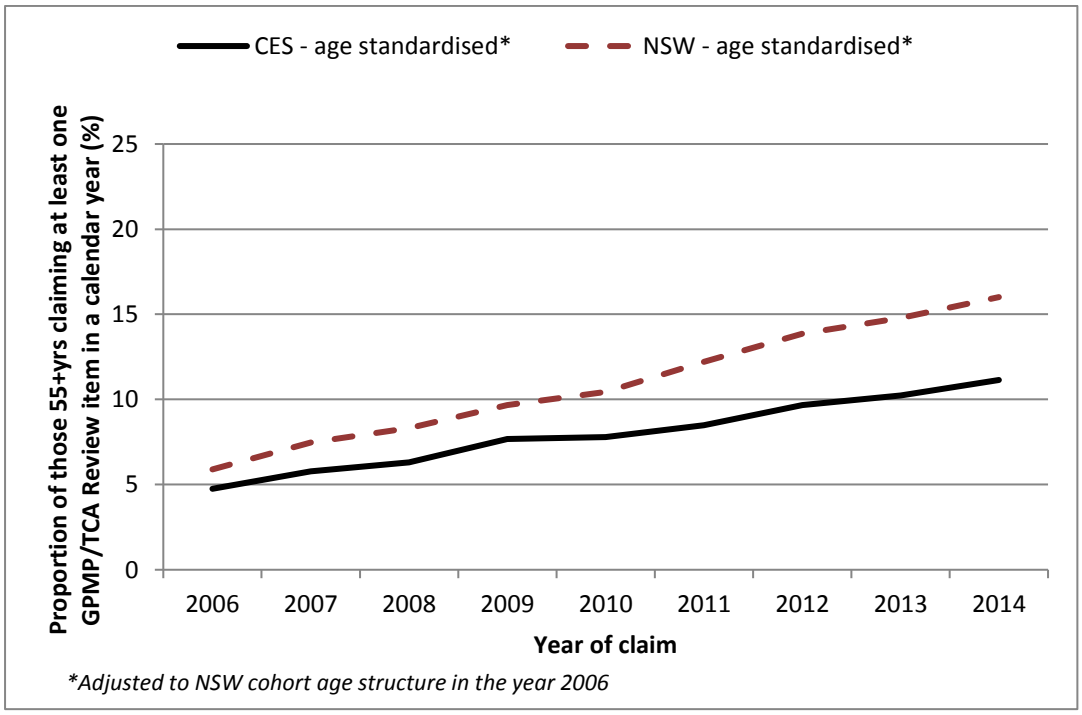


**Figure 4: PROPORTION WITH AT LEAST ONE ALLIED HEALTH ITEM IN A CALENDAR YEAR BY AREA OF RESIDENCE AT BASELINE (AGE ADJUSTED RATES)**

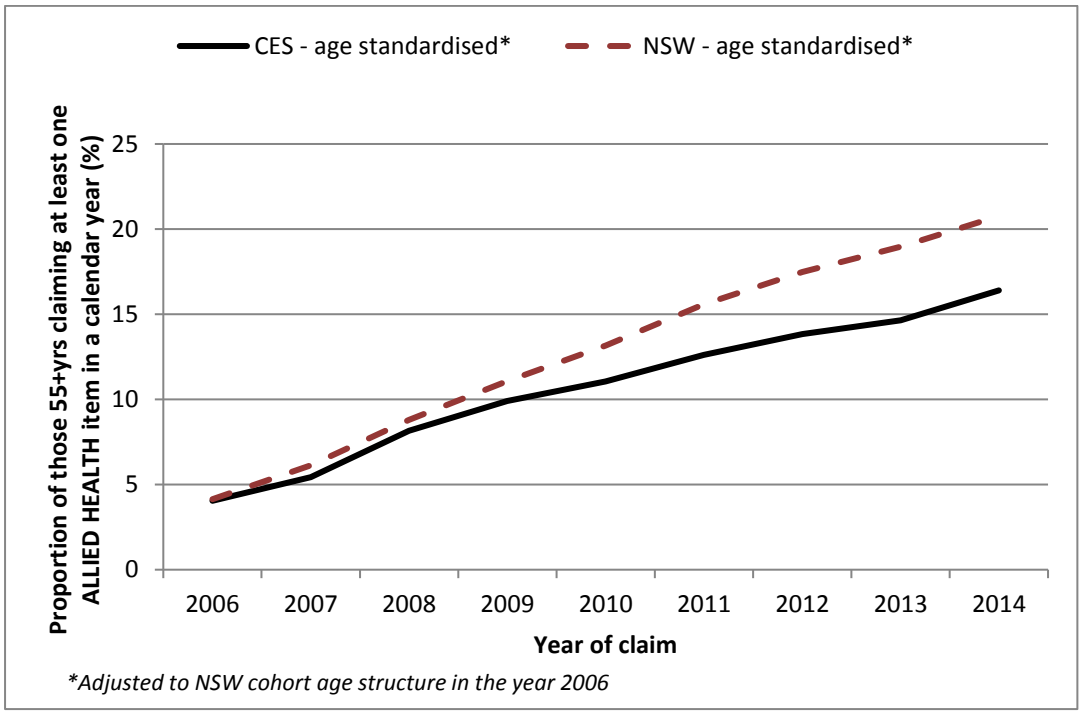



Figure 5 provides two further comparisons of GPMP/TCA utilisation:

a) CES compared to other metropolitan Sydney areas and then

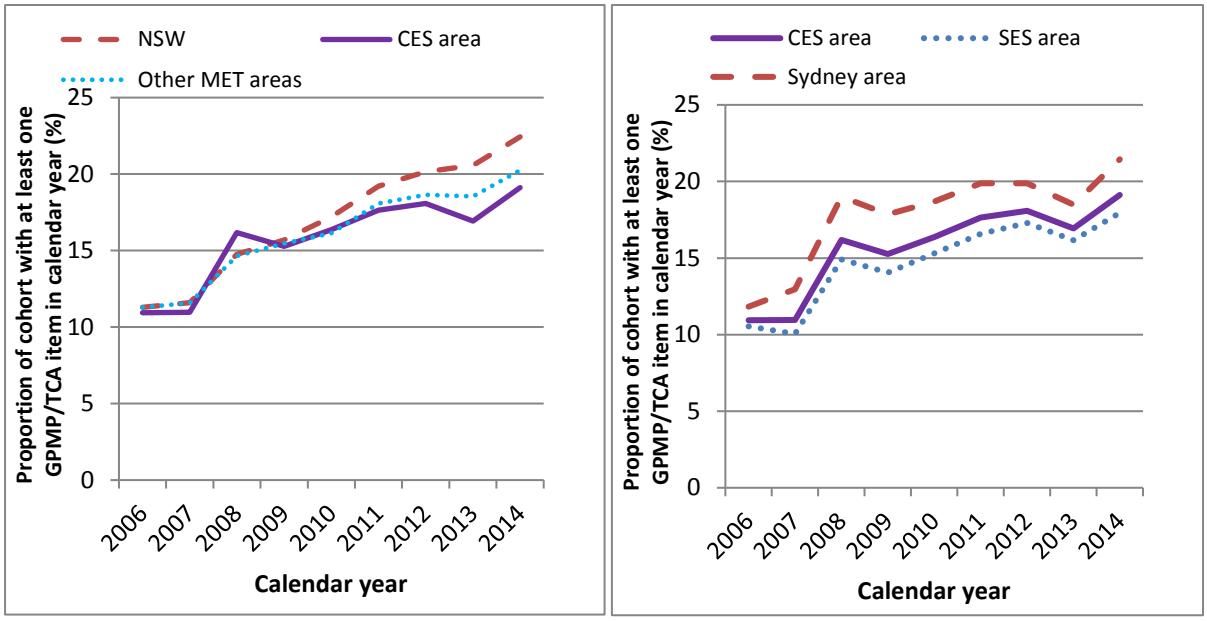
b) within the CES area the difference in utilisation between the "Sydney" area and the "South Eastern Sydney" area.

Utilisation of the GPMP/TCA items is higher in other metropolitan areas compared to the CES area but these areas in turn are lower have a lower rate of use compared to NSW as a whole. Within the CES area, there is a higher rate of use of these items in the Sydney area compared to South Eastern Sydney area. The pattern of increase over time is consistent between these two areas.

It is highly likely that many of these differences are explained by differences in socio-demographic and health need within different geographic areas, and the factors that influence the use of these items will be explored further in Part 2 of this report.

**Figure 5: PROPORTION OF 45 AND UP STUDY PARTICIPANTS AGED 55 YEARS OR OLDER WITH AT LEAST ONE GPMP/TCA ITEM IN A CALENDAR YEAR BY AREA OF RESIDENCE AT BASELINE (AGE-ADJUSTED RATES)**

**A)** CES COMPARED TO OTHER METROPOLITAN AREAS[1] AND NSW **B)** SESLHD COMPARED TO SLHD AREA

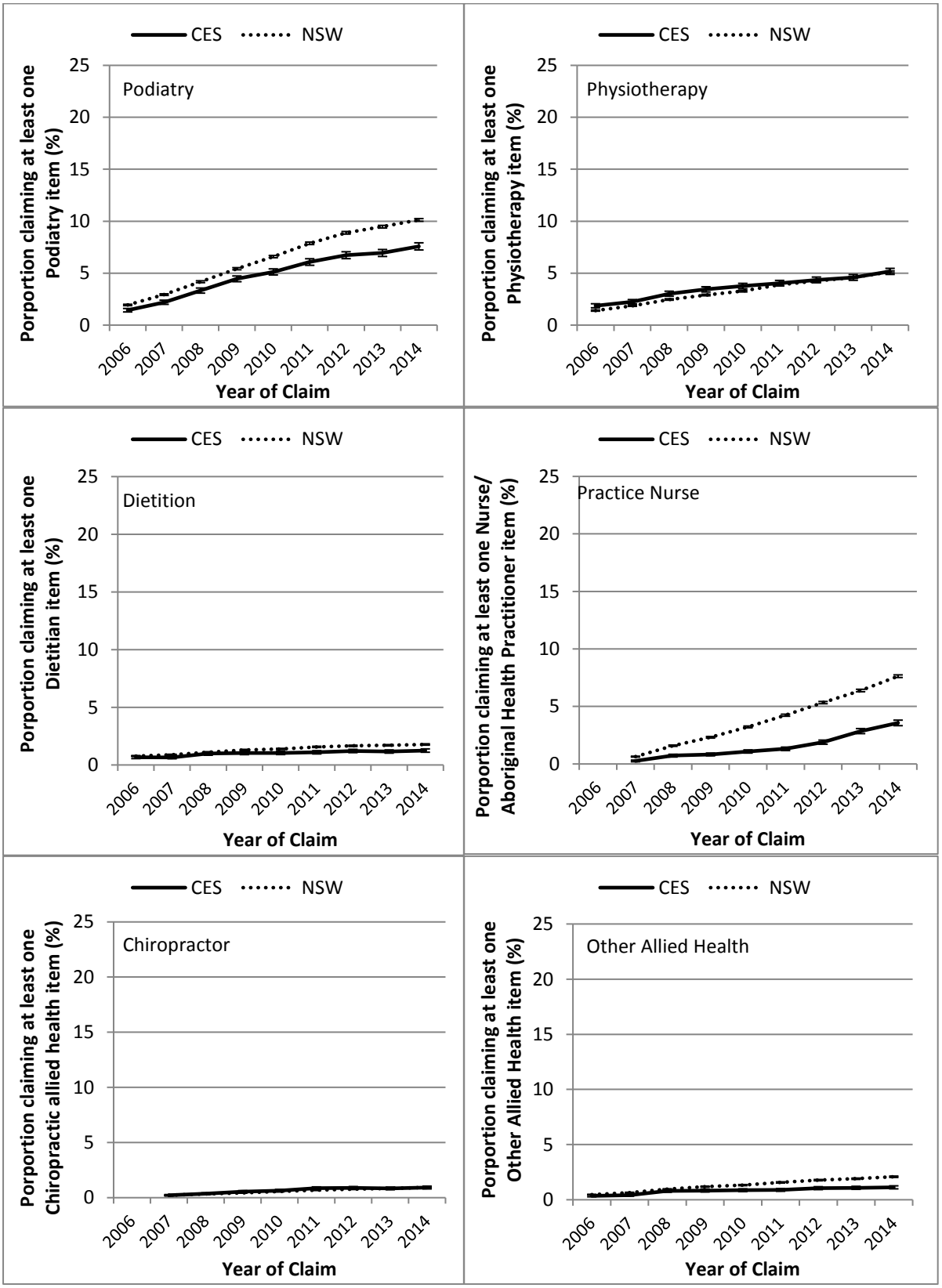



**adjusted to the NSW cohort age structure in the year 2006 based on year of birth*

Figure 6 presents utilisation rates of the CDM allied health items in more detail. This shows that the differences in utilisation between CES and NSW are more marked for certain allied health disciplines. For example, the use of podiatry services has been increasing rapidly for both CES and NSW, but the increase has been more rapid in NSW as a whole compared to CES. Similarly, the use of the nurse practitioner/ Aboriginal health practitioner items have increased rapidly within NSW since 2006, however this increase was slower in the CES area initially with a faster increase since 2011. Conversely, the use of physiotherapy items was slightly higher in the CES area in 2006 compared to NSW but by 2014, utilisation rates were similar in CES and NSW.

[1] Includes all other PHN areas classified as metropolitan: Norther Sydney; South Western Sydney; Western Sydney; and Nepean Blue Mountains

**Figure 6: AGE-STANDARDISED PROPORTION OF 45 AND UP STUDY PARTICIPANTS AGED 55 YEARS AND OVER CLAIMING AT LEAST ONE ALLIED HEALTH ITEM IN A CALENDAR YEAR BY AREA OF RESIDENCE AT BASELINE, YEAR OF CLAIM AND TYPE OF ALLIED HEALTH**




** Standardised to the population structure of the NSW 45 and Up Study cohort in the year 2006*

### *Age-specific rates of use of multidisciplinary/integrated care items*

Figures 7-9 present age-specific utilisation rates for GPMP/TCA, GPMP review and allied health items. In general, use of all of these items increases with age, with a small drop-off in use in the oldest age group (over 85 years). This drop-off in use among those aged over 85 years is most noticeable for the GPMP/TCA items and GPMP review item but less so for the allied health items. This may be explained in part because GPMP/TCA and GPMP review items are not used for residents within the residential aged care setting, whereas these residents may still gain access to the allied health items through multidisciplinary care plan prepared by a residential aged care service with input from a GP (billed under a different item number).

**Figure 7: Proportion of 45 and Up Study participants residing in CES area at baseline with at least one GPMP/TCA item in a calendar year by age group within each calendar year (2006-2014)**

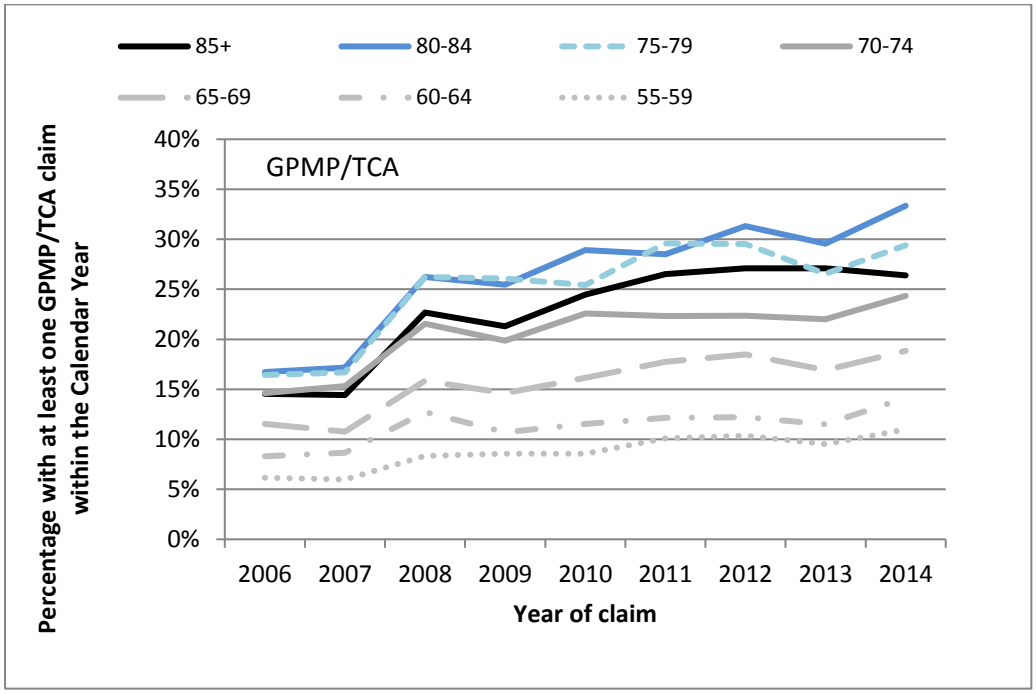



**Figure 8: Proportion of 45 and Up Study participants aged 55 years and over residing in CES area at baseline with at least one GPMP/TCA REVIEW item in a calendar year by age group within each calendar year (2006-2014)**

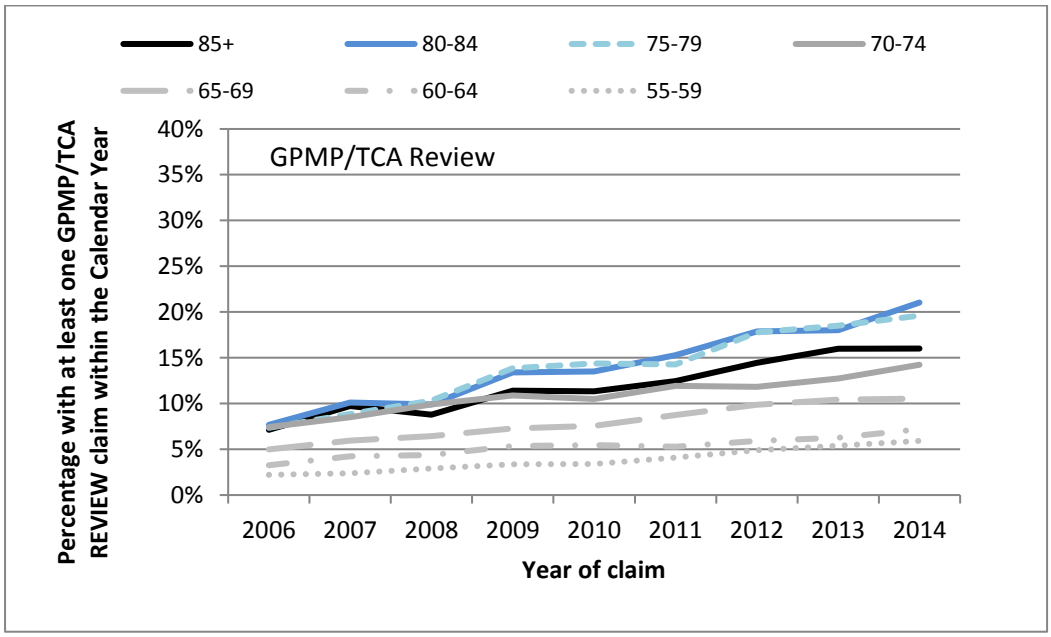
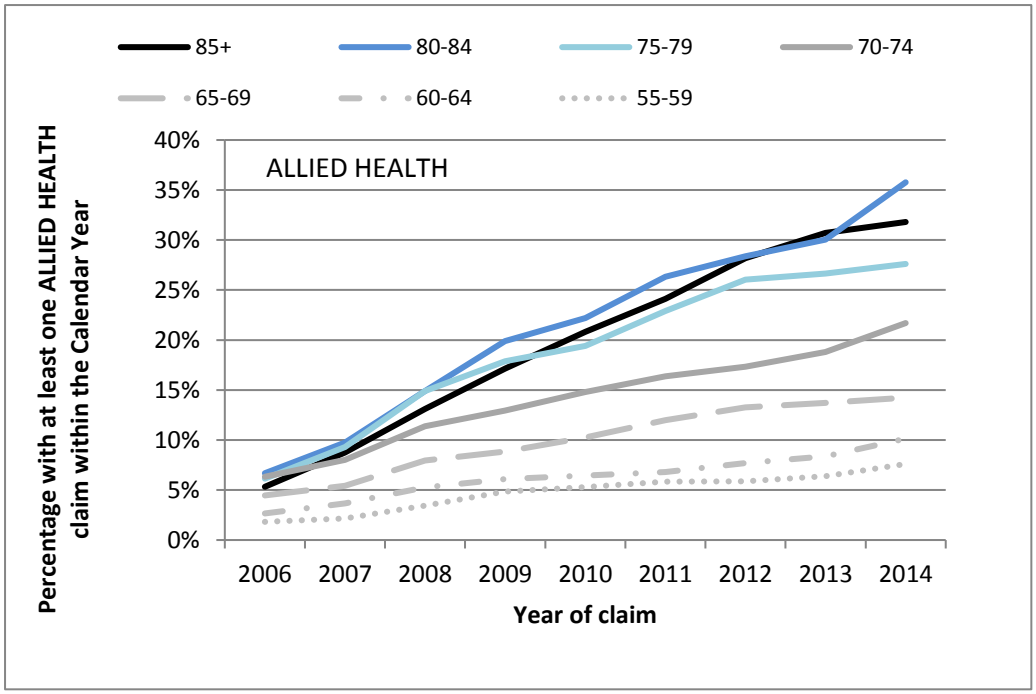


