

2 Methods

This study is a secondary analysis of data from the BEACH (Bettering the Evaluation and Care of Health) program, a continuous study of general practice activity. The data period investigated is from April 1998 to March 2000 inclusive. The BEACH methods are summarised below in Section 2.1, which also includes a more detailed description of the methods applied in the analyses of cardiovascular problem contacts and cardiovascular problem prevalence in this report.

2.1 The BEACH program

The methods adopted in the BEACH program have been described in detail elsewhere^{12,14,234}. In summary, each of the recognised GPs in a random sample of approximately 1,000 per year records details about 100 doctor–patient encounters of all types. The information is recorded on structured paper encounter forms. The sample of GPs is a rolling sample, approximately 20 GPs participating each week, 50 weeks a year.

Sampling methods

The source population includes all GPs who claimed a minimum of 375 general practice A1 Medicare items (items 1–51, 601, 602) in the most recently available 3-month HIC data period. This equates with 1,500 Medicare claims a year and ensures inclusion of the majority of part-time GPs while excluding those who are not in private practice but claim for a few consultations a year. The General Practice Branch of the Commonwealth Department of Health and Ageing (DHA) draws a sample on a regular basis.

Recruitment methods

The randomly selected GPs are approached initially by letter, then by telephone follow-up. GPs who agree to participate are set an agreed recording date approximately 3 to 4 weeks ahead. A research pack is sent to each participant about 10 days before their planned recording date. A telephone reminder is made to each participating GP in the first days of the agreed recording period. Non-returns are followed up by regular telephone calls.

Each participating GP earns points towards their quality assurance (QA) requirements under the Royal Australian College of General Practitioners (RACGP)'s Quality Assurance program. As part of this QA process, each GP receives an analysis of his or her results compared with those of nine other unidentified practitioners who recorded at approximately the same time. Comparisons with the national average and with targets relating to the National Health Priority Areas are also provided.

BEACH includes three interrelated data collections: encounter data, GP characteristics, and patient health status. Examples of the forms used to collect the encounter data and the data on patient health status are included as Appendix 1 (1998–99 data year) and Appendix 2 (1999–00 data year). Copies of the GP characteristics questionnaires are included as Appendix 3 (1998–99 data year) and Appendix 4 (1999–00 data year).

Encounter data include date of consultation, type of consultation (direct, indirect), Medicare/Veterans' Affairs item number (where applicable), specified other payment source (tick boxes).

Information about **the patient** includes date of birth, sex, postcode of residence. Tick boxes are provided for healthcare card holder, Veterans' Affairs card holder, non-English-speaking background, an Aboriginal person (self-identification) and Torres Strait Islander (self-identification). Space is provided for up to three patient reasons for encounter (RFEs).

The **content of the encounter** is described in terms of the problems managed and the management techniques applied to each of these problems. Data elements include up to four diagnoses/problems. Tick boxes are provided to denote the status of each problem as new to the patient (if applicable) and if it was thought to be work-related.

Management data for each problem include medications prescribed, over-the-counter medications advised and other medications supplied by the GP. Details for each **medication** comprise brand name, form (where required), strength, regimen, status (if new medication for this problem for this patient) and number of repeats. **Non-pharmacological management** of each problem includes counselling and procedures, new referrals, and pathology and imaging ordered.