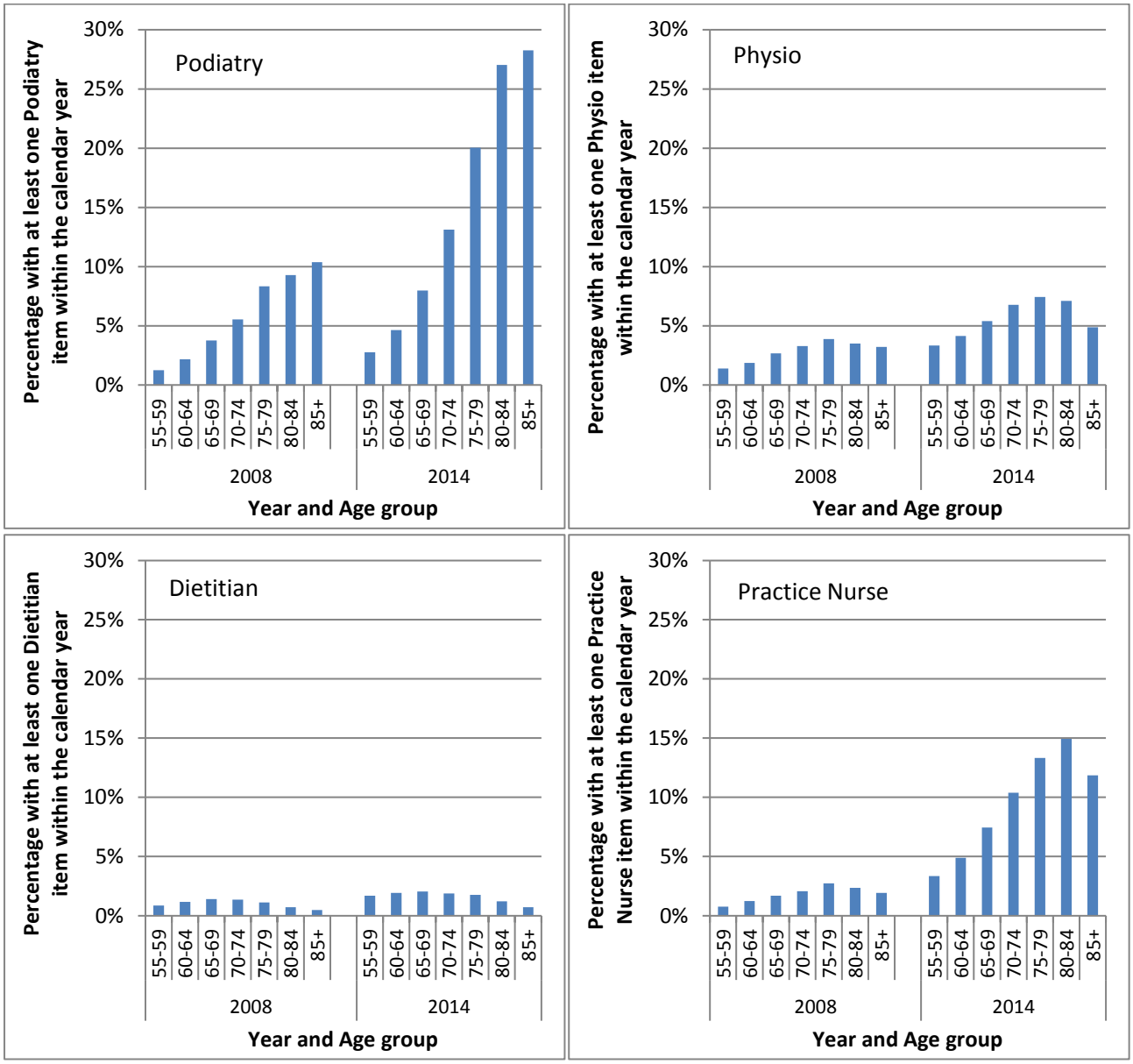
**Figure 9: PROPORTION OF 45 AND UP STUDY PARTICIPANTS AGED 55 YEARS AND OVER RESIDING IN CES AREA AT BASELINE WITH AT LEAST ONE ALLIED HEALTH ITEM IN A CALENDAR YEAR BY AGE GROUP WITHIN EACH CALENDAR YEAR (2006-2014)**




A link between age and increase in rate of utilisation of these items existed for the allied health items with the greatest increase in use of these items in the older age groups. For example, use of allied health items increased from 6.7% of all 80-84 year olds in CES in 2006 to 35.8% of all 80-84 year olds in 2014 – a 435% increase. This compares to an increase from 1.8% to 7.6% among 55-59 year olds, a 318% increase (Figure 9).

Figure 10 explores the differences in age groups utilising four of the most commonly utilised allied health items. This is based on the whole NSW cohort to allow a more reliable break-down by age-group for these smaller groupings. This shows some clear differences with the oldest participants utilising podiatry more commonly, whereas physiotherapy and nurse practitioner items were more common amongst those 75-84 years and dietitian items were more common amongst those aged 60-74 years.

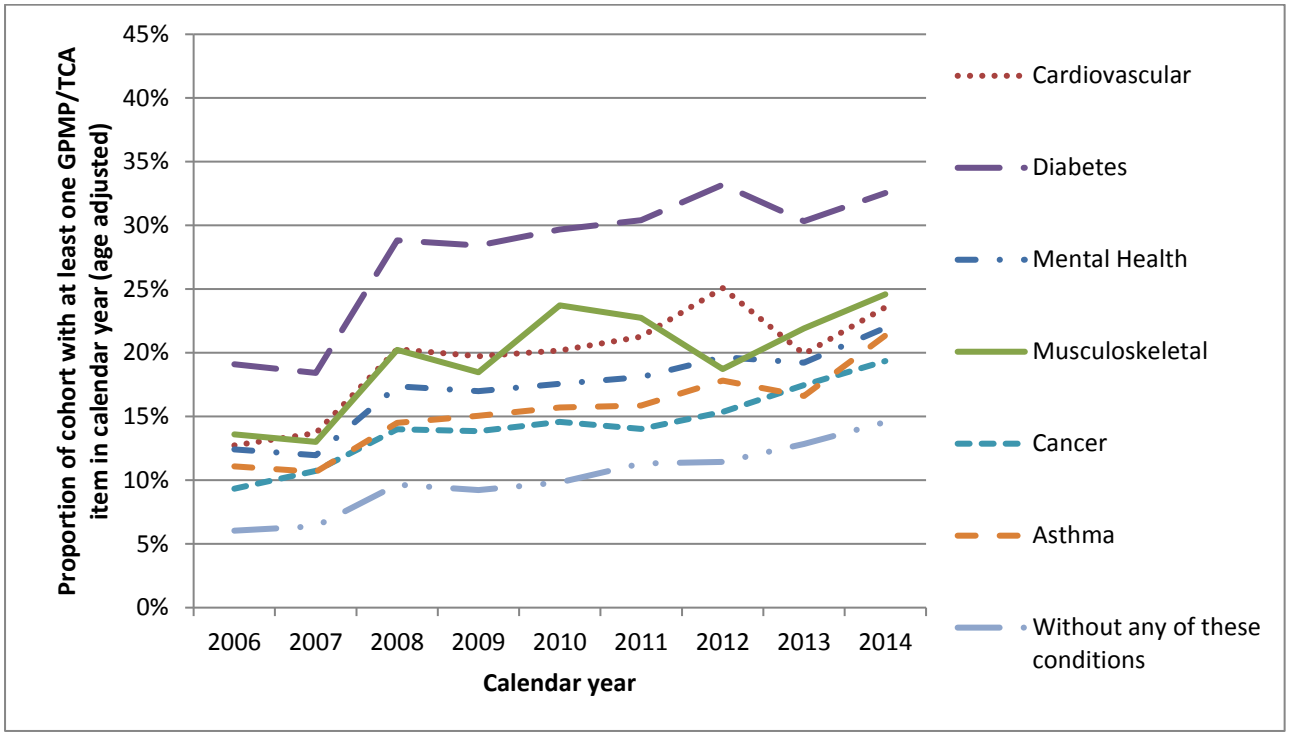
**Figure 10: PROPORTION OF 45 AND UP STUDY PARTICIPANTS AGED 55 YEARS AND OVER RESIDING IN NSW WITH AT LEAST ONE ALLIED HEALTH ITEM IN A CALENDAR YEAR (2008 COMPARED TO 2014) BY AGE GROUP WITHIN EACH CALENDAR YEAR BY ITEM NUMBER, FOR PODIATRY, PHYSIOTHERAPY, DIETITIAN, PRACTICE NURSE ITEMS**



### *Use of multidisciplinary/integrated care items by chronic disease category*

While it is not possible to tell from the data for which conditions a GPMP or TCA were put in place to address, we can examine rates of use amongst particular disease groups using self-reported conditions within the 45 and Up Study baseline survey. This survey was conducted between 2006 and 2009 (with the majority of participants responding in 2008). Within the CES area, use of GPMP or TCA was most common among those who had reported having diabetes (32.5% in 2014) followed by musculoskeletal conditions (24.6%) and cardiovascular disease (23.6%) (Figure 11). Those who did not identify as having any of these six conditions had a lower rate of use (14.6% in 2014). The CDM program does not specify which type(s) of conditions a person must have to be eligible for these items – other conditions where a GPMP or TCA may be appropriate could include dementia, chronic pain or chronic migraine. It is also possible that a participant was diagnosed with a chronic condition after baseline. In general, increase in use over time has been fairly similar across all disease groupings.

**Figure 11: Proportion of 45 and Up Study participants aged 55 years and over residing in CES area at baseline with at least one GPMP/TCA item in a calendar year by type of self-reported chronic condition (at baseline)**




Figures 12 and 13 explore differences between CES and NSW trends in use of GPMP/TCA items within each disease grouping. Within most of the disease groupings, CES rate of use has been similar to that of NSW for the earlier years of research project with a slight divergence occurring around 2010-11 whereby CES rate of increase has then been slightly slower compared to NSW rate of increase. The exception to this is the diabetes group (Figure 12) which shows a more parallel trend between CES and NSW across the whole period with CES showing a lower rate of use of the GPMP/TCA items across all years.

**Figure 12: PROPORTION OF 45 AND UP STUDY PARTICIPANTS AGED 55 WITH AT LEAST ONE GPMP/TCA ITEM IN CALENDAR YEAR BY AREA OF RESIDENCE AT BASELINE (CES AREA VS NSW) AND TYPE OF SELF-REPORTED CHRONIC CONDITION (AT BASELINE)**

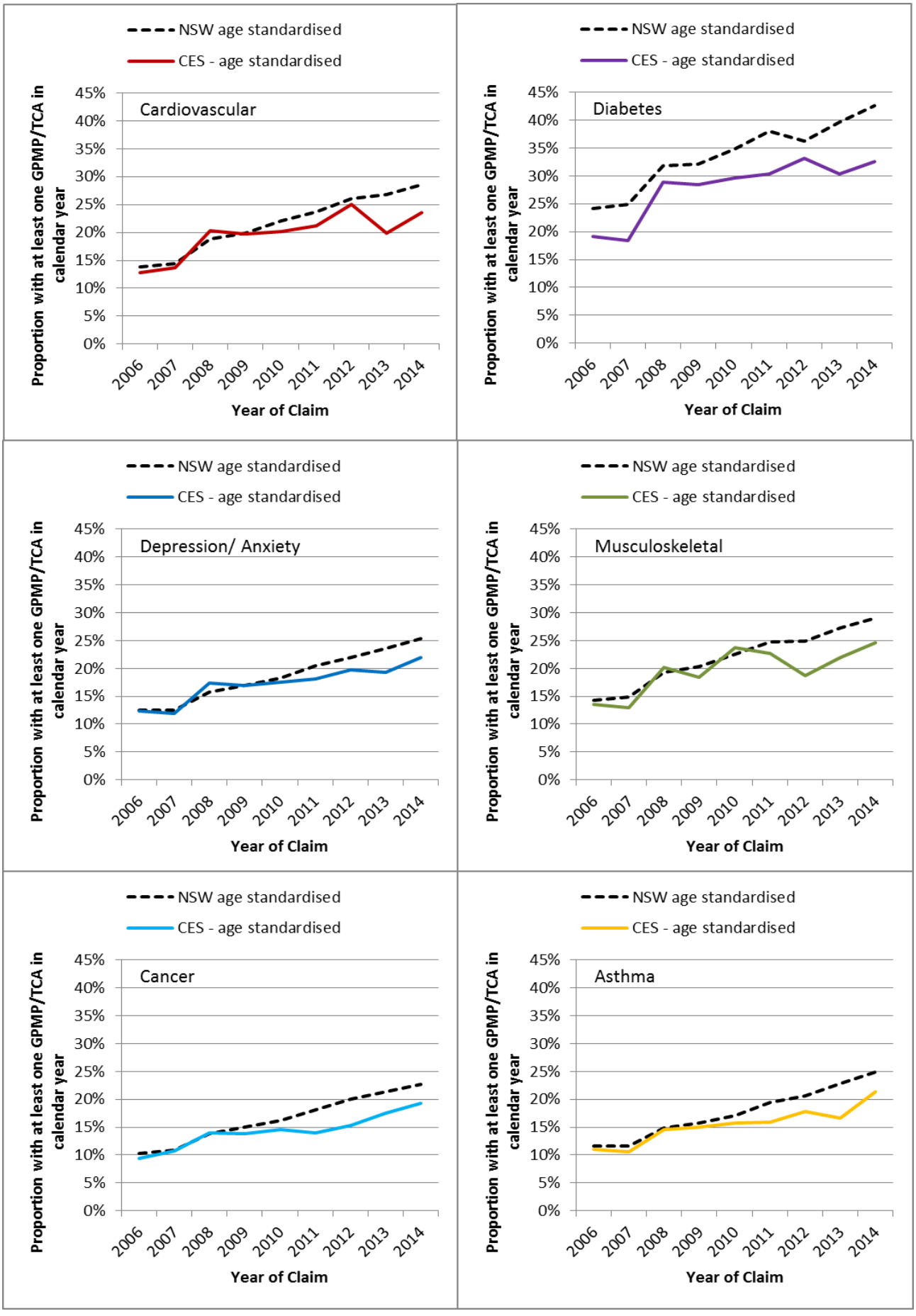
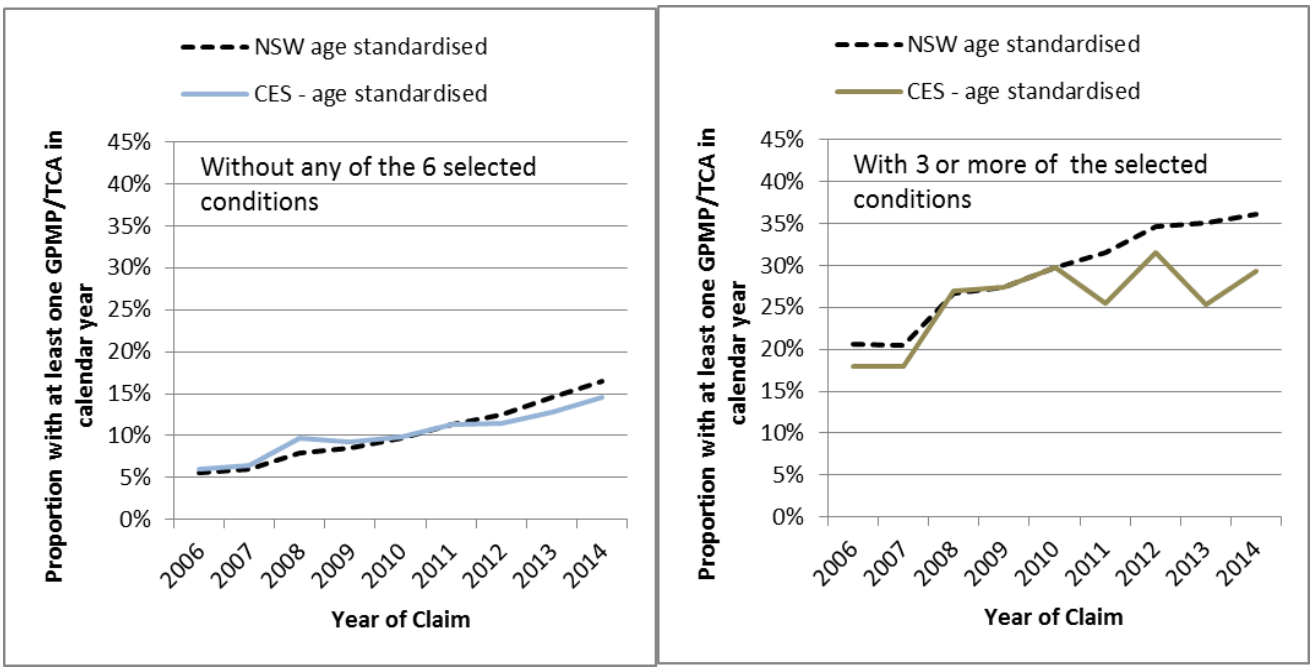


**Figure 13: PROPORTION OF 45 AND UP STUDY PARTICIPANTS AGED 55 WITH AT LEAST ONE GPMP/TCA ITEM IN CALENDAR YEAR BY AREA OF RESIDENCE AT BASELINE (CES AREA VS NSW) AND NUMBER OF SELF-REPORTED CHRONIC CONDITIONS (AT BASELINE)**




## 1.4 Summary of Results

Utilisation of GPMPs/TCAs within general practice in the CES cohort is increasing over time. In 2006, 11% of the CES cohort within the 45 and Up Study utilised GPMP/ TCA Medicare items. By 2014, after adjusting for the ageing of the cohort, this had increased to 19% (almost double the rate). Age-specific rates within each calendar year show the fastest rate of increase over time is occurring within the older age groups.

Use of GPMP/TCA review items has also increased over time but has been consistently much lower at 11% in 2014. GPMPs/TCAs were more frequent among those with diabetes, followed by musculoskeletal and cardiovascular disease.

The largest increase in use over time has been for the allied health items. Four per cent of the CES cohort utilised these items in 2006 rising to 16% in 2014 – a four-fold increase. The increase over time in the use of all the CDM Medicare items within the CES cohort has been slower than the increase observed at a NSW level and this difference in rate of increase has been diverging over time.

Those within the SES area of CES had a lower rate of use compared to those within the Sydney area. This difference was consistent across all years of the research project and is likely linked to different socio-demographic and health characteristics of the populations.

Unpacking the allied health items in more detail revealed that by far the largest increase in use over time has been for podiatry items followed by the practice nurse items. Podiatry had the highest use within the oldest age groups with more than one in every four people aged over 85 years accessing Podiatry services in 2014.

# Part 2: Determine the characteristics of patients more likely to receive integrated care

## 2.1 Aim

The aim of this section is to determine the characteristics of the patients more likely to utilise the CDM Medicare items in the CES area. Specifically, it seeks to address the following questions:

- What characteristics are associated with receiving a GPMP/TCA?
- Of those who accessed a GPMP or TCA, which characteristics were associated with accessing a Review of GPMP/TCA or allied health items?
- Are there any differences in characteristics of patients accessing these items for two specific disease groups: diabetes and depression/anxiety?
- Has there been any change over time in the characteristics of patients accessing these items?

## 2.2 Statistical Analysis

The sample and MBS measures of interest are defined in Table 1, 2 and 3 in the General Methods section. This was a cross-sectional analysis using information captured at baseline: either in the baseline 45 and Up Study survey or within the baseline period (+/- 12 months from date of recruitment to the 45 and Up Study).

Descriptive analyses were undertaken to examine the proportion of people utilising the MBS measures of integrated care by each socio-demographic, health risk factor, health status and health service utilisation characteristic of interest. As people tended to have both a GPMP and a TCA these items were grouped together as one measure "GPMP/TCA" based on whether a person had used either one or these items or both the items in the period.

Logistic regression was then used to examine which factors were significantly related to the measures of integrated care independently of the other factors. All factors were included in the model.

To examine differences over time in the characteristics associated with GPMP/TCA use, a preliminary descriptive cross-sectional analysis was also undertaken for the follow-up period. A follow-up survey was undertaken approximately five years after the baseline survey. At the time of analysis, not all follow-up data were complete with some surveys still to be returned and some variables still required additional coding checks by the Sax Institute. Data were used only for those who returned the follow-up survey (n=10,080 for CES; 38% of original sample). Results must be treated with some caution due to potential non-response bias.

## 2.3 Results

### *Characteristics associated with receiving a GPMP or TCA in the CES area*

Within the two-year 45 and Up Study baseline period which generally centred around 2008 (but could range from 2007-2009), 22% of those residing in the CES area (5,771 people) had a claim recorded for a GPMP or TCA.

Having a claim recorded for a GPMP or TCA within the 45 and Up Study baseline period (c. 2008) was closely related to the socio-demographic and health need of a participant (Table 2). As would be expected, the characteristics of participants accessing GPMPs or TCAs was consistent with the profile of those with chronic disease and suggests that these plans and care arrangements are being used within the patient groups intended by the program.

Socio-demographic factors

Claims for preparation of a GPMP or TCA were more frequent within 45 and Up Study participants that were: in the older age groups; with a language background other than English; born overseas; with lower educational attainment; with lower income; not working; and those not living in a flat/unit or other type of accommodation rather than a house (Table 4).

After controlling for all other socio-demographic, health risk, well-being and health utilisation factors:

- All of these relationships were still evident independently of the other factors with the exception of "born overseas" becoming non-significant.

There were also some slight differences among the factors:

- Being female was associated with a lower rate of claiming for a GPMP or TCA.
- Lower income was more strongly related with GPMP/TCA than lower educational attainment.
- While increasing age was significantly related to claiming a GPMP/TCA, this relationship disappeared in the oldest age group (over 85 years).
- While living in a flat/unit was associated with higher rates of claiming a GPMP/TCA, living in a care facility[2] was associated with lower rates of claiming a GPMP/TCA.

Health risk factors

Claims for preparation of a GPMP or TCA were more frequent within those who: were current or ex-smokers; had insufficient physical activity; were obese; or were taking medication for high blood pressure or high cholesterol. There was very little difference among those who had adequate versus inadequate fruit and vegetable intake and there was a lower rate of claiming for GPMP/TCA among those who drank alcohol compared to those who did not (Table 5).

Some of these relationships appeared to be confounded by other socio-demographic and well-being factors. After controlling for all other socio-demographic, health risk, well-being and health utilisation factors:

- Smoking, being overweight/obese and being on medication for high blood pressure were all still independently related to claiming for a GPMP/TCA.
- Being a drinker was also still associated with a lower rate of claiming a GPMP/TCA.
- Insufficient physical activity and having high cholesterol were not related to claiming a GPMP/TCA after controlling for other factors.

[2] Includes housing types described as "nursing home" and "hostel for the aged".

**Table 4: Claims recorded for preparation of a GPMP/TCA by CES cohort at baseline (+/- 12 months from date of recruitment) by socio-demographic characteristics (n=26,291)**

| | Claims for preparation of GPMP/TCA | | Model 1: Full Model | |
|---|---|---|---|---|
| **Characteristic** | **n** | **% of CES cohort** | **OR** | **95% CI** |
| Gender | | | | |
| Male | 2,714 | 21.8 | 1 | |
| Female | 3,057 | 22.1 | **0.88** | **(0.82-0.95)** |
| Age group | | | | |
| 45-59 years | 1,585 | 12.6 | 1 | |
| 60-74 years | 2,166 | 25.8 | **1.23** | **(1.12-1.35)** |
| 75-84 years | 1,633 | 39.4 | **1.28** | **(1.13-1.44)** |
| 85 years and over | 387 | 34.3 | 1.04 | (0.87-1.23) |
| Language other than English | | | | |
| No | 4,155 | 19.7 | 1 | |
| Yes | 1,616 | 31.0 | **1.31** | **(1.19-1.44)** |
| Born overseas | | | | |
| Overseas born | 2,457 | 25.5 | 1.00 | (0.92-1.09) |
| Australia born | 3,314 | 19.9 | 1 | |
| Highest educational attainment | | | | |
| Less than high school | 2,230 | 31.8 | **1.12** | **(1.02-1.24)** |
| Year 12 or equivalent | 697 | 23.9 | 1.08 | (0.96-1.21) |
| Trade/diploma | 1,602 | 21.9 | 1.07 | (0.97-1.17) |
| University or higher | 1,242 | 13.7 | 1 | |
| Yearly Household Income | | | | |
| <$20,000 | 1,738 | 43.1 | **1.57** | **(1.37-1.79)** |
| $20,000 to $39,999 | 936 | 27.7 | **1.33** | **(1.17-1.51)** |
| $40,000 to $69,999 | 741 | 17.3 | 1.12 | (1.00-1.26) |
| $70,000 or more | 846 | 9.5 | 1 | |
| Won't disclose | 1,510 | 26.8 | **1.33** | **(1.18-1.50)** |
| Work status | | | | |
| Not working | 4,013 | 33.6 | **1.27** | **(1.14-1.42)** |
| Part time | 754 | 14.9 | 1.04 | (0.93-1.17) |
| Full time | 1,004 | 10.8 | 1 | |
| Housing type | | | | |
| House | 3,719 | 20.3 | 1 | |
| Flat or unit | 1,885 | 25.8 | 1.07 | (1.00-1.16) |
| Nursing home | 34 | 24.3 | **0.37** | **(0.24-0.56)** |
| Other | 133 | 27.1 | 0.84 | (0.67-1.06) |
| Health insurance status | | | | |
| None | 879 | 25.1 | **1.30** | **(1.17-1.44)** |
| Private with extras | 2,696 | 17.1 | 1 | |
| Private no extras | 810 | 22.0 | **1.14** | **(1.03-1.26)** |
| DVA health care card only | 44 | 11.5 | **0.68** | **(0.47-0.97)** |
| Health care card only | 1,342 | 46.0 | **1.48** | **(1.33-1.64)** |
| **TOTAL** | **5,771** | **22.0** | | |

**Table 5: Claims recorded for preparation of a GPMP/TCA by CES cohort at baseline (+/- 12 months from date of recruitment) by health risk factor (n=26,291)**

| | Claims for preparation of GPMP/TCA | | Model 1: Full Model | |
|---|---|---|---|---|
| Characteristic | n | % of CES cohort | OR | 95% CI |
| Smoking status | | | | |
| Never smoke | 3,221 | 20.9 | 1 | |
| Ex-smoker | 2,104 | 23.1 | 1.06 | (0.98-1.14) |
| Current smoker | 446 | 25.9 | **1.18** | **(1.03-1.36)** |
| Sufficient physical exercise | | | | |
| No | 2,213 | 27.4 | 1 | |
| Yes | 3,558 | 19.5 | 0.98 | (0.91-1.05) |
| Sufficient fruit and vegetable intake | | | | |
| No | 4,537 | 21.7 | 1 | |
| Yes | 1,234 | 22.8 | 1.03 | (0.95-1.12) |
| Alcohol intake per week | | | | |
| Zero | 2,554 | 30.2 | 1 | |
| 1-13 drinks | 2,381 | 18.3 | **0.89** | **(0.82-0.96)** |
| 14 plus drinks | 836 | 17.4 | **0.84** | **(0.75-0.93)** |
| BMI category | | | | |
| Underweight | 649 | 23.4 | 1.07 | (0.95-1.20) |
| Normal weight | 1,733 | 18.4 | 1 | |
| Overweight | 2,042 | 21.7 | **1.15** | **(1.06-1.24)** |
| Obese | 1,347 | 28.8 | **1.42** | **(1.29-1.57)** |
| Taking medication for high blood pressure | | | | |
| No | 3,825 | 18.7 | 1 | |
| Yes | 1,946 | 33.1 | **1.17** | **(1.08-1.27)** |
| Taking medication for high cholesterol | | | | |
| No | 4,529 | 20.4 | 1 | |
| Yes | 1,242 | 30.7 | 1.07 | (0.98-1.17) |
| **TOTAL** | **5,771** | **22.0** | | |

Health status factors

Records of claims for preparation of a GPMP or TCA were more frequent within those who: had more severe physical limitations; had higher levels of psychological distress; had lower self-rated health or quality of life; had more chronic conditions; needed help for a disability; or had experienced a fall in the previous 12 months (Table 6).

After controlling for all other socio-demographic, health risk, well-being and health utilisation factors:

- Severity of physical limitations, self-rated general health, number of chronic conditions and whether someone needed help with a disability were all independently related to an increased rate of claim for a GPMP/TCA.
- Levels of psychological distress, self-rated quality of life, and whether someone had reported a fall became non-significant suggesting that these factors may be strongly related to other health or socio-demographic factors included in the model.

**Table 6: Claims for preparation of a GPMP/TCA by CES cohort at baseline (+/- 12 months from date of recruitment) by health status (n=26,291)**

| Characteristic | Claims for preparation of GPMP/TCA | | Model 1: Full Model | |
|---|---|---|---|---|
| | n | % of CES cohort | OR | 95% CI |
| Physical Functioning | | | | |
| No limitations | 1,017 | 11.6 | 1 | |
| Minor limitations | 1,100 | 16.8 | 1.07 | (0.97-1.18) |
| Moderate limitations | 1,516 | 29.6 | **1.25** | **(1.13-1.39)** |
| Severe limitations | 1,357 | 44.3 | **1.36** | **(1.19-1.55)** |
| Not Available | 781 | 28.3 | **1.21** | **(1.07-1.38)** |
| Psychological distress | | | | |
| Low psychological distress | 3,385 | 18.6 | 1 | |
| Moderate psychological distress | 852 | 23.7 | 1.06 | (0.96-1.17) |
| High psychological distress | 396 | 31.9 | 1.16 | (1.00-1.35) |
| Very high psychological distress | 234 | 35.7 | 0.96 | (0.79-1.17) |
| Not available | 904 | 34.7 | 0.98 | (0.88-1.09) |
| Health self-rated as "good" or "very good" | | | | |
| No | 1,712 | 39.3 | **1.16** | **(1.05-1.29)** |
| Yes | 4,059 | 18.5 | 1 | |
| Quality of life self-rated as "good" or "very good" | | | | |
| No | 1,449 | 36.0 | 0.98 | (0.88-1.09) |
| Yes | 4,322 | 19.4 | 1 | |
| Number of chronic conditions | | | | |
| Zero | 1,734 | 13.9 | 1 | |
| One | 2,201 | 24.5 | **1.43** | **(1.32-1.55)** |
| Two | 1,242 | 34.9 | **1.67** | **(1.51-1.85)** |
| Three or more | 594 | 46.9 | **1.86** | **(1.61-2.14)** |
| Receives help for a disability | | | | |
| No | 5,183 | 20.7 | 1 | |
| Yes | 588 | 48.2 | **1.19** | **(1.03-1.38)** |
| Self-reported a fall in the last 12 months | | | | |
| No | 4,477 | 20.5 | 1 | |
| Yes | 1,294 | 29.2 | 0.93 | (0.85-1.01) |
| **TOTAL** | **5,771** | **22.0** | | |

Health utilisation factors

Claims for preparation of a GPMP or TCA were more frequent within those who: had more visits to the GP; had a hospitalisation within the baseline period; or had visited a specialist within the baseline period. There was little difference between those who experienced continuity of care (based on seeing their usual provider 75% or more of the time in the baseline period) compared to those who did not (Table 7).

After controlling for all other socio-demographic, health risk, well-being and health utilisation factors:

- Frequency of GP visits were still strongly related to claims for a GPMP/TCA. Those seeing the GP more than 10 times per year were more than five times as likely to have claimed for a GPMP/TCA compared to those who saw the GP two or fewer times per year.
- Seeing a specialist was also independently related to claiming for a GPMP/TCA but having experienced a hospitalisation was not.

**Table 7: Claims for preparation of a GPMP/TCA by CES cohort at baseline (+/- 12 months from date of recruitment) by health service utilisation (n=26,291)**

| | Claims for preparation of GPMP/TCA | | Model 1: Full Model | |
|---|---|---|---|---|
| Characteristic | n | % of CES cohort | OR | 95% CI |
| Average GP visits per annum in baseline period^(standard visits) | | | | |
| Two or fewer | 184 | 4.1 | 1 | |
| Three - four | 490 | 9.3 | 1.11 | (0.87-1.43) |
| Five - nine | 1,899 | 20.2 | **1.73** | **(1.36-2.19)** |
| Ten plus | 3,198 | 44.6 | **3.13** | **(2.46-4.00)** |
| Continuity of care (provider) at baseline^ | | | | |
| Infrequent GP visits | 109 | 3.3 | **0.49** | **(0.36-0.66)** |
| Continuity of care | 3,239 | 26.3 | 0.93 | (0.87-1.00) |
| No continuity of care | 2,423 | 22.8 | 1 | |
| Hospitalisation in two-year baseline period^ | | | | |
| No | 2,561 | 17.3 | 1 | |
| Yes | 3,210 | 27.9 | 1.06 | (0.99-1.14) |
| Saw a specialist in two-year baseline period^ | | | | |
| No | 699 | 10.8 | 1 | |
| Yes | 5,072 | 25.6 | **1.40** | **(1.26-1.55)** |
| Bulk-billing status at baseline^ | | | | |
| All visits bulk-billed | 4,149 | 32.5 | **2.93** | **(2.40-3.59)** |
| >50% visits bulk-billed | 910 | 22.3 | **2.74** | **(2.22-3.38)** |
| <= 50% visits bulk-billed | 486 | 11.9 | **1.83** | **(1.47-2.27)** |
| No visits bulk-billed | 117 | 5.7 | 1 | |
| **TOTAL** | **5,771** | **22.0** | | |

^ baseline period defined as +/- 12 months from date of recruitment

### *Characteristics associated with claiming for a GPMP/TCA review in the CES area*

Of those who claimed for preparation of a GPMP or TCA, 31% (1,988) also claimed for a review of the GPMP /TCA within the following 12 months. Figures 14-17 show that there was very little relationship between a patient's socio-demographic or health characteristics and whether they received a review of their GPMP /TCA.

The only factors that appeared to be related to claiming for a review were if a participant lived in an "other" type of housing (this included housing type not specified as well as mobile homes), if they saw the GP frequently and if they were always bulk-billed or had more than 50% of their GP visits bulk-billed they had higher rates of claiming for a review. If they held a DVA health care card they had lower claim rates for the review item.

**FIGURE 14: PROPORTION OF CES COHORT WITH A GPMP/TCA CLAIMING A GPMP/TCA REVIEW IN THE FOLLOWING 12 MONTHS, BY SOCIO-DEMOGRAPHIC CHARACTERISTIC (N= 5,771)**

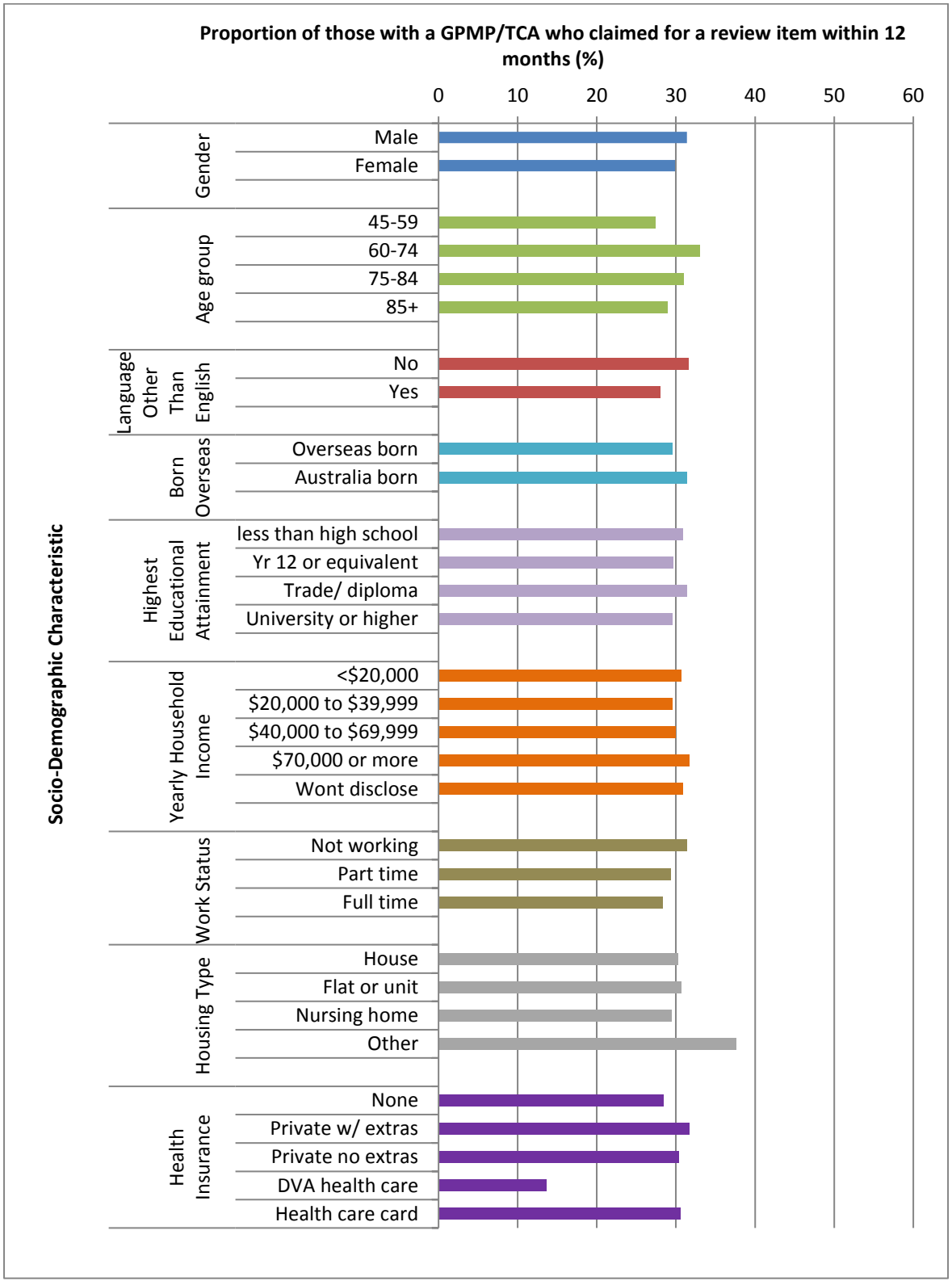


**FIGURE 15: PROPORTION OF CES COHORT WITH A GPMP/TCA CLAIMING AT LEAST ONE GPMP/TCA REVIEW IN THE FOLLOWING 12 MONTHS, BY HEALTH RISK CHARACTERISTIC (N= 5,771)**

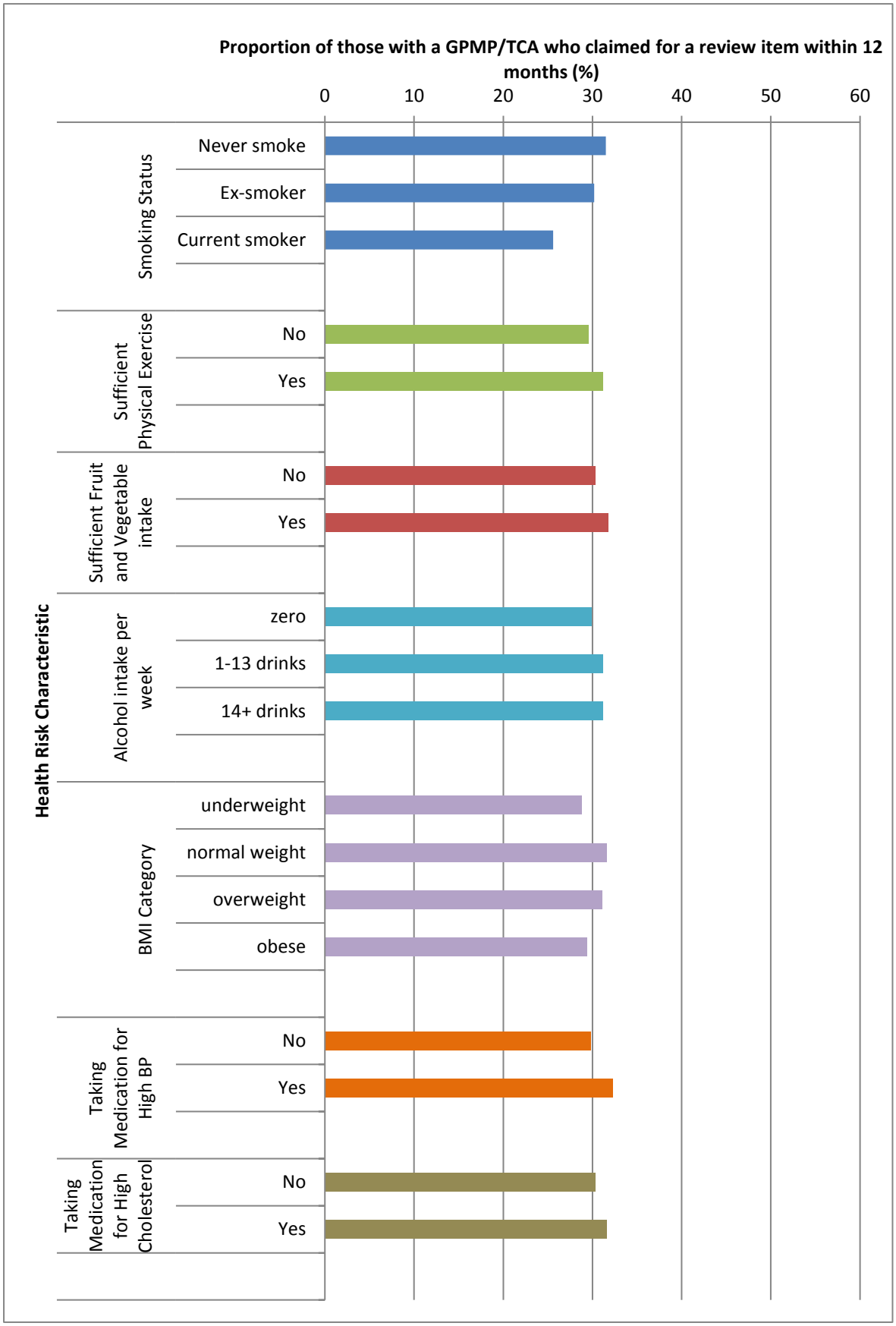


**FIGURE 16: PROPORTION OF CES COHORT WITH A GPMP/TCA CLAIMING AT LEAST ONE GPMP/TCA REVIEW IN THE FOLLOWING 12 MONTHS, BY HEALTH STATUS CHARACTERISTIC (N= 5,771)**