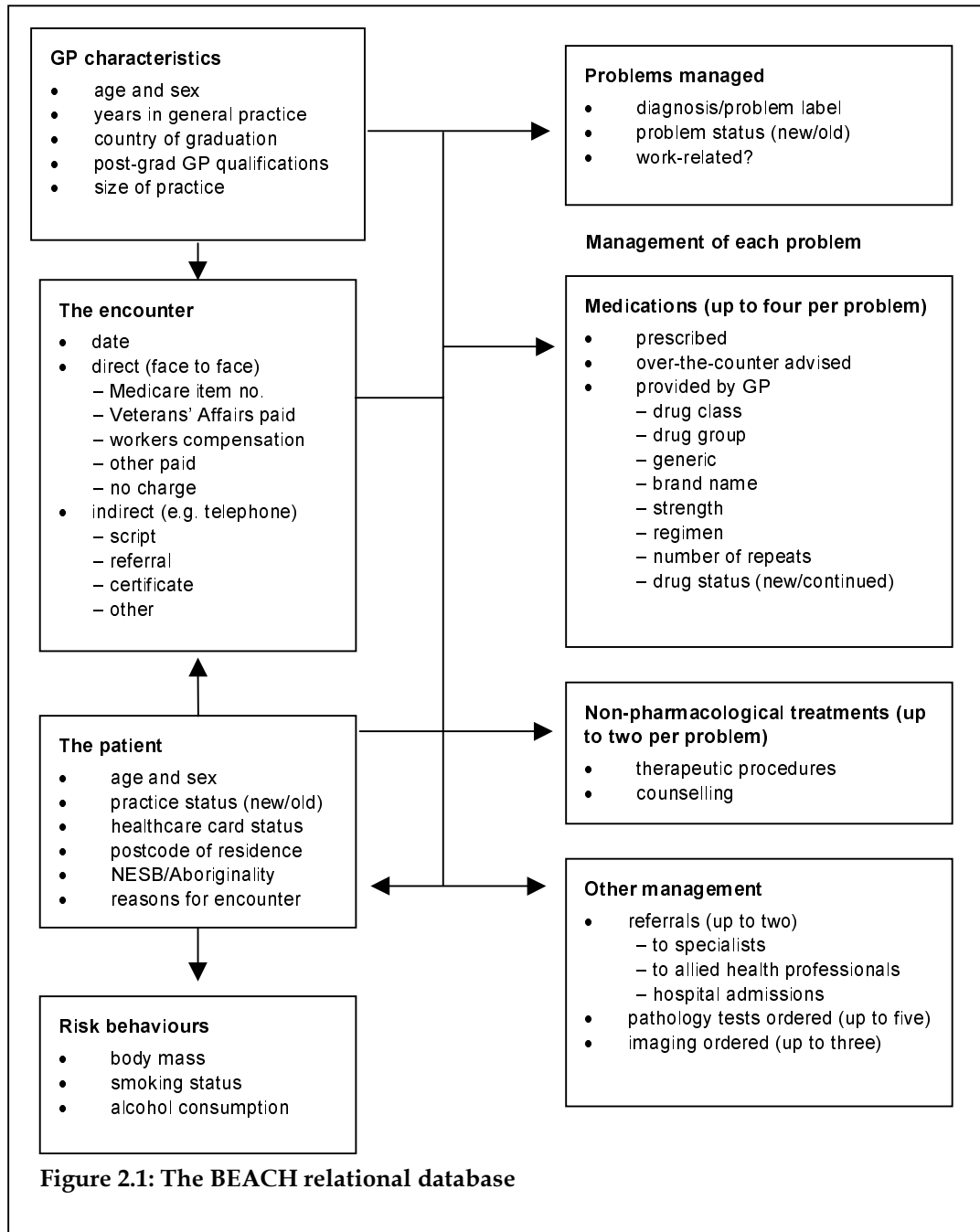
GP characteristics include age and sex, years in general practice, number of GP sessions worked per week, number of full-time and part-time GPs working in the practice (to generate a measure of practice size), consultations in languages other than English, postcode of major practice address, country of graduation, postgraduate general practice training and FRACGP status, after-hours care arrangements and use of computers in the practice.

Supplementary analysis of nominated data (SAND): A section on the bottom of each recording form investigates aspects of patient health or healthcare delivery in general practice not covered by the consultation-based information (see Appendix 1). The year-long data collection period is divided into 10 blocks, each of 5 weeks. Each block is designed to include data from 100 GPs. Each GP's recording pack of 100 forms is made up of 40 forms which contain questions about patient wellbeing, height and weight (for calculation of BMI) and alcohol intake, 40 that have a single question about the patient's smoking status together with questions on other subjects nominated for that block, and 20 forms with other nominated questions. Different questions are asked of the patient in each block and these vary throughout the year. Data from such substudies are used in this report to investigate the prevalence of cardiovascular disease among patients at general practice encounters (Chapter 8) and selected health risk behaviours of patients at encounters involving the management of cardiovascular problems (Chapter 9).

In Chapter 9, comparisons are made of the management of cardiovascular problems in general practice between 1990–91 and 1998–00. The earlier data are drawn from the Australian Morbidity and Treatment Survey (AMTS)²³⁵. A copy of the recording form used in the AMTS is provided as Appendix 5 of this report.

The BEACH relational database

The BEACH relational database is described diagrammatically in Figure 2.1. Note that all variables can be directly related to GP and patient characteristics and to the encounter. Reasons for encounter (RFEs) have only an indirect relationship with problems managed. All types of management are directly related to the problem being treated.



Classification of data

The patient reasons for encounter, problems managed, therapeutic procedures, other non-pharmacological treatments, referrals, pathology and imaging orders are coded using ICPC-2 PLUS²³⁶. This is an extended vocabulary of terms classified according to the International Classification of Primary Care (Version 2) (ICPC-2), a product of the World Organization of Family Doctors (WONCA)²³⁷. The ICPC is regarded as the international standard for data classification in primary care. The structure and derivatives of ICPC-2 have been described elsewhere^{12,237}.