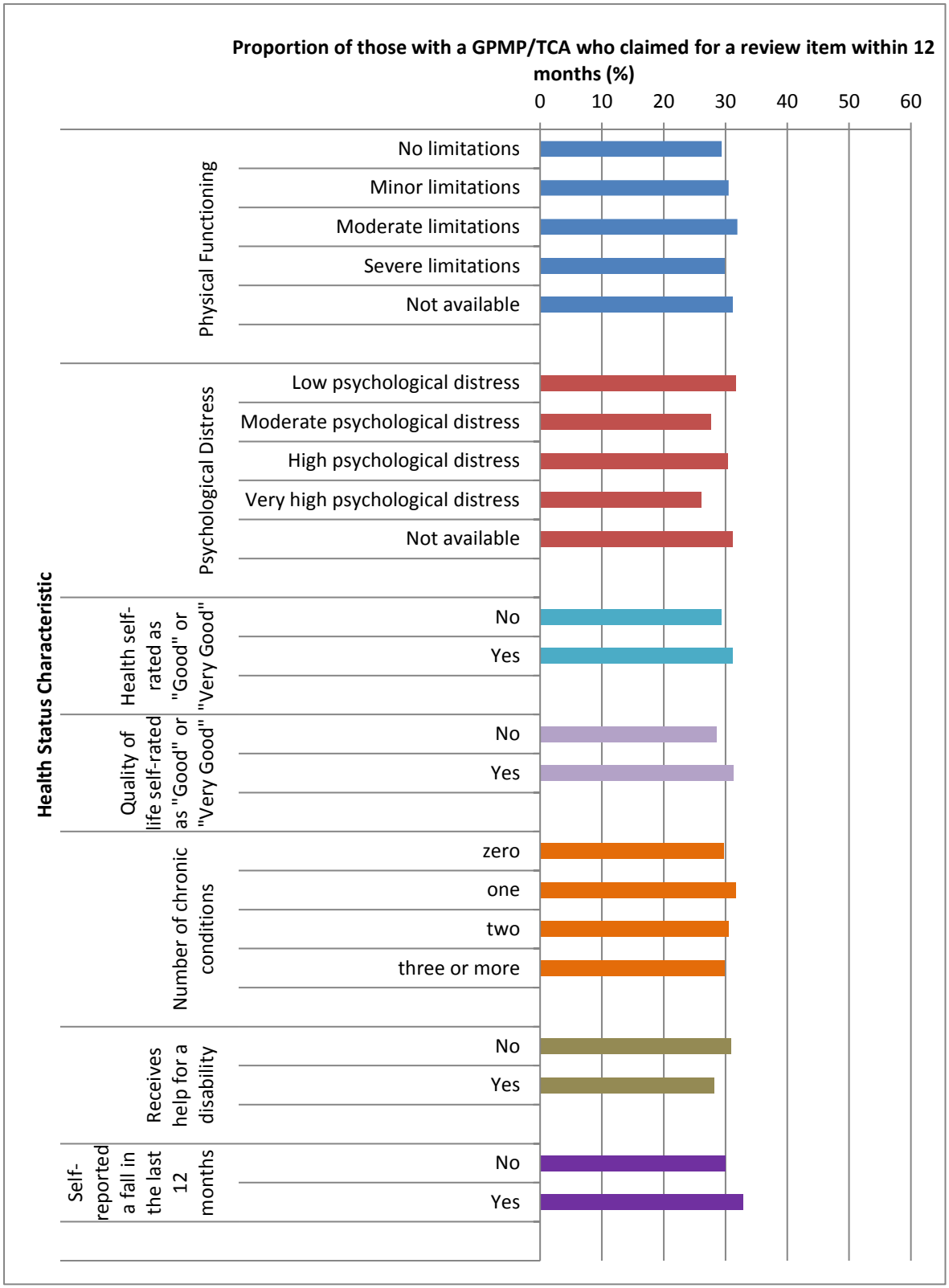
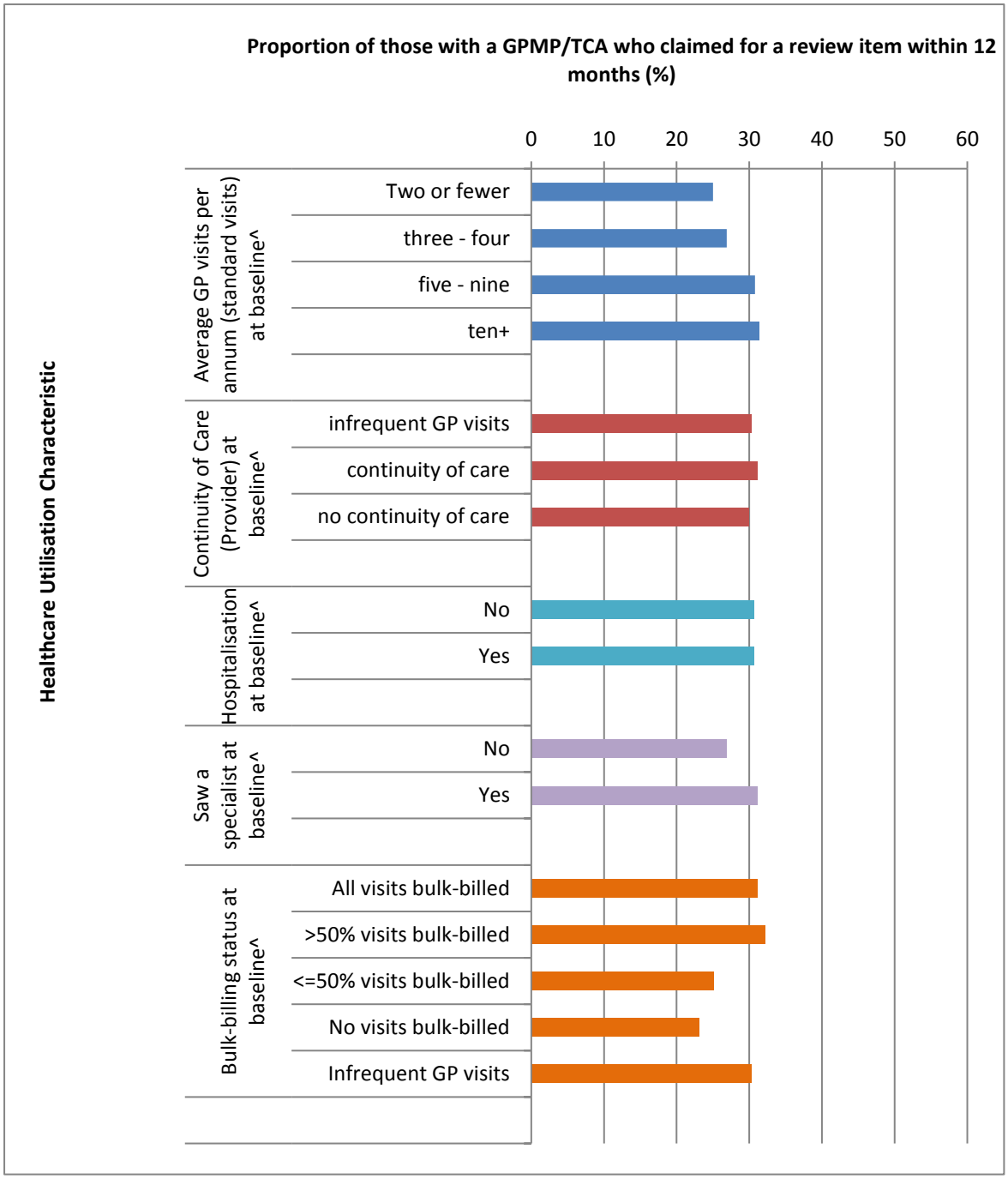


**FIGURE 17: PROPORTION OF CES COHORT WITH A GPMP/TCA CLAIMING AT LEAST ONE GPMP/TCA REVIEW IN THE FOLLOWING 12 MONTHS, BY HEALTH CARE UTILISATION CHARACTERISTIC (N= 5,771)**




*^ baseline period defined as +/- 12 months from date of recruitment*

These relationships remained after controlling for all other factors within the logistic regression model. In addition, after controlling for other factors:

- Those with a language other than English and those who were current smokers were less likely to claim for a review.
- Those in the second lowest income bracket and those who had reported a fall at baseline were more likely to claim for a review.

### *Characteristics associated with claiming for private allied health services among those with a GPMP/TCA in the CES area*

Of those who claimed for preparation of a GPMP or TCA, 42% (2,437) also claimed for at least one affiliated private allied health care item within the following 12 months.

Figures 18-21 show that in general, those with higher socio-demographic need and poorer physical health were more likely to access these allied health items in the year following their claim for a care plan/team care arrangement.

However, insurance status did also appear to be important. Those with a DVA card had the lowest rates of claim for allied health – likely because these services are covered by their DVA insurance. Those with private health cover but no extras cover had the highest rates of claim.

After controlling for all other factors in the model:

- Being female was related to a higher rate of claim for allied health items.
- Having private health cover with no extras was associated with more claims than those who had private health cover with extras. Those that had a DVA card had significantly lower rate of claim than others.
- Being overweight or obese was associated with a higher rate of claim than being in the normal weight range. However, being a current smoker was associated with lower use of allied health than being a non-smoker.
- Those with moderate or severe physical limitations claimed more frequently than those without limitations as did those with more chronic conditions.

**FIGURE 18: PROPORTION OF CES COHORT WITH A GPMP/TCA CLAIMING AT LEAST ONE ALLIED HEALTH ITEM IN THE FOLLOWING 12 MONTHS, BY SOCIO-DEMOGRAPHIC CHARACTERISTIC (N= 5,771)**

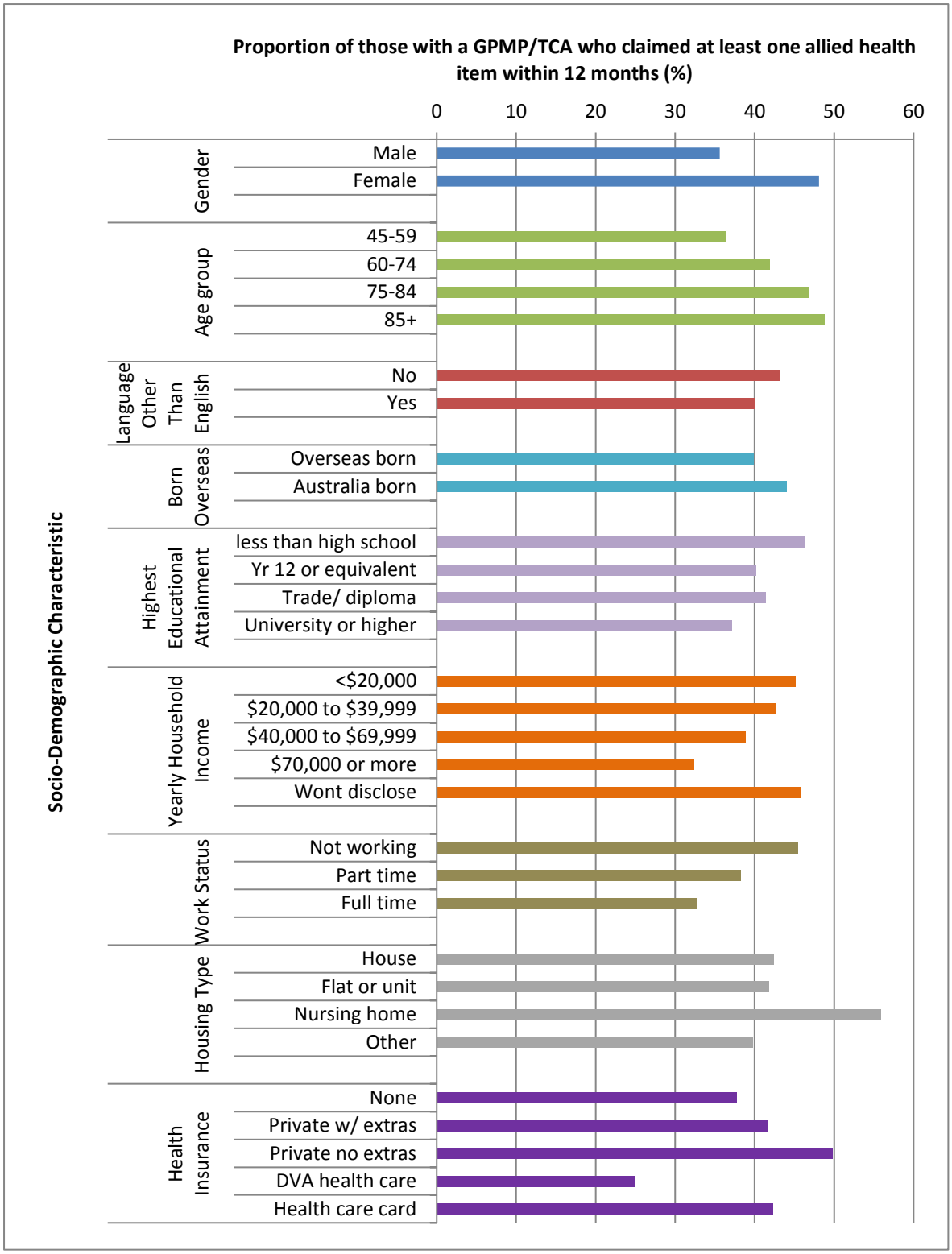


**FIGURE 19: PROPORTION OF CES COHORT WITH A GPMP/TCA CLAIMING AT LEAST ONE ALLIED HEALTH ITEM IN THE FOLLOWING 12 MONTHS, BY HEALTH RISK CHARACTERISTIC (N= 5,771)**

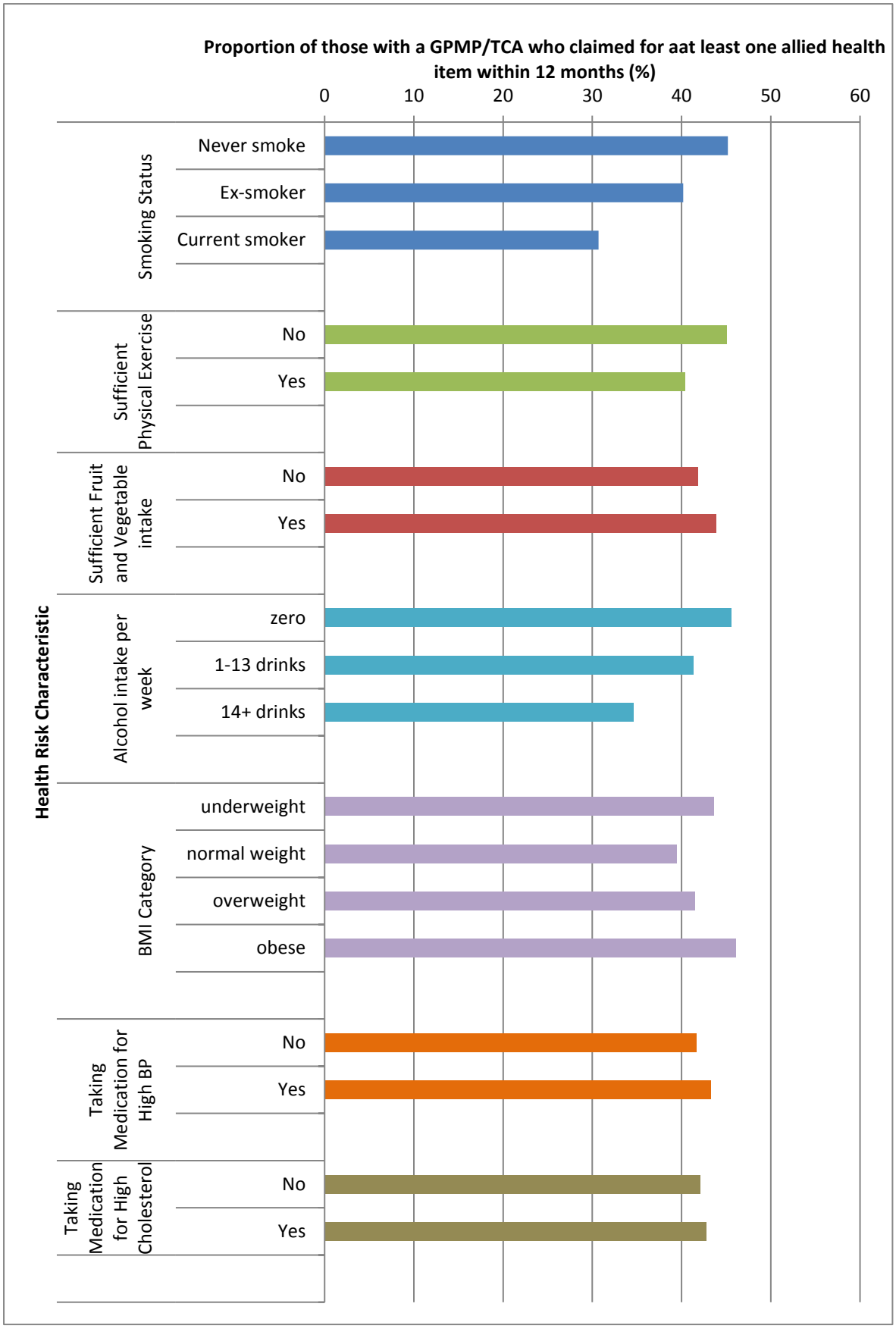


**FIGURE 20: PROPORTION OF CES COHORT WITH A GPMP/TCA CLAIMING AT LEAST ONE ALLIED HEALTH ITEM IN THE FOLLOWING 12 MONTHS, BY HEALTH STATUS CHARACTERISTIC (N= 5,771)**

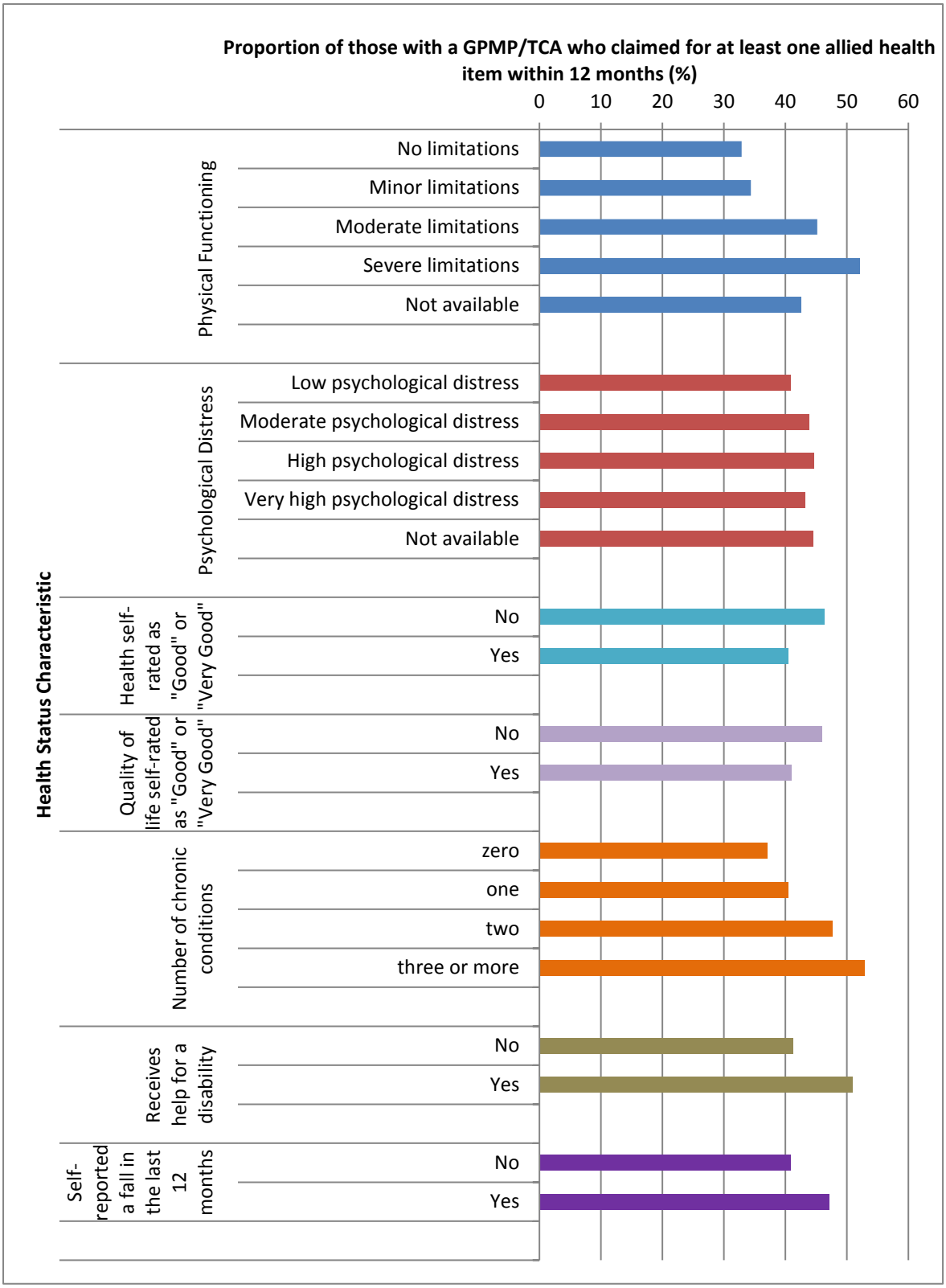
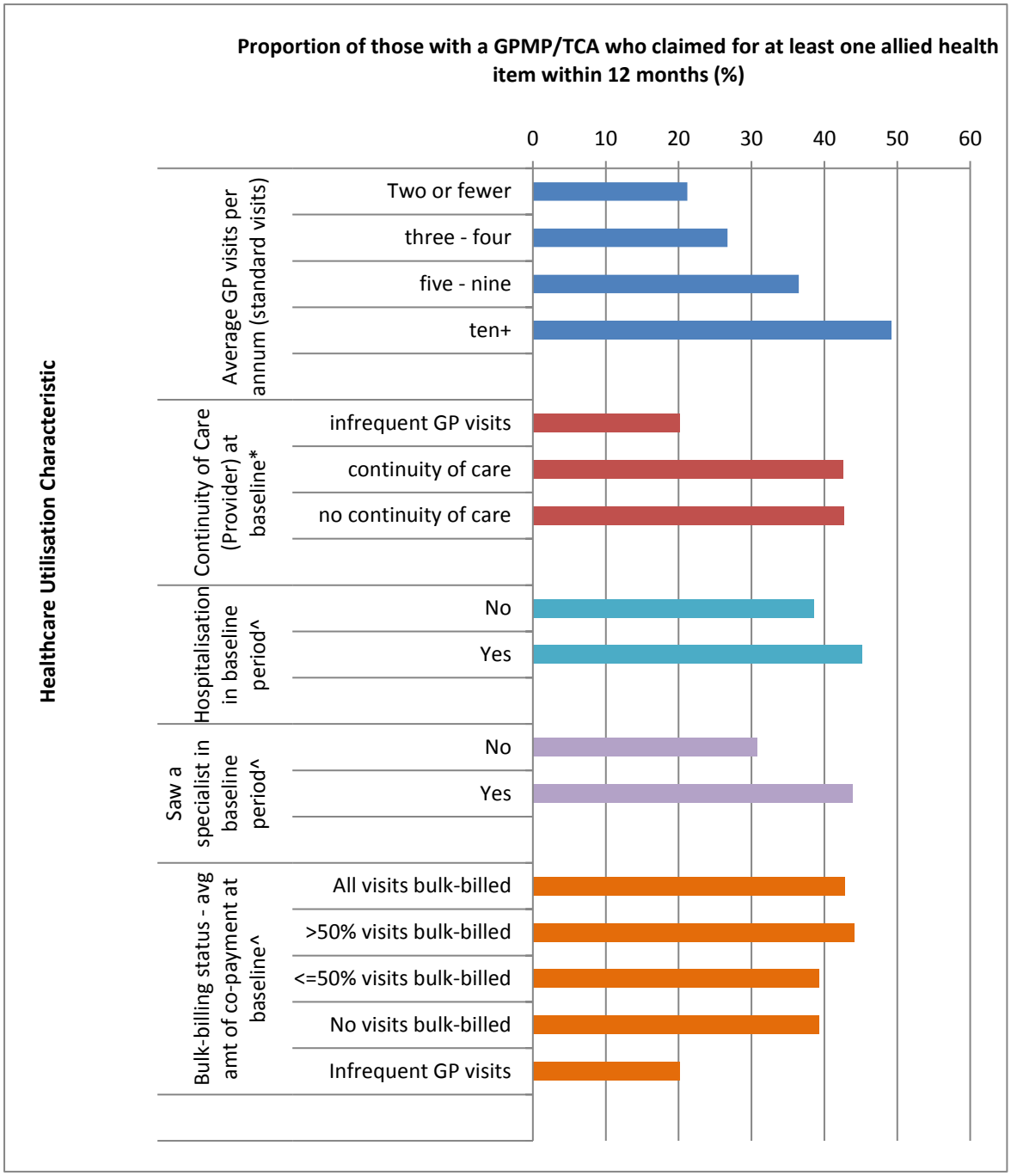


**FIGURE 21: PROPORTION OF CES COHORT WITH A GPMP/TCA CLAIMING AT LEAST ONE ALLIED HEALTH ITEM IN THE FOLLOWING 12 MONTHS, BY HEALTH CARE UTILISATION CHARACTERISTIC (N= 5,771)**




*^ baseline period defined as +/- 12 months from date of recruitment*

### *Differences between those with diabetes versus depression/anxiety in utilisation of care planning items*

In general, the patterns of characteristics associated with use of GPMP/TCA items were similar for those with diabetes, depression/anxiety and the cohort as a whole. Table 8 presents a summary of four separate logistic regression models that investigate relationships between participant characteristics and whether a participant claimed for preparation of a GPMP or TCA at baseline for four groups: (i) all CES cohort; (ii) NSW cohort; (iii) NSW cohort with a self-reported diabetes diagnosis and (iv) NSW cohort with a self-reported anxiety or depression diagnosis.

The characteristics associated with claiming for a GPMP/TCA for the CES cohort were very similar to that of NSW cohort as a whole. There were some relationships significant for NSW but not for CES which were due to the increased sample size.

Given the similarities between CES and NSW as a whole, the diabetes and anxiety/depression groups were examined at the NSW level to allow for greater sample size. There were some differences between these groups.

- Males and females were equally likely to claim for a GPMP/TCA among those with diabetes. However, similar to the overall pattern of claims, females had lower odds than males to claim for a GPMP/TCA among those with depression/anxiety.
- For those with diabetes, older age was not associated with an increase in use of GPMP/TCA. There were no differences between the age groups for those aged less than 85 years. However, the over 85 age group had lower odds than those aged 45-59 years to have claimed for a GPMP/TCA.
- Among those with depression/anxiety, age was associated with an increase in claiming for GPMP/TCA with the exception of those in the 85 years and over age group claiming at a similar rate to those aged 45-59 years.
- Educational attainment was not related to GPMP/TCA claims in the depression/anxiety groups although income was. This differed from the diabetic group.
- While most risk factors were associated with GPMP/TCA claims in similar patterns for both the diabetes and depression/anxiety groups, there did seem to be a small difference for smoking. This did not appear to be as strongly related to GPMP/TCA claims among diabetics as among those with depression/anxiety.
- A person's health status did not appear to be as strongly related to GPMP/TCA claims among the diabetes group:
    - Physical functioning scores were only weakly linked and not in a linear fashion – those with moderate limitations had slightly higher odds than those with no limitations to claim for a GPMP/TCA but those with severe limitations were not.
    - Having more comorbid conditions was not related to claiming for a GPMP/TCA for diabetics. This may be because claiming was high already amongst diabetics and that this condition was likely to form the basis for a care plan rather than any additional conditions.
- While psychological distress was not related to claims for a GPMP/TCA among the population as a whole nor the diabetes group, there was a moderate relationship between psychological distress (as measured by the K10) and claims for GPMP/TCA amongst those with depression/anxiety.

**Table 8: Relationship between 45 and Up Study participant characteristics and claims for preparation of a GPMP/TCA within four different groups: (i) all CES cohort at baseline; (ii) all NSW cohort at baseline; (iii) all NSW cohort reporting a diabetes diagnosis at baseline; (iv) all NSW cohort reporting a depression/anxiety diagnosis at baseline**

| Socio-demographic Characteristic | (i) GPMP/TCA claim ALL - CES<br>n = 26,291<br>OR | (ii) GPMP/TCA claim ALL - NSW<br>n = 227,840<br>OR | (iii) GPMP/TCA claim diabetes - NSW<br>n = 20,385<br>OR | (iv) GPMP/TCA claim depression/anxiety - NSW<br>n = 44,221<br>OR |
|---|---|---|---|---|
| **Gender** | | | | |
| Male | 1 | 1 | 1 | 1 |
| Female | 0.88 | 0.90 | ≈ | 0.94 |
| **Age group** | | | | |
| 45-59 years | 1 | 1 | 1 | 1 |
| 60-74 years | 1.23 | 1.20 | ≈ | 1.12 |
| 75-84 years | 1.28 | 1.32 | ≈ | 1.14 |
| 85 years and over | ≈ | 1.20 | 0.74 | ≈ |
| **Language other than English** | | | | |
| No | 1 | 1 | 1 | 1 |
| Yes | 1.31 | 1.21 | ≈ | 1.20 |
| **Country of birth** | | | | |
| Australian born | 1 | 1 | 1 | 1 |
| Overseas born | ≈ | 1.10 | ≈ | 1.10 |
| **Highest qualification** | | | | |
| Less than high school | 1.12 | 1.16 | 1.23 | ≈ |
| Year 12 or equivalent | | 1.10 | ≈ | ≈ |
| Trade/diploma | | 1.07 | 1.16 | ≈ |
| University | 1 | 1 | 1 | 1 |
| **Income group** | | | | |
| <$20,000 | 1.57 | 1.37 | 1.35 | 1.42 |
| $20,000-$39,999 | 1.33 | 1.25 | 1.32 | 1.28 |
| $40,000 - $69,999 | | 1.14 | 1.18 | 1.24 |
| $70,000 or higher | 1 | 1 | 1 | 1 |
| Won't disclose | 1.33 | 1.31 | 1.29 | 1.29 |
| **Work status** | | | | |
| Not working | 1.27 | 1.26 | 1.18 | 1.35 |
| Part time | ≈ | 1.05 | ≈ | 1.15 |
| Full time | 1 | 1 | 1 | 1 |
| **Housing type** | | | | |
| House | 1 | 1 | 1 | 1 |
| Flat or unit | ≈ | 1.17 | ≈ | 1.24 |
| Nursing home | 0.37 | 0.48 | 0.44 | 0.37 |
| Other | ≈ | 1.18 | 1.26 | 1.15 |
| **Health insurance status** | | | | |
| None | 1.30 | 1.18 | ≈ | 1.16 |
| Private with extras | 1 | 1 | 1 | 1 |
| Private no extras | 1.14 | 1.09 | 1.13 | 1.10 |
| DVA health care | 0.68 | 0.64 | 0.25 | 0.46 |
| Health care card | 1.48 | 1.28 | 1.18 | 1.22 |

| Health Risk Characteristic | GPMP/TCA claim ALL - CES n = 26,291 OR | GPMP/TCA claim ALL - NSW n = 227,840 OR | GPMP/TCA claim Diabetes - NSW n = 20,385 OR | GPMP/TCA claim Depression/ Anxiety - NSW n = 44,221 OR |
|---|---|---|---|---|
| **Smoking status** | | | | |
| Never smoke | 1 | 1 | 1 | 1 |
| Ex-smoker | ≈ | 1.08 | ≈ | 1.12 |
| Current smoker | 1.18 | 1.07 | ≈ | 1.14 |
| **Adequate physical activity** | | | | |
| No | 1 | 1 | 1 | 1 |
| Yes | ≈ | 0.97 | ≈ | ≈ |
| **Adequate fruit and vegetable intake** | | | | |
| No | 1 | 1 | 1 | 1 |
| Yes | 1.03 | 1.06 | 1.05 | 1.08 |
| **Alcohol intake per week** | | | | |
| Zero | | | | |
| 1-13 drinks | 0.89 | 0.91 | ≈ | 0.91 |
| 14+ drinks | 0.84 | 0.86 | 0.86 | 0.92 |
| **BMI category** | | | | |
| Obese | 1.42 | 1.46 | 1.16 | 1.38 |
| Overweight | 1.15 | 1.14 | 1.07 | 1.14 |
| Normal weight | 1 | 1 | 1 | 1 |
| Underweight | ≈ | 1.10 | ≈ | 1.11 |
| **Treatment for high blood pressure** | | | | |
| No | 1 | 1 | 1 | 1 |
| Yes | 1.17 | 1.23 | 1.14 | 1.20 |
| **Treatment for High cholesterol** | | | | |
| No | 1 | 1 | 1 | 1 |
| Yes | ≈ | 1.25 | 1.16 | 1.25 |
| **Health Status Characteristic** | | | | |
| **Physical Functioning (SF36)** | | | | |
| No Limitations | 1 | 1 | 1 | 1 |
| Minor limitations | 1.07 | 1.10 | ≈ | ≈ |
| Moderate limitations | 1.25 | 1.27 | 1.14 | 1.17 |
| Severe limitations | 1.36 | 1.30 | ≈ | 1.22 |
| Not available | 1.21 | 1.27 | ≈ | 1.16 |
| **Psychological Distress (K10)** | | | | |
| Low | 1 | 1 | 1 | 1 |
| Moderate | ≈ | ≈ | ≈ | 1.08 |
| High | ≈ | ≈ | ≈ | 1.15 |
| Very high | ≈ | ≈ | ≈ | ≈ |
| Not available | ≈ | ≈ | ≈ | 1.10 |
| **Self-rated general health - good/very good** | | | | |
| No | 1 | 1 | 1 | 1 |
| Yes | 1.16 | 1.19 | 1.08 | 1.21 |
| **Self-rated QoL - good/very good** | | | | |
| No | 1 | 1 | 1 | 1 |
| Yes | ≈ | ≈ | ≈ | ≈ |

| Health Status Characteristic | | | GPMP/TCA claim ALL - CES n = 26,291 | GPMP/TCA claim ALL - NSW n = 227,840 |
|---|---|---|---|---|
| | | OR | OR | OR |
| **Number of chronic conditions** | | | | |
| Zero | 0.70 | 0.65 | n/a | n/a |
| One | 1 | 1 | 1 | 1 |
| Two | 1.17 | 1.22 | ≈ | 1.41 |
| Three | 1.30 | 1.46 | ≈ | 1.89 |
| **Needs help for a disability** | | | | |
| No | 1 | 1 | 1 | 1 |
| Yes | 1.19 | 1.14 | ≈ | 1.16 |
| **Reported a fall** | | | | |
| No | 1 | 1 | 1 | 1 |
| Yes | ≈ | ≈ | ≈ | ≈ |
| **Health Care utilisation factor** | | | | |
| **Avg GP visits per annum in baseline period** | | | | |
| Two or fewer | 1 | 1 | 1 | 1 |
| Three - four | ≈ | 1.29 | ≈ | 1.15 |
| Five - nine | 1.73 | 1.87 | ≈ | 1.73 |
| Ten plus | 3.13 | 2.97 | 1.55 | 2.81 |
| **Continuity of Care (Provider) in baseline period** | | | | |
| No continuity of care | 1 | 1 | 1 | 1 |
| Continuity of care | | 0.93 | 0.76 | 0.93 |
| Infrequent GP visits | 0.49 | 0.57 | 0.53 | 0.51 |
| **Hospitalised in baseline period** | | | | |
| No | 1 | 1 | 1 | 1 |
| Yes | ≈ | ≈ | ≈ | ≈ |
| **Saw a specialist in baseline period** | | | | |
| No | 1 | 1 | 1 | 1 |
| Yes | 1.40 | 1.39 | 1.29 | 1.29 |
| **Bulk billing status in baseline period** | | | | |
| No visits bulk-billed | 1 | 1 | 1 | 1 |
| <=50% visits bulk-billed | 1.83 | 1.76 | 1.81 | 1.95 |
| >50% visits bulk-billed | 2.74 | 2.72 | 2.18 | 3.09 |
| All visits bulk-billed | 2.93 | 2.71 | 2.14 | 3.05 |

**Key**

| | | | |
|---|---|---|---|
| OR<0.5 | Very large decrease in odds compared to ref category | 1.01 - 1.20 | Slight increase in odds compared to ref category |
| 0.5-0.67 | Large decrease in odds compared to ref category | 1.20 - 1.50 | Moderate increase in odds compared to ref category |
| 0.67-0.83 | Moderate decrease in odds compared to ref category | 1.50 - 2.00 | Large increase in odds compared to ref category |
| 0.83-0.99 | Slight decrease in odds compared to ref category | >2 | Very large increase in odds compared to ref category |
| ≈ | No statistical difference to ref category (p>0.05) | | |

### *Differences in characteristics claiming GPMP/TCA between two time periods – baseline (c. 2008) versus follow-up (c. 2012-2013)*

This analysis explores differences across two time-periods (baseline and the 2012-2013 follow-up) in the use of GPMP/TCA items within the CES area. While follow-up information (approximately five years after baseline) is now becoming available, at this stage it is incomplete, and some coding issues are still being addressed. As such, only some participant characteristics are presented, and data are only included for those who responded to the follow-up survey (n= 11,760; approximately 44% of the baseline CES sample). The results should be treated with some caution as there may be some bias due to non-response in the follow-up survey.

In part one it was shown that that the proportion of CES cohort claiming a GPMP/TCA has increased over time. This analysis investigates whether there have been any changes in the characteristics of those utilising these items.

- Overall there was growth in use of GPMP/TCA items between baseline and follow-up:
    - 18.4% of participants claimed at least once in the baseline period compared to 24.0% at follow-up.

The results presented in Figures 22-25 show:

- The pattern of relationships between participant characteristics and use of GPMP/TCA items was very similar within the baseline and follow-up time-periods:
    - In both time periods, GPMPs/TCAs appeared targeted towards both socio-demographic and health need.
- Growth was fairly evenly distributed across most participant groups with some exceptions:
    - AGE - There was a greater increase in the proportion of people with a GPMP/TCA at follow-up compared to baseline in the older age groups, for example:
        - At baseline 32.9% of those aged 85 years and over had a GPMP/TCA compared to 43.4% of those aged 85 years and over in the follow-up time period – an increase of 10.5 percentage points (Figure 22).
        - 21.6% of those aged 60-74 years had a GPMP/TCA at baseline compared to 24.3% at follow-up – an increase of only 2.7 percentage points (Figure 22).
    - EDUCATION – there was highest growth in the group with less than year 12 as their highest educational level (Figure 22).
    - PSYCHOLOGICAL DISTRESS – there was highest growth in use in the group classified as “very high” (10.3 percentage points) and lowest in the group classified as “high” (2.6 percentage points) (Figure 24).
    - QUALITY OF LIFE (QoL) – higher growth in those who had not rated their quality of life as “good”, “very good” or “excellent” compared to those who had not (Figure 23).
    - GP USE – there was increasing growth in use of these items with increasing use of GP services (1.9 percentage point increase among those who visited the GP two or fewer times per year on average compared to a 10.9 percentage point increase among those who visited the GP 10 or more times per year) (Figure 25).

Factors such as: lower education, lower rated quality of life, higher GP use and increased psychological distress are all associated with increased age. This suggests that the changes observed in utilisation patterns over time may, in part, be explained by an increasing trend to use these MBS items for people within the older age groups. Further investigation of changes over time will be possible when more complete follow-up data are available.