Grouping codes for cardiovascular problems

In this report, some grouping of ICPC-2 codes and/or ICPC-2 PLUS codes has been made to overcome differences in the level of specificity recorded by GPs in ascribing problem labels. For example, GPs often do not specify whether the hypertension they are managing is with or without complications. Hypertension unspecified is (by ICPC-2 rules) classified to 'simple hypertension'. To avoid under- or over-estimation of the relative rates of management of 'simple hypertension' versus 'hypertension with complications', these rubrics are grouped under the general heading 'hypertension'. These grouped codes are marked with an asterisk and are defined in terms of ICPC-2 rubrics in Appendix 6.

In Chapter 8, which investigates the prevalence of multiple cardiovascular problems, broader groups have been created to facilitate analysis. Use of individual rubrics or the smaller groups used in problem management analyses would render the number of possible combinations unmanageable. These broader groups of cardiovascular problems are also defined in Appendix 6.

Classification of pharmaceuticals

In Chapter 7 comparisons are made between the pharmacological management of cardiovascular problems in 1990–91 and 1998–00. Pharmaceuticals prescribed are coded and classified according to an in-house classification called the Coding Atlas for Pharmaceutical Substances (CAPS). This is a hierarchical structure that facilitates analysis of data at a variety of levels, e.g. drug class, drug group, generic composition and brand name. CAPS is mapped to the Anatomical Therapeutic Chemical classification (ATC)²³⁸ which is used in Australia for classifying drugs at the generic level.

Statistical methods

The analysis of the BEACH database is conducted with SAS version 6.12²³⁹ and the encounter is the primary unit of analysis. Proportions (%) are used only when describing the distribution of an event that can arise only once at a consultation (e.g. age, sex or item numbers) or to describe the distribution of events within a class of events (e.g. problem A as a percentage of total problems).

Rates per 100 encounters are used when an event can occur more than once at the consultation (e.g. patient reasons for encounter, problems managed or medications). Rates per 100 problems are also sometimes used when a management event can occur more than once per problem managed. In general, the number of observations (n), rate per 100 encounters and the 95% confidence intervals are presented.

The BEACH study is essentially a random sample of GPs, each providing data about a cluster of encounters. Cluster sampling study designs in general practice research violate the simple random sample (SRS) assumption because the probability of an encounter being included is a function of the probability of the GP being selected²⁴⁰.

There is also a secondary probability function of particular encounters being included in the GP's cluster (associated with the characteristics of the GP or the type and place of the practice) and this increases the likelihood of sampling bias. Also there will be inherent relationships between encounters from the same cluster and this creates a potential statistical bias. The probability of gaining a representative sample of encounters is therefore reduced by the potential sampling and statistical bias, decreasing the accuracy of national estimates.

When a study design other than SRS is used, analytical techniques that consider the study design should be employed. In reporting BEACH results, the standard error calculations used in the 95% confidence intervals accommodate both the single-stage clustered study design and sample weighting according to Kish's description of the formulae²⁴¹. SAS 6.12 is limited in its capacity to calculate the standard error for the current study design, so additional programming is required to incorporate the formulae. In annual analyses of results, post-stratification weighting is applied to the raw data before each year's analysis to account for underrepresentation of GPs in any particular group such as age, sex or activity level¹².

Post-stratification weighting (described earlier) is based on annual data sets and would therefore have been applied differently for the two data sets (i.e. the collection periods, April 1998 to March 1999 and April 1999 to March 2000) depending on which groups were underrepresented in each year's sample of participants. Therefore, unweighted data are used. This means that there is a slight underrepresentation of young GPs aged less than 35 years in the 2-year data set and this may mean the results are not totally representative of GP-patient encounters nationally.

Due to rounding, individual frequencies do not always sum exactly to the reported total. Where the relative frequency of an event is sufficient to provide statistical estimates of accuracy, the 95% confidence interval is provided. The rate is an estimate and its confidence limits suggest a 95% certainty that the true result lies between the reported upper and lower limits.

In the comparison of BEACH results and an earlier study (Chapter 7), statistical methods for the measurement of differences were applied incorporating the single-stage cluster sampling design used in both studies. Statistical difference was determined on the basis of non-overlapping confidence intervals (95% CI) where specific comparisons were made between two estimates. Chi-square tests at the 5% level were used to measure differences between the characteristics of GP participants in both studies.