**FIGURE 22: PROPORTION OF CES COHORT WITH A GPMP OR TCA IN THE BASELINE COMPARED TO FOLLOW-UP TIME PERIODS, BY SOCIO-DEMOGRAPHIC CHARACTERISTICS AT BASELINE OR FOLLOW-UP RESPECTIVELY**

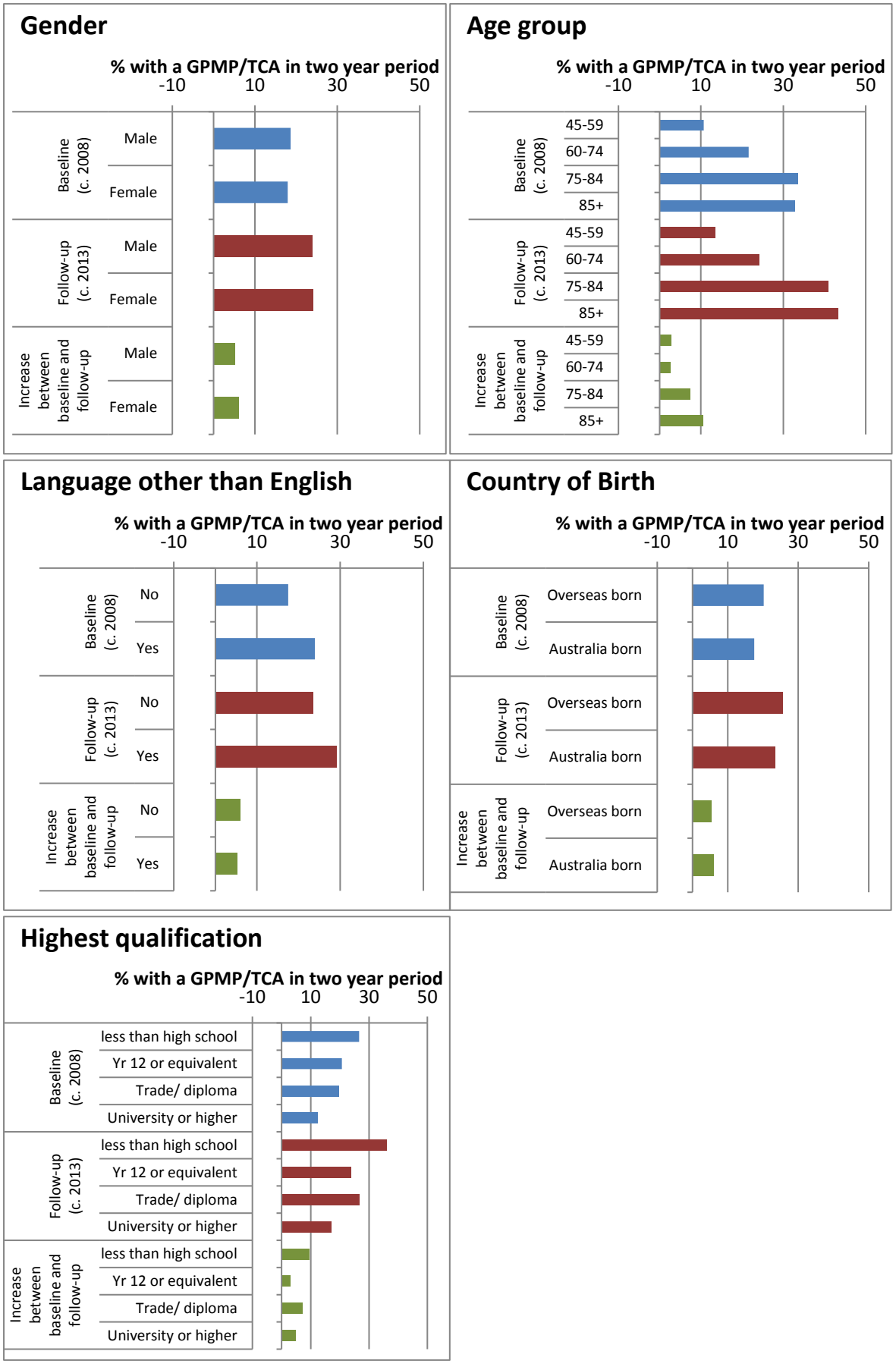


**FIGURE 23: PROPORTION OF CES COHORT WITH A GPMP OR TCA IN THE BASELINE COMPARED TO FOLLOW-UP TIME PERIODS, BY HEALTH RISK FACTOR CHARACTERISTICS AT BASELINE OR FOLLOW-UP RESPECTIVELY**

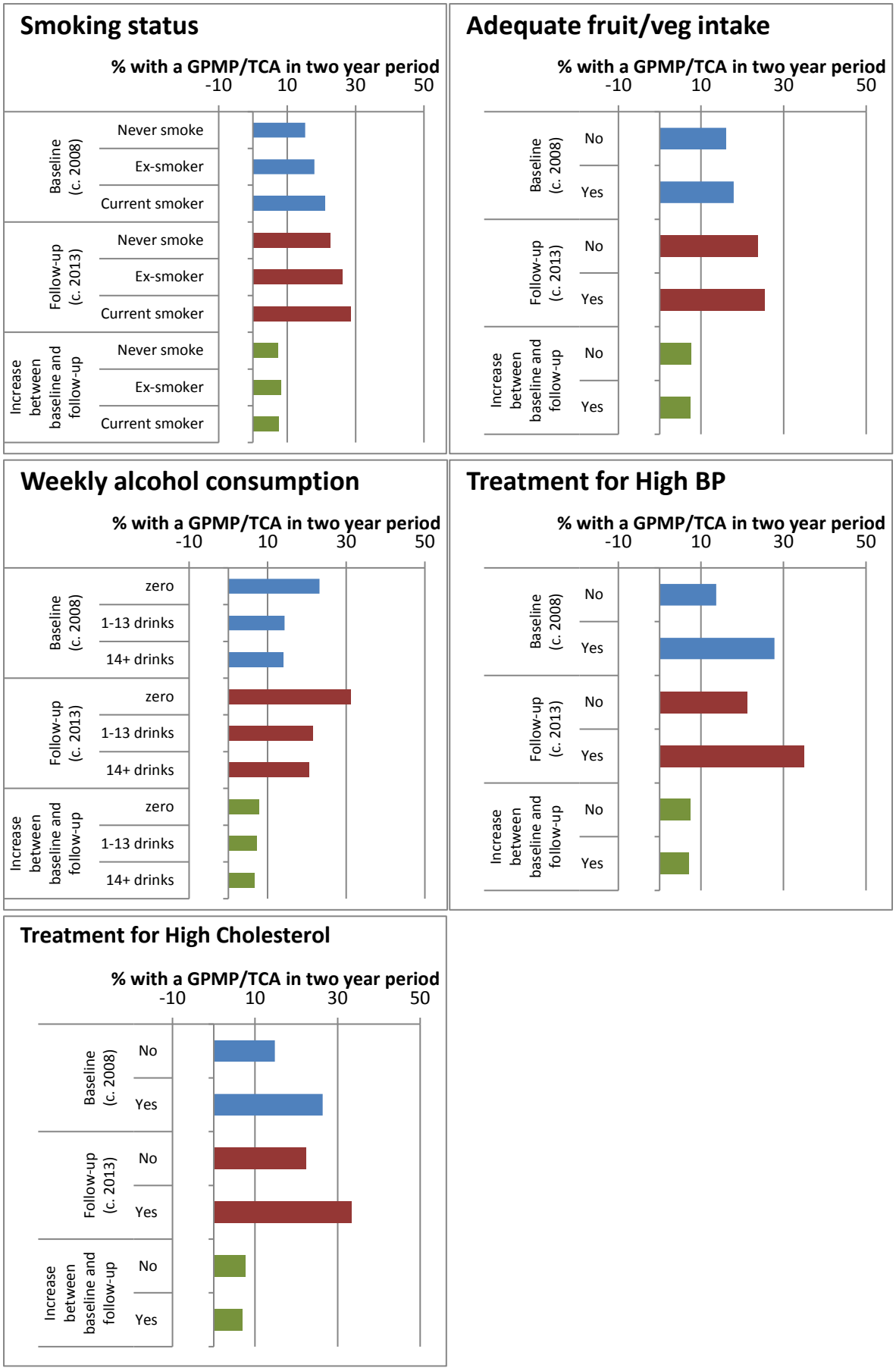


FIGURE 24: PROPORTION OF CES COHORT WITH A GPMP OR TCA IN THE BASELINE COMPARED TO FOLLOW-UP TIME PERIODS, BY HEALTH STATUS CHARACTERISTICS AT BASELINE OR FOLLOW-UP RESPECTIVELY

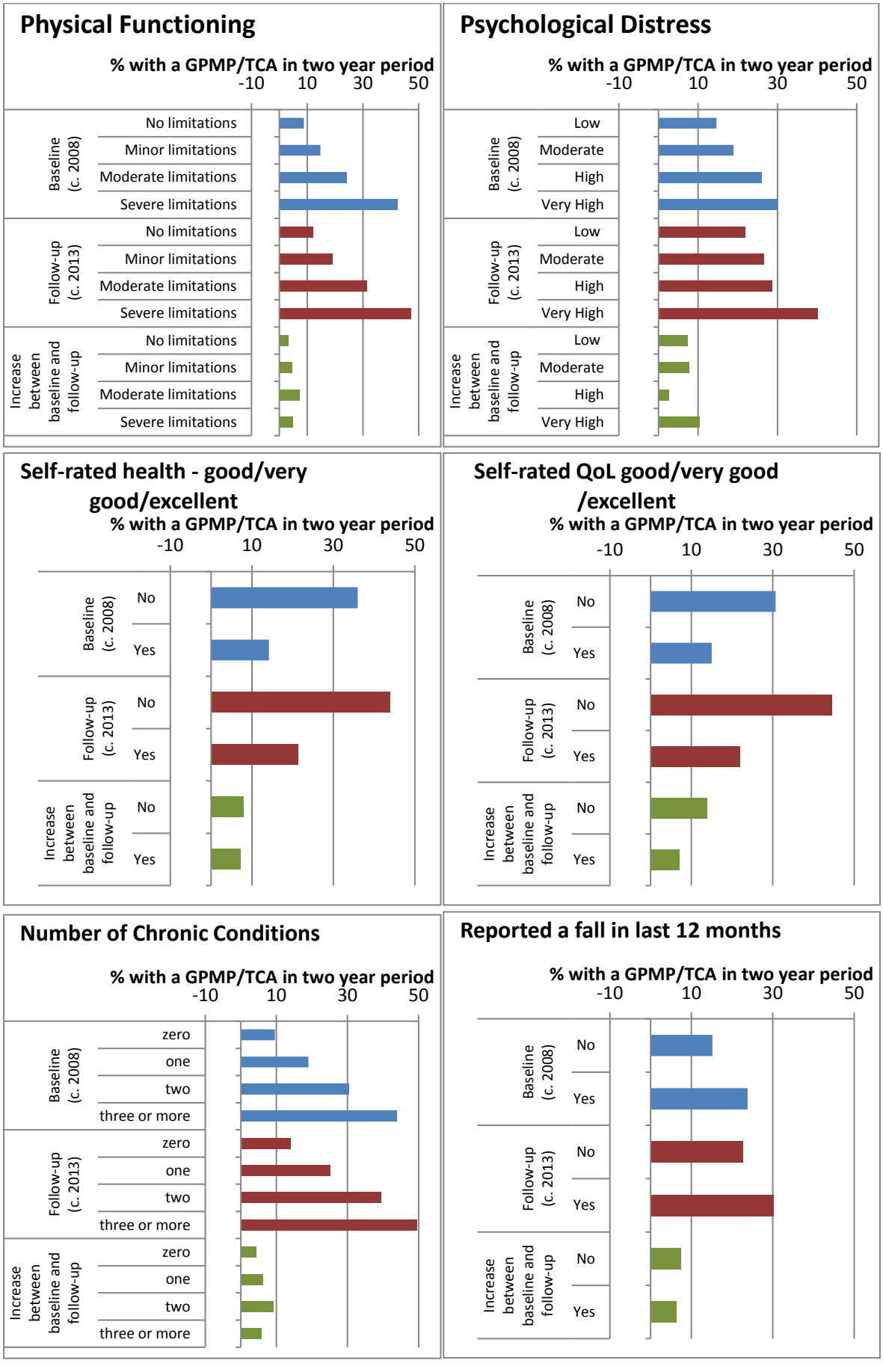
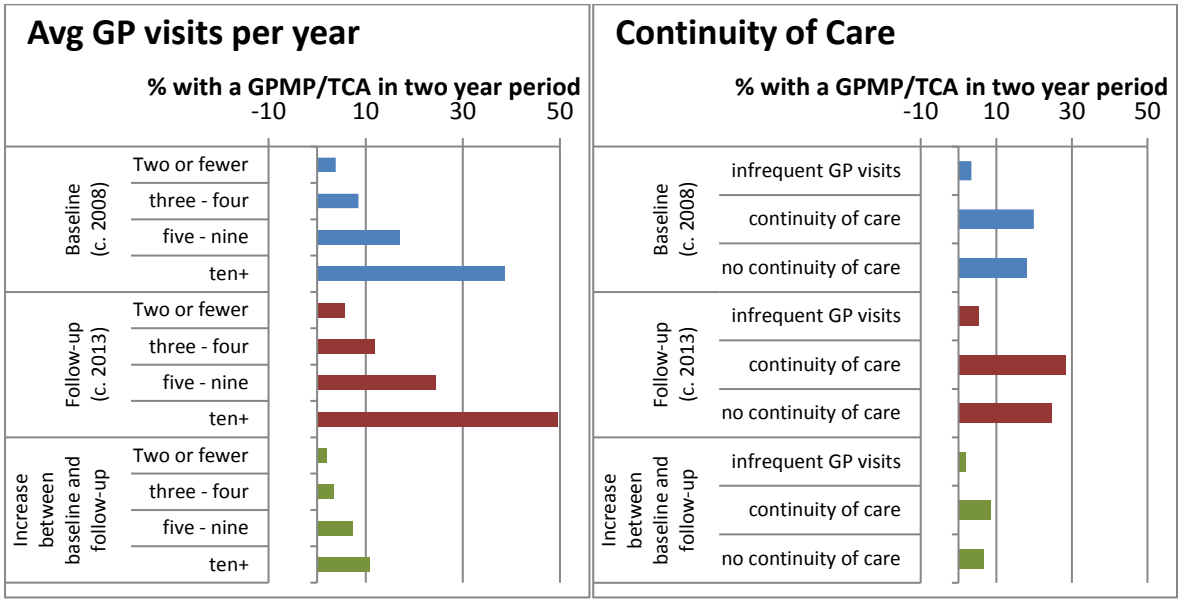


FIGURE 25: PROPORTION OF CES COHORT WITH A GPMP OR TCA IN THE BASELINE COMPARED TO FOLLOW-UP TIME PERIODS, BY HEALTH UTILISATION CHARACTERISTICS AT BASELINE OR FOLLOW-UP RESPECTIVELY




## 2.4 Summary of Results

Approximately one in four people claimed for a GPMP/TCA item in the CES area during the baseline period (approximately 2008). In general, use of GPMP/TCA items in the CES area was associated with socio-demographic and health need. This is as would be expected for items aimed at the management of complex chronic conditions and suggests that the items are being used within the patient groups intended by the program.

Within those who had a GPMP /TCA, less than one in three accessed a review item and there were few associations between patients' socio-demographic or health characteristics and the use of a GPMP/TCA review item. Bulk-billing status was related to use of review items with those bulk-billed all the time or those bulk billed most of the time more likely to have also been reviewed.

More people with a care plan accessed allied health (40%) and use of allied health items within this group was associated with higher socio-demographic need and poorer health status. Health insurance status was also associated with use of allied health with those who had private health insurance but no extras coverage using these items most frequently and those with a DVA card using the items least frequently. Those on a DVA card would get access to allied health through the DVA scheme. This suggests that the program has indeed been filling a need for those who do not have access to other means of support for private allied health.

Overall the pattern of characteristics of those who claimed for a GPMP/TCA were similar for people with diabetes and those with depression/anxiety. However, there were some interesting differences. The profile of people with diabetes who used a care plan item was less linked to age and health status compared to those with depression/anxiety.

# Part 3: Investigate whether access to measures of multidisciplinary/ integrated care is associated with reduced hospital admissions and emergency department visits

## 3.1 Aim

The aim of this section is to determine whether the measures of multidisciplinary/integrated care are associated with reduced hospital admissions or emergency department visits. Specifically, it seeks to address the following questions:

- After controlling for demographic, lifestyle, well-being and health service utilisation factors, are these measures of integrated care associated with:
  - reduced potentially preventable hospital admissions?
  - reduced emergency department visits that led to a hospital admission (emergency admission)?
- Is there a difference in the relationship between measures of multidisciplinary/integrated care and hospitalisations within different chronic disease groups?

## 3.2 Statistical Analysis

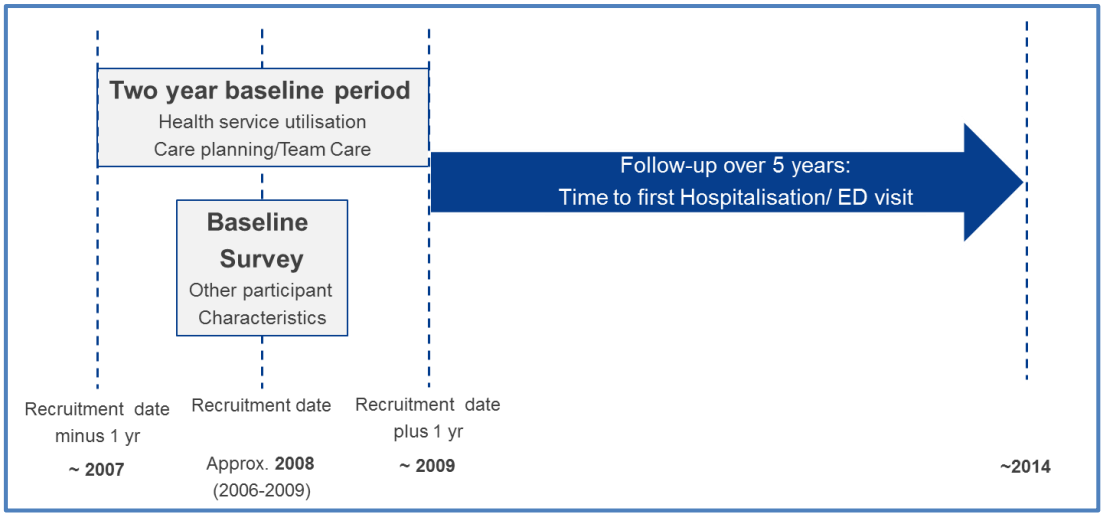
The sample and MBS measures of interest are defined in Table 1, 2 and 3 in the General Methods section.

This was a time to event analysis using information captured at baseline: either in the baseline 45 and Up Study survey or within the baseline period (+/- 1 year from date of recruitment to the 45 and Up Study) and hospital/ ED admissions in the five-year period following baseline. The multidisciplinary/ integrated care measures were included in two different ways:

(1) categorised to account for the number of times these items were used within the baseline period;
(2) as for 1, but including physiotherapy and podiatry separately instead of the grouped allied health variable.

Two outcomes were investigated: potentially preventable hospital (PPH) and emergency admission. These are defined further in table 3 in the General Methods section. Outcomes were censored at first hospitalisation, death or five years following recruitment date, whichever occurred first. Cox Proportional hazards regression modelling was used to examine the relationship between the MBS measures and these outcome variables, controlling for all socio-demographic, health risk factor, health status and health care utilisation factors. Figure 26 summarises the approach taken in this analysis.

**FIGURE 26: RESEARCH PROJECT DESIGN – FACTORS ASSOCIATED WITH TIME TO HOSPITALISATION/EMERGENCY DEPARTMENT (ED) VISIT**



## 3.3 Results

### *Association between multidisciplinary/integrated care measures and hospitalisation in the CES area*

The group of participants who utilised the measures of multidisciplinary/integrated care at baseline were also more likely to experience a hospital admission (PPH or emergency admission) in the five years that followed. For example, Table 9 shows that potentially preventable hospital admissions were twice as high in those who had a GPMP/TCA compared to those who did not for this time period.

However, the results from Part 2 demonstrated that these measures of multidisciplinary/ integrated care were also associated with higher socio-demographic need, increased health risk factors, poorer health status and higher health care utilisation which are also related to increased hospitalisation. When these factors are taken into account in the multivariable model, there is very little difference in rate of hospitalisation between those who used these measures and those who did not. This was found across both PPHs as well as emergency hospitalisations (See Figures 27 and 28). For potentially preventable hospitalisations, use of a GPMP/TCA review item was associated with a very slightly higher rate of hospitalisation but this relationship was not significant for emergency hospitalisations.

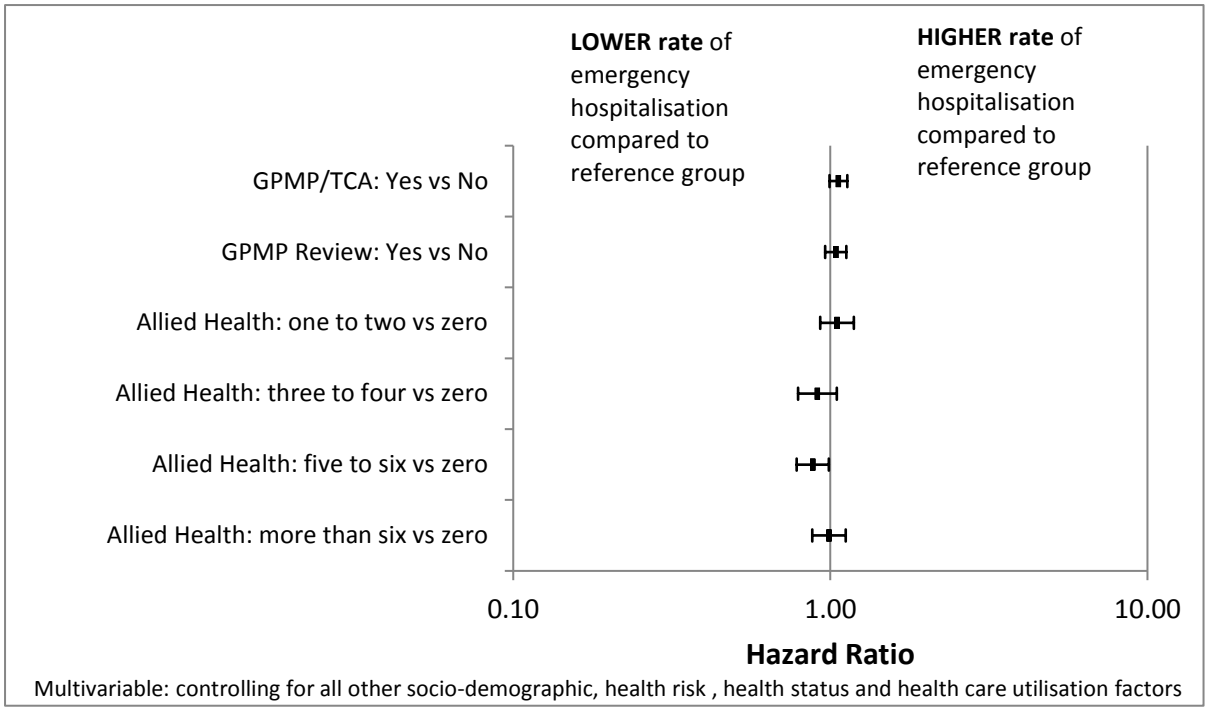
Both models did show a very similar, albeit small relationship between increased use of allied health care of up to five to six allied health items and a reduction in hospitalisation. Controlling for all other factors, those who accessed five to six allied health items experienced PPHs at 80% the rate (emergency hospitalisations at 88%) of those who used no allied health care.

A second model was investigated including the two most common type of allied health (podiatry and physiotherapy) separately. This showed similar patterns of association for physiotherapy and podiatry – a reduction in hospitalisations with increased utilisation peaking at 5-6 episodes – but also a greater reduction in hospitalisation rate for those using physiotherapy compared to podiatry (Figure 29).

**Table 9: Number and percent of CES cohort who experienced an emergency hospital admission or a potentially preventable hospital admission in the five years following baseline, by measures of integrated/multidisciplinary care - unadjusted**

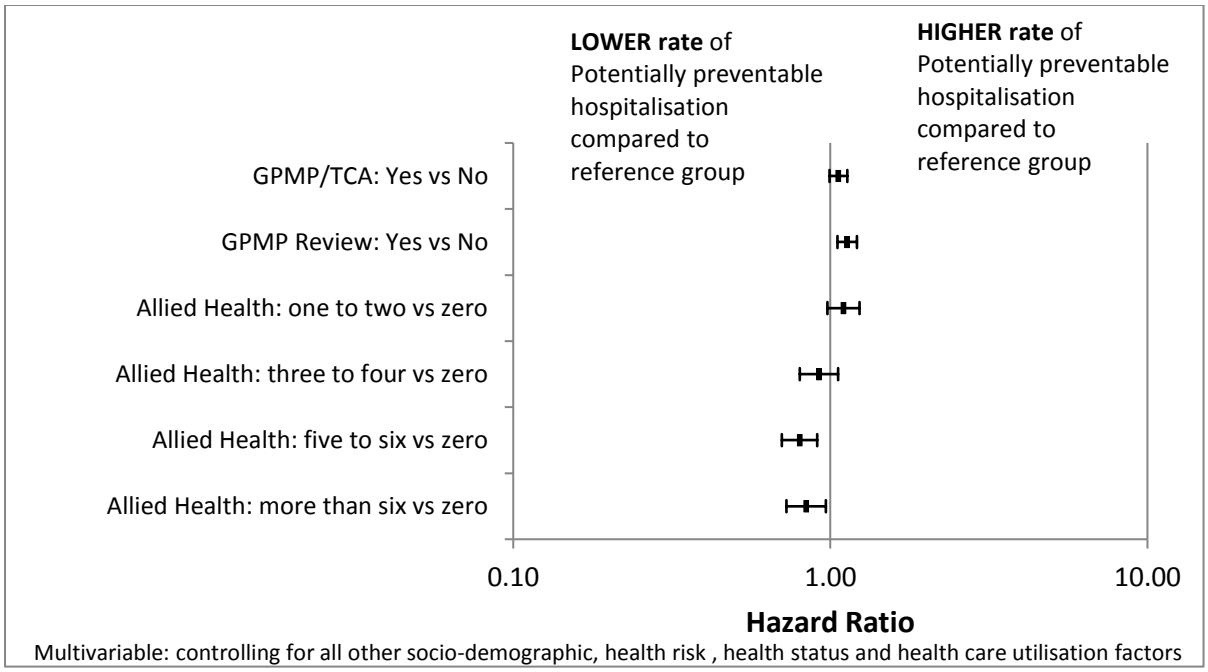
| Measures of integrated/multidisciplinary care | Hospitalisation within 5 years | | | |
|---|---|---|---|---|
| | Emergency admission | | Potentially Preventable Hospitalisation | |
| | N | % | N | % |
| GPMP or TCA at baseline | | | | |
| No | 4,829 | 23.5 | 2,219 | 10.8 |
| Yes | 2,494 | 43.2 | 1,249 | 21.6 |
| GPMP/TCA review at baseline | | | | |
| No | 6,349 | 26.3 | 2,953 | 12.3 |
| Yes | 974 | 44.5 | 515 | 23.5 |
| Number of Allied health items at baseline | | | | |
| No Allied Health | 6,093 | 25.8 | 2,846 | 12.1 |
| One-two | 309 | 45.8 | 163 | 24.2 |
| Three - four | 225 | 41.1 | 122 | 22.3 |
| Five - six | 357 | 42.9 | 175 | 21.0 |
| More than six | 339 | 53.9 | 162 | 25.8 |
| **Total** | **7,323** | **27.9** | **3,468** | **13.2** |

**FIGURE 27: COMPARISON OF HAZARD RATIOS: ASSOCIATION OF MULTIDISCIPLINARY/INTEGRATED CARE MEASURES WITH RATE OF EMERGENCY HOSPITALISATION, CONTROLLING FOR SOCIO-DEMOGRAPHIC, HEALTH RISK, HEALTH STATUS AND HEALTH CARE UTILISATION**



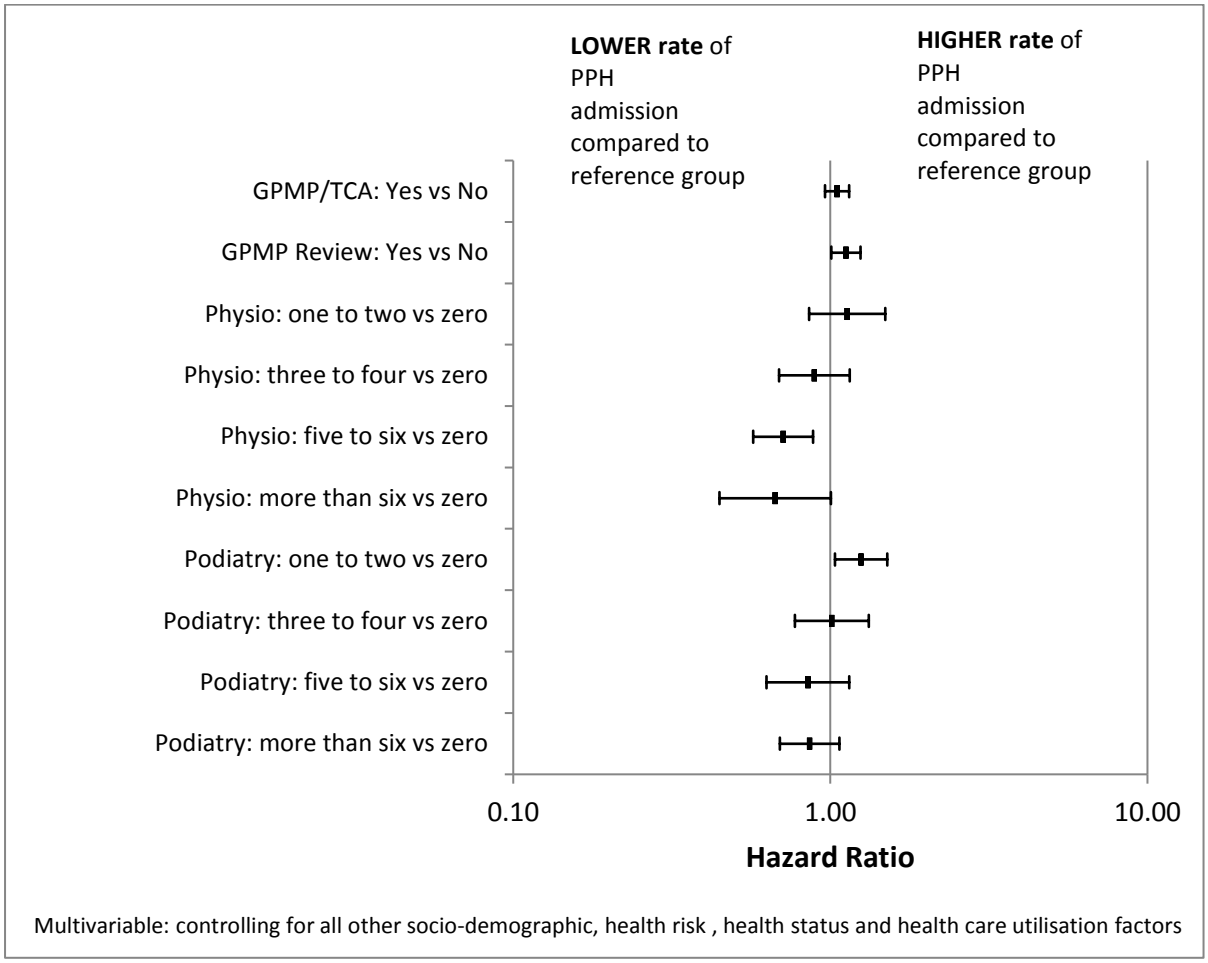

Multivariable: controlling for all other socio-demographic, health risk , health status and health care utilisation factors

**FIGURE 28: COMPARISON OF HAZARD RATIOS: ASSOCIATION OF MULTIDISCIPLINARY/INTEGRATED CARE MEASURES WITH RATE OF POTENTIALLY PREVENTABLE HOSPITALISATION, CONTROLLING FOR SOCIO-DEMOGRAPHIC, HEALTH RISK, HEALTH STATUS AND HEALTH CARE UTILISATION**




Multivariable: controlling for all other socio-demographic, health risk , health status and health care utilisation factors

**FIGURE 29: COMPARISON OF HAZARD RATIOS INCLUDING PHYSIOTHERAPY AND PODIATRY SEPARATELY: ASSOCIATION OF MULTIDISCIPLINARY/INTEGRATED CARE MEASURES WITH RATE OF POTENTIALLY PREVENTABLE HOSPITALISATION (PPH), CONTROLLING FOR SOCIO-DEMOGRAPHIC, HEALTH RISK, HEALTH STATUS AND HEALTH CARE UTILISATION**




### *Association between multidisciplinary/integrated care measures and hospitalisation in New South Wales area, by condition type*

The full NSW cohort was used in order to provide a larger sample to examine whether the relationship between measures of multidisciplinary/integrated care varied by type of chronic condition. Only PPHs were investigated. The same model was applied to the NSW, CES and NSW – condition specific cohorts. This included controlling for all socio-demographic, health risk, health status and health care utilisation factors.

There were some slight differences in findings between the CES cohort and NSW cohort which can mostly be explained by the much larger sample size for NSW. Within the NSW cohort, having used a GPMP/TCA or a review item at baseline were both still associated with a slightly higher rate of hospitalisations after controlling for all other factors (only a review item was associated with marginally higher hospitalisations in CES). A similar pattern existed for allied health in NSW as well as CES in which those with lower use of allied health were associated with slightly higher hospitalisation compared to zero use but those with five to six allied health items at baseline were associated with lower hospitalisation rates.

Two condition specific groups are presented for NSW (Table 10) – those who reported being diagnosed with diabetes and those who reported a depression or anxiety diagnosis. There were no major differences in pattern of association with hospitalisations between the two groups and the NSW cohort as a whole. The smaller sample for diabetes meant that no associations were statistically significant in this group.

**Table 10: Comparison of Hazard Ratios for four groups (i) CES cohort; (ii) NSW cohort; (iii) NSW cohort with diabetes; (iv) NSW cohort with depression/anxiety: association of multidisciplinary/integrated care measures with rate of potentially preventable hospitalisation (PPH)**

| | PPH– CES<br>n = 26,291<br>HR* | PPH - NSW<br>n = 227,840<br>HR* | PPH -diabetes NSW<br>n = 20,385<br>HR* | PPH - depression/ anxiety - NSW<br>n = 44,221<br>HR* |
|---|---|---|---|---|
| GPMP/TCA at baseline | | | | |
| No | 1 | 1 | 1 | 1 |
| Yes | ≈ | 1.14 | ≈ | 1.10 |
| GPMP/TCA review at baseline | | | | |
| No | 1 | 1 | 1 | 1 |
| Yes | 1.13 | 1.08 | ≈ | 1.10 |
| Allied health at baseline | | | | |
| No allied health | 1 | 1 | 1 | 1 |
| One-two | ≈ | 1.06 | ≈ | ≈ |
| Three - four | ≈ | 1.09 | ≈ | ≈ |
| Five - six | 0.80 | 0.94 | ≈ | ≈ |
| More than six | | | | |

*controlling for all socio-demographic, health risk, health status and health care utilisation factors

**Key**

| | | | |
|---|---|---|---|
| OR<0.5 | Very large decrease in hazard compared to ref category | 1.01 - 1.20 | Slight increase in hazard compared to ref category |
| 0.5-0.67 | Large decrease in hazard compared to ref category | 1.20 - 1.50 | Moderate increase in hazard compared to ref category |
| 0.67-0.83 | Moderate decrease in hazard compared to ref category | 1.50 - 2.00 | Large increase in hazard compared to ref category |
| 0.83-0.99 | Slight decrease in hazard compared to ref category | >2 | Very large increase in hazard compared to ref category |
| ≈ | No statistical difference to ref category (p>0.05) | | |

## 3.4 Summary of Results

Having claimed for a GPMP/TCA at baseline or used one of the affiliated MBS items (such as a review or allied health) was associated with higher rates of emergency department visits and PPH in the subsequent five years. However, after controlling for confounding factors such as socio-demographic need, health risk, health status and health care utilisation of these individuals, this relationship was considerably reduced with no significant difference in either emergency or PPE rates between those who claimed for a GPMP/TCA and those who did not.

Use of the review item was very marginally associated with higher PPH admissions but not emergency admissions. Use of allied health care was related in a complex manner with hospital admissions: those who accessed five or six allied health items at baseline had lower rates of both emergency admission and PPH compared to those who had not used allied health.

Further investigation of the two most common types of allied health care used showed that the relationship with reduced hospitalisation rate was stronger for physiotherapy compared to podiatry.

There were no major differences found in patterns of association of these items with hospitalisation within the different chronic condition types.

## Discussion

This research project explored the use of MBS CDM items within a cohort of community-dwelling older people residing in the CES region.

There has been an increasing trend in the use of the CDM items within this cohort with the strongest growth in the use of allied health items over time. It is plausible that increased awareness of the availability of subsidised private allied health both in the GP and general population is, at least in part, driving the increased use of care planning items. However, in general, use of GPMPs or TCAs was linked to socio-demographic and health need: those from poorer households, less educated and with more risk factors and poorer health were the most likely to access a GPMP or TCA. The profile of users of GPMP/TCAs and allied health items is consistent with that of chronic disease and complex care needs suggesting that the use of these items by GPs has been focussed on the populations intended by the CDM program.

Further comparisons over time suggested that there has been a shift in the type of allied health being accessed. The largest growth by far has been in the use of the podiatry items, followed by practice nurse items. There has also been largest growth in the use of these items within the older age groups. Use of other allied health services such as physiotherapy, dietetics and exercise physiology were not as commonly claimed in the oldest age groups and these groups also did not experience as large growth over time in use of their respective allied health items. It is possible that these older age groups are accessing these services but it may be that these types of services are more adequately met within the hospital or community health setting and so referral to a private service is not required. While physiotherapy was the second most frequently used allied health item within the CDM scheme, the other types of allied health service may also not be as commonly considered in patient-GP interactions or it may be that these services are not so readily available in the area.

The use of GPMP/TCA review items was low – only one in three patients with a GPMP/TCA accessed a review within twelve months even though these review items can be billed every three months. There were also fewer patient factors associated the use of a review item, with the only clear associations being the bulk-billing status of a patient: those bulk-billed all the time or most of the time were more likely to have used a review item. This suggests that the use of the review items may be more dependent on other factors such as characteristics of the GP or practice. This is not to say that a patient's care plan was not reviewed if there was no Review item billed – it may be that the financial incentive to use these items over a standard billing item (e.g. item '23' or '36') is not of great consequence unless a patient is generally bulk-billed.

Growth in the use of GPMP/TCA and affiliated items has been slightly slower in the CES area compared to NSW as a whole. The population profile of CES compared to NSW as a whole is generally more affluent and also healthier. This would explain a lower rate of chronic disease and thus use of the CDM items but it would not necessarily explain a different growth trajectory. Differences in the CES area compared to NSW as a whole in the use of particular allied health services as well as practice nurses may explain some of the difference in rate of growth. For example, it is possible that the uptake of practice nurses in the CES area has been slower than other areas and that this driver for use of the CDM items has been lagging behind other areas.

The relationship between use of GPMP/TCA items and subsequent rate of hospitalisation is complex. In general, the group of people with a GPMP/TCA in place were a high risk group for hospitalisations with this group experiencing approximately twice the rate of hospitalisations within a five year period compared to those without a GPMP/TCA. However, almost all of this increased rate can be explained by the socio-demographic and health factors that are associated with chronic and complex conditions and thus the likelihood of having a care plan in the first place.

After controlling for these factors there was no clear evidence that GPMP/TCAs were associated with reduced rates of hospitalisation but there was some evidence that those that also accessed a certain amount of allied health care did have a reduced rate of hospitalisation. Accessing only one or two items did not seem enough, but accessing at least five or six items within the two-year baseline period was associated with lower hospitalisation rates. This effect was stronger for physiotherapy compared to podiatry. It is possible that the allied health care did act to more effectively manage a person's condition and so prevent hospitalisations. However, it is also possible that accessing these treatments reflects a generally higher level of functioning of an individual and that this is why hospitalisations appear lower. Further research would be required to assess causality of this relationship.

### Relevance for Health Services

The current research project highlights a number of trends and associations that will have relevance for planning health service delivery in the CES area.

Over time there has been an increasing use of CDM items, particularly for allied health items such as podiatry as well as the practice nurse items. The increase has not been as steep for the CES area compared to NSW as a whole. There may be differences in population structures underlying this (such as rate of increase of chronic conditions) but it may also be relevant to consider whether there are any systemic factors that prevent uptake of these items, for example lower rates of practice nurses within CES compared to other parts of NSW.

Generally, the use of these items appeared targeted to a group whose profile of socio-demographic and health need was consistent with those who have chronic and complex conditions. However, the GPMP/TCA review items had relatively low rates of use and the link with socio-demographic and health need was less clear.

While it was difficult to test causal assumptions within this research project, there was no evidence that GPMPs/TCAs by themselves were leading to a reduction in unplanned hospital admissions. However, there were associations found between use of allied health items and reduced hospital admissions. This link may be due to a positive protective effect from more effective multidisciplinary management of chronic conditions or may reflect a difference in health status of those individuals seeking allied health care. Further research is needed to clarify this finding.

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# Appendices

## Appendix A: Multivariate associations for a review of GPMP/TCA

**Table A1: Multivariate associations between socio-demographic, risk, health status, health care use factors and claims for a review of GPMP/TCA within 12 months by CES cohort who had a GPMP/TCA at baseline - (n=5,771)**

**Socio-demographic Factors**

| Characteristic | Claim for GPMP/TCA review within 12 months of preparation of GPMP/TCA | | Model 1: Full Model | |
|---|---|---|---|---|
| | n | % of those with a GPMP/TCA | OR | 95% CI |
| Gender | | | | |
| Male | 852 | 31.4 | 1 | |
| Female | 914 | 29.9 | 0.89 | (0.78-1.01) |
| Age group | | | | |
| 45-59 years | 434 | 27.4 | 1 | |
| 60-74 years | 714 | 33.0 | 1.16 | (0.97-1.37) |
| 75-84 years | 506 | 31.0 | 0.96 | (0.78-1.18) |
| 85 years and over | 112 | 28.9 | 0.91 | (0.68-1.21) |
| Language other than English | | | | |
| No | 1,313 | 31.6 | 1 | |
| Yes | 453 | 28.0 | **0.83** | **(0.70-0.98)** |
| Born Overseas | | | | |
| Overseas born | 725 | 29.5 | 1.01 | (0.87-1.18) |
| Australia born | 1,041 | 31.4 | 1 | |
| Highest educational attainment | | | | |
| Less than high school | 690 | 30.9 | 1.08 | (0.91-1.28) |
| Year 12 or equivalent | 206 | 29.6 | 1.03 | (0.84-1.28) |
| Trade/diploma | 503 | 31.4 | 1.09 | (0.92-1.29) |
| University or higher | 367 | 29.5 | 1 | |
| Yearly household income | | | | |
| <$20,000 | 533 | 30.7 | 0.81 | (0.64-1.03) |
| $20,000 to $39,999 | 276 | 29.5 | **0.75** | **(0.59-0.95)** |
| $40,000 to $69,999 | 222 | 30.0 | 0.81 | (0.64-1.01) |
| $70,000 or more | 268 | 31.7 | 1 | |
| Won't disclose | 467 | 30.9 | 0.84 | (0.67-1.06) |
| Work status | | | | |
| Not working | 1,261 | 31.4 | 1.10 | (0.89-1.35) |
| Part time | 221 | 29.3 | 1.03 | (0.82-1.28) |
| Full time | 284 | 28.3 | 1 | |
| Housing type | | | | |
| House | 1,128 | 30.3 | 1 | |
| Flat or unit | 578 | 30.7 | 1.07 | (0.95-1.22) |
| Nursing home | 10 | 29.4 | 1.15 | (0.54-2.46) |
| Other | 50 | 37.6 | **1.49** | **(1.04-2.15)** |
| Health insurance status | | | | |
| None | 250 | 28.4 | 0.90 | (0.75-1.08) |
| Private w/ extras | 854 | 31.7 | 1 | |
| Private no extras | 246 | 30.4 | 0.92 | (0.77-1.10) |
| DVA health care card only | 6 | 13.6 | **0.32** | **(0.13-0.77)** |
| Health care card only | 410 | 30.6 | 0.95 | (0.81-1.13) |
| **TOTAL** | **1,766** | **30.6** | | |

**Health Risk Factors**

| Characteristic | Claim for GPMP/TCA review within 12 months of preparation of GPMP/TCA | | Model 1: Full Model | |
|---|---|---|---|---|
| | n | % of those with a GPMP/TCA | OR | 95% CI |
| Smoking status | | | | |
| Never smoke | 1,016 | 31.5 | 1 | |
| Ex-smoker | 636 | 30.2 | 0.91 | (0.80-1.03) |
| Current smoker | 114 | 25.6 | **0.76** | **(0.60-0.96)** |
| Sufficient physical exercise | | | | |
| No | 655 | 29.6 | 1 | |
| Yes | 1,111 | 31.2 | 1.04 | (0.92-1.18) |
| Sufficient fruit and vegetable intake | | | | |
| No | 1,373 | 30.3 | 1 | |
| Yes | 393 | 31.8 | 1.05 | (0.91-1.21) |
| Alcohol intake per week | | | | |
| Zero | 763 | 29.9 | 1 | |
| 1-13 drinks | 742 | 31.2 | 1.04 | (0.91-1.18) |
| 14+ drinks | 261 | 31.2 | 1.02 | (0.85-1.23) |
| BMI category | | | | |
| Underweight | 187 | 28.8 | 0.91 | (0.74-1.11) |
| Normal weight | 547 | 31.6 | 1 | |
| Overweight | 636 | 31.1 | 0.97 | (0.84-1.11) |
| Obese | 396 | 29.4 | 0.87 | (0.74-1.03) |
| Taking medication for high blood pressure | | | | |
| No | 1,138 | 29.8 | 1 | |
| Yes | 628 | 32.3 | 1.12 | (0.98-1.28) |
| Taking medication for high cholesterol | | | | |
| No | 1,373 | 30.3 | 1 | |
| Yes | 393 | 31.6 | 1.00 | (0.86-1.16) |
| **TOTAL** | **1,766** | **30.6** | | |

**Health Status Factors**

| Characteristic | Claim for GPMP/TCA review within 12 months of preparation of GPMP/TCA | | Model 1: Full Model | |
|---|---|---|---|---|
| | n | % of those with a GPMP/TCA | OR | 95% CI |
| Physical functioning | | | | |
| No limitations | 299.0 | 29.4 | 1 | |
| Minor limitations | 336.0 | 30.5 | 1.02 | (0.84-1.23) |
| Moderate limitations | 483.0 | 31.9 | 1.10 | (0.91-1.32) |
| Severe limitations | 405.0 | 29.8 | 1.09 | (0.87-1.36) |
| Not available | 243.0 | 31.1 | 1.15 | (0.91-1.44) |
| Psychological distress | | | | |
| Low psychological distress | 1,068.0 | 31.6 | 1 | |
| Moderate psychological distress | 235.0 | 27.6 | 0.86 | (0.72-1.03) |
| High psychological distress | 120.0 | 30.3 | 1.04 | (0.82-1.33) |
| Very high psychological distress | 61.0 | 26.1 | 0.84 | (0.61-1.17) |
| Not available | 282.0 | 31.2 | 1.00 | (0.84-1.19) |
| Health self-rated as "good" or "very good" | | | | |
| No | 501.0 | 29.3 | 0.97 | (0.82-1.14) |
| Yes | 1,265.0 | 31.2 | 1 | |
| Quality of life self-rated as "good" or "very good" | | | | |
| No | 414.0 | 28.6 | 0.92 | (0.78-1.09) |
| Yes | 1,352.0 | 31.3 | 1 | |
| Number of chronic conditions | | | | |
| Zero | 515.0 | 29.7 | 1 | |
| One | 695.0 | 31.6 | 1.05 | (0.91-1.21) |
| Two | 379.0 | 30.5 | 0.98 | (0.83-1.16) |
| Three or more | 177.0 | 29.8 | 0.94 | (0.75-1.18) |
| Needs help for a disability | | | | |
| No | 1,600.0 | 30.9 | 1 | |
| Yes | 166.0 | 28.2 | 0.91 | (0.74-1.13) |
| Self-reported a fall in the last 12 months | | | | |
| No | 1,342.0 | 30.0 | 1 | |
| Yes | 424.0 | 32.8 | **1.18** | **(1.02-1.36)** |
| **TOTAL** | **1,766** | **30.6** | | |

**Health Care Utilisation Factors**

| Characteristic | Claim for GPMP/TCA review within 12 months of preparation of GPMP/TCA | | Model 1: Full Model | |
|---|---|---|---|---|
| | n | % of those with a GPMP/TCA | OR | 95% CI |
| Average GP visits per annum in baseline period^(standard visits) | | | | |
| Two or fewer | 46 | 25.0 | 1 | |
| Three – four | 132 | 26.9 | 1.52 | (0.86-2.69) |
| Five – nine | 584 | 30.8 | **1.75** | **(1.02-3.02)** |
| Ten plus | 1,004 | 31.4 | **1.83** | **(1.06-3.18)** |
| Continuity of care (provider) at baseline^ | | | | |
| Infrequent GP visits | 33 | 30.3 | **2.12** | **(1.10-4.09)** |
| Continuity of care | 1,008 | 31.1 | 1.05 | (0.93-1.18) |
| No continuity of care | 725 | 29.9 | 1 | |
| Hospitalisation in two-year baseline period^ | | | | |
| No | 784 | 30.6 | 1 | |
| Yes | 982 | 30.6 | 0.93 | (0.82-1.05) |
| Saw a specialist in two-year baseline period^ | | | | |
| No | 188 | 26.9 | 1 | |
| Yes | 1,578 | 31.1 | 1.14 | (0.94-1.39) |
| Bulk-billing status at baseline^ | | | | |
| All visits bulk-billed | 1,291 | 31.1 | **1.58** | **(1.01-2.47)** |
| >50% visits bulk-billed | 293 | 32.2 | 1.58 | (0.99-2.51) |
| <= 50% visits bulk-billed | 122 | 25.1 | 1.11 | (0.68-1.80) |
| No visits bulk-billed | 27 | 23.1 | 1 | |
| **TOTAL** | **1,766** | **30.6** | | |

^ baseline period defined as +/- 12 months from date of recruitment

**Table A2: Multivariate associations between socio-demographic, risk, health status, health care use factors and Claims for allied health services within 12 months by the CES cohort who had a GPMP/TCA at baseline - (n=5,771)**

**Socio-demographic Factors**

| Characteristic | Claim for allied health within 12 months of GPMP/TCA | | Model 1: Full Model | |
|---|---|---|---|---|
| | n | % of all with a GPMP/TCA | OR | 95% CI |
| Gender | | | | |
| Male | 966 | 35.6 | 1 | |
| Female | 1,471 | 48.1 | **1.45** | **(1.28-1.63)** |
| Age group | | | | |
| 45-59 years | 575 | 36.3 | 1 | |
| 60-74 years | 907 | 41.9 | 1.05 | (0.89-1.24) |
| 75-84 years | 766 | 46.9 | 1.05 | (0.86-1.28) |
| 85 years and over | 189 | 48.8 | 1.08 | (0.82-1.42) |
| Language other than English | | | | |
| No | 1,789 | 43.1 | 1 | |
| Yes | 648 | 40.1 | 0.91 | (0.77-1.07) |
| Born overseas | | | | |
| Overseas born | 980 | 39.9 | 0.91 | (0.79-1.06) |
| Australia born | 1,457 | 44.0 | 1 | |
| Highest educational attainment | | | | |
| Less than high school | 1,033 | 46.3 | 1.04 | (0.88-1.22) |
| Year 12 or equivalent | 280 | 40.2 | 0.97 | (0.79-1.19) |
| Trade/diploma | 663 | 41.4 | 1.04 | (0.88-1.22) |
| University or higher | 461 | 37.1 | 1 | |
| Yearly household income | | | | |
| <$20,000 | 783 | 45.1 | 1.18 | (0.94-1.49) |
| $20,000 to $39,999 | 400 | 42.7 | 1.20 | (0.96-1.51) |
| $40,000 to $69,999 | 288 | 38.9 | 1.11 | (0.88-1.38) |
| $70,000 or more | 274 | 32.4 | 1 | |
| Won't disclose | 692 | 45.8 | 1.21 | (0.97-1.51) |
| Work status | | | | |
| Not working | 1,820 | 45.4 | 1.11 | (0.91-1.36) |
| Part time | 289 | 38.3 | 0.99 | (0.80-1.23) |
| Full time | 328 | 32.7 | 1 | |
| Housing type | | | | |
| House | 1,577 | 42.4 | 1 | |
| Flat or unit | 788 | 41.8 | 0.98 | (0.87-1.11) |
| Nursing home | 19 | 55.9 | 1.43 | (0.70-2.93) |
| Other | 53 | 39.8 | 0.90 | (0.62-1.30) |
| Health insurance status | | | | |
| None | 331 | 37.7 | 0.88 | (0.74-1.04) |
| Private w/ extras | 1,124 | 41.7 | 1.0 | |
| Private no extras | 403 | 49.8 | **1.28** | **(1.08-1.51)** |
| DVA health care card only | 11 | 25.0 | **0.39** | **(0.19-0.80)** |
| Health care card only | 568 | 42.3 | 0.88 | (0.75-1.03) |
| **TOTAL** | **2,437** | **42.2** | | |

**Health Risk Factors**

| Characteristic | Claim for Allied Health within 12 months of GPMP/TCA | | Model 1: Full Model | |
|---|---|---|---|---|
| | n | % of all with a GPMP/TCA | OR | 95% CI |
| Smoking status | | | | |
| Never smoke | 1,455 | 45.2 | 1 | |
| Ex-smoker | 845 | 40.2 | 0.89 | (0.79-1.00) |
| Current smoker | 137 | 30.7 | **0.63** | **(0.50-0.79)** |
| Sufficient physical exercise | | | | |
| No | 998 | 45.1 | 1 | |
| Yes | 1,439 | 40.4 | 0.97 | (0.86-1.09) |
| Sufficient fruit and vegetable intake | | | | |
| No | 1,895 | 41.8 | 1 | |
| Yes | 542 | 43.9 | 0.98 | (0.86-1.12) |
| Alcohol intake per week | | | | |
| Zero | 1,164 | 45.6 | 1 | |
| 1-13 drinks | 984 | 41.3 | 0.97 | (0.86-1.10) |
| 14+ drinks | 289 | 34.6 | 0.86 | (0.72-1.04) |
| BMI category | | | | |
| Underweight | 283 | 43.6 | 1.08 | (0.89-1.31) |
| Normal weight | 685 | 39.5 | 1 | |
| Overweight | 848 | 41.5 | **1.16** | **(1.01-1.32)** |
| Obese | 621 | 46.1 | **1.30** | **(1.12-1.52)** |
| Taking medication for high blood pressure | | | | |
| No | 1,595 | 41.7 | 1 | |
| Yes | 842 | 43.3 | 0.89 | (0.78-1.01) |
| Taking medication for high cholesterol | | | | |
| No | 1,905 | 42.1 | 1 | |
| Yes | 532 | 42.8 | 0.96 | (0.83-1.11) |
| **TOTAL** | **2,437** | **42.2** | | |

**Health Status Factors**

| Characteristic | Claim for allied health within 12 months of GPMP/TCA | | Model 1: Full Model | |
|---|---|---|---|---|
| | n | % of all with a GPMP/TCA | OR | 95% CI |
| Physical Functioning | | | | |
| No limitations | 335 | 32.9 | 1 | |
| Minor limitations | 378 | 34.4 | 0.98 | (0.82-1.19) |
| Moderate limitations | 685 | 45.2 | **1.29** | **(1.07-1.54)** |
| Severe limitations | 707 | 52.1 | **1.47** | **(1.19-1.81)** |
| Not Available | 332 | 42.5 | 1.16 | (0.93-1.44) |
| Psychological Distress | | | | |
| Low psychological distress | 1,383 | 40.9 | 1 | |
| Moderate psychological distress | 374 | 43.9 | 1.06 | (0.90-1.25) |
| High psychological distress | 177 | 44.7 | 1.00 | (0.79-1.26) |
| Very high psychological distress | 101 | 43.2 | 0.91 | (0.67-1.22) |
| Not Available | 402 | 44.5 | 0.90 | (0.76-1.06) |
| Health self-rated as "Good" or "Very Good" | | | | |
| No | 792 | 46.3 | 0.94 | (0.81-1.10) |
| Yes | 1,645 | 40.5 | 1 | |
| Quality of life self-rated as "Good" or "Very Good" | | | | |
| No | 667 | 46.0 | 1.06 | (0.90-1.24) |
| Yes | 1,770 | 41.0 | 1 | |
| Number of chronic conditions | | | | |
| Zero | 643 | 37.1 | 1 | |
| One | 889 | 40.4 | 1.00 | (0.87-1.15) |
| Two | 591 | 47.6 | **1.19** | **(1.01-1.40)** |
| Three or more | 314 | 52.9 | **1.26** | **(1.02-1.55)** |
| Receives help for a disability | | | | |
| No | 2,138 | 41.3 | 1 | |
| Yes | 299 | 50.9 | 0.98 | (0.80-1.20) |
| Self-reported a fall in the last 12 months | | | | |
| No | 1,828 | 40.8 | 1 | |
| Yes | 609 | 47.1 | 0.99 | (0.87-1.14) |
| **TOTAL** | **2,437** | **42.2** | | |

**Health Utilisation Factors**

| Characteristic | Claim for allied health within 12 months of GPMP/TCA | | Model 1: Full Model | |
|---|---|---|---|---|
| | n | % of all with a GPMP/TCA | OR | 95% CI |
| Average GP visits per annum in baseline period^(standard visits) | | | | |
| Two or fewer | 39 | 21.2 | 1 | |
| Three - four | 131 | 26.7 | 1.11 | (0.64-1.92) |
| Five - nine | 693 | 36.5 | 1.53 | (0.91-2.57) |
| Ten plus | 1,574 | 49.2 | **2.37** | **(1.40-4.00)** |
| Continuity of care (provider) at baseline^ | | | | |
| Infrequent GP visits | 22 | 20.2 | 0.83 | (0.42-1.63) |
| Continuity of care | 1,381 | 42.6 | 0.98 | (0.88-1.10) |
| No continuity of care | 1,034 | 42.7 | 1 | |
| Hospitalisation in two-year baseline period^ | | | | |
| No | 986 | 38.5 | 1 | |
| Yes | 1,451 | 45.2 | 1.03 | (0.91-1.16) |
| Saw a specialist in two-year baseline period^ | | | | |
| No | 215 | 30.8 | 1 | |
| Yes | 2,222 | 43.8 | 1.19 | (0.98-1.43) |
| Bulk-billing status at baseline^ | | | | |
| All visits bulk-billed | 1,777 | 42.8 | 0.74 | (0.50-1.11) |
| >50% visits bulk-billed | 401 | 44.1 | 0.82 | (0.54-1.25) |
| <= 50% visits bulk-billed | 191 | 39.3 | 0.82 | (0.53-1.27) |
| No visits bulk-billed | 46 | 39.3 | 1 | |
| **TOTAL** | **2,437** | **42.2** | | |

^ baseline period defined as +/- 12 months from date of recruitment

## Appendix B: Number of MBS claims by year of claim – Allied health items

**FIGURE B1: NUMBER OF CDM ALLIED HEALTH ITEMS CLAIMED BY THE CES COHORT AT BASELINE, BY YEAR OF CLAIM AND TYPE OF ALLIED HEALTH**

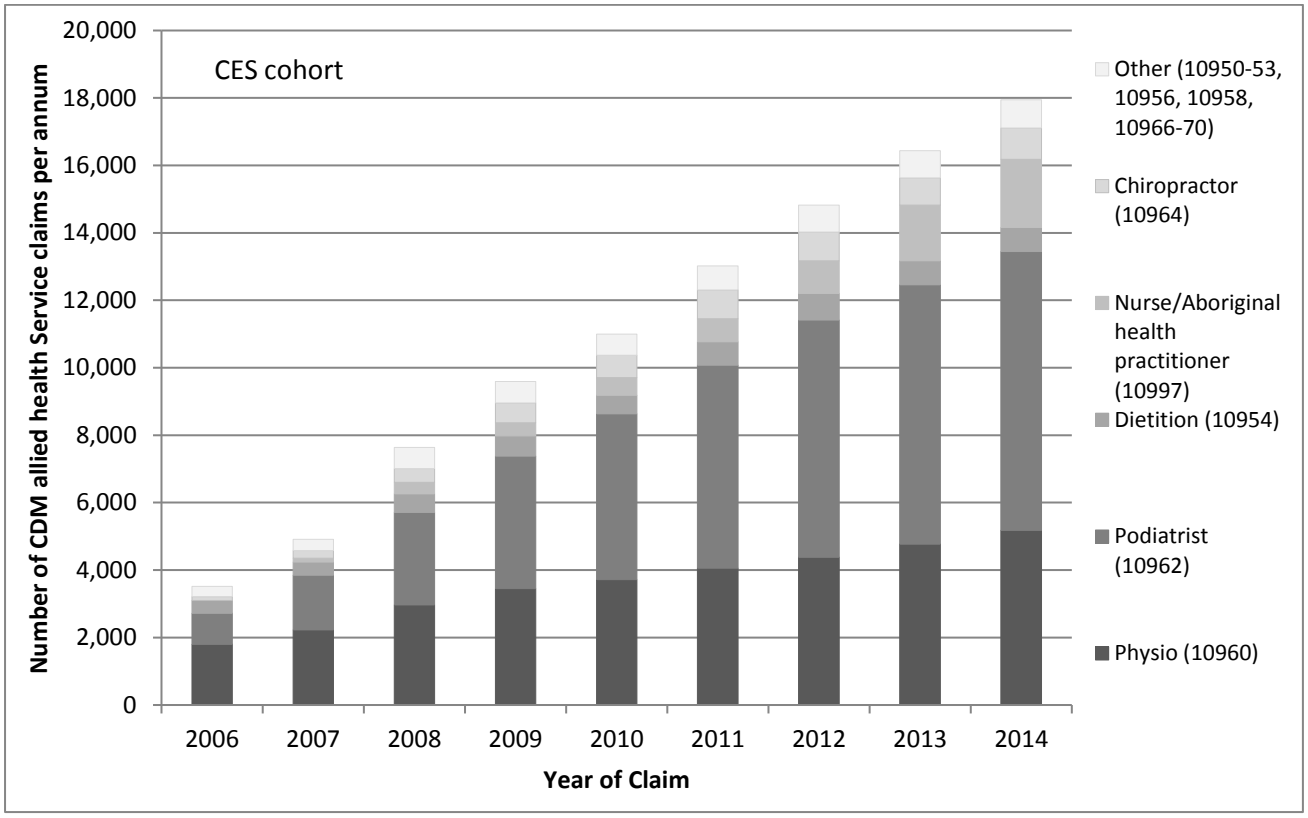


**FIGURE B2: PROPORTION OF CDM ALLIED HEALTH CLAIMS PER ANNUM BY TYPE OF ALLIED HEALTH AND YEAR OF CLAIM**