Australian Government
Department of Health, Disability and Ageing

Whole of Medical Workforce Supply and Demand Model - Methodology Paper

June 2026

Suggested citation

Department of Health, Disability and Ageing, 2026, Whole of Medical Workforce Supply and Demand Model – Methodology Paper, [page no.], https://hwd.health.gov.au/resources/primary/whole-of-medical-workforce-supply-and-demand-model-methodology-paper.pdf, retrieved DD/MM/YYYY

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List of Acronyms and Abbreviations

ABS	Australian Bureau of Statistics
ADRG	Adjacent Diagnostic Related Group
AECC	Australian Emergency Care Classification
AFHW	Australia's Future Health Workforce
Ahpra	Australian Health Practitioner Regulation Agency
AMC	Australian Medical Council
APC	Admitted Patient Care
AR-DRG	Australian Refined – Diagnostic Related Group
CMO	Career Medical Officers
CSP	Commonwealth Supported Place
DMS	Derived Major Specialty
DRG	Diagnostic Related Group
EDDG	Emergency Department Diagnosis Groups
ERP	Estimated Resident Population
ESRGs	Enhanced Service-Related Groups
FTE	Full-Time Equivalent
GLM	Generalised Linear Model
GP	General Practitioner
IMGs	International Medical Graduates
MBA	Medical Board of Australia
MBS	Medicare Benefits Schedule
MDANZ	Medical Deans Australia and New Zealand
MeSHWPoD	Medical Specialist Health Workforce Prediction of Demand
NAP	Non-Admitted Patient
NAPEDC	Non-Admitted Patient Emergency Department Care
NEP	National Efficient Price
NHCDC	National Hospital Cost Data Collection
NHWDS	National Health Workforce Datasets
NNAPD	National Non-Admitted Patient Database
Non-VR GPs	Non-Vocationally Recognised General Practitioners
NTMP	Northern Territory Medical Program
NWAU	National Weighted Activity Unit
PHDB	Private Hospital Data Bureau

PLIDA	Personal Level Integrated Data Asset
SA4	Statistical Area 4
SIMG	Specialist International Medical Graduates
UDG	Urgency Disposition Groups
URG	Urgency Related Group

1.0 Introduction

This paper provides the methodology used for the supply and demand model for the Whole of Medical Workforce. It aims to quantify the supply and demand for all medical practitioners between 2024 and 2048 using data collected from several sources between 2018 and 2023.[1]

2.0 Modelling Overview

2.1 Scope

The scope of this modelling is all medical practitioners who meet the definitions of supply for the medical workforce in Australia.

To practise in Australia, all medical practitioners must be registered with the Australian Health Practitioner Regulation Agency (Ahpra) and the Medical Board of Australia (MBA). There is a range of different types of registration to match different levels of training and experience. There are specific types of registration for Australian or New Zealand medical graduates and international medical graduates. The types of registration include provisional, general, specialist, limited and non-practising registration.

For this modelling, medical practitioners are grouped into the following categories:

1. Interns (Australian and New Zealand medical graduates)
2. Hospital prevocational doctors
3. Hospital career medical officers
4. Registrars
5. Specialists
6. Others which include non-specialists working outside of hospitals and Non-Vocationally Recognised General Practitioners (Non-VR GPs)
7. Limited and other provisional registrants.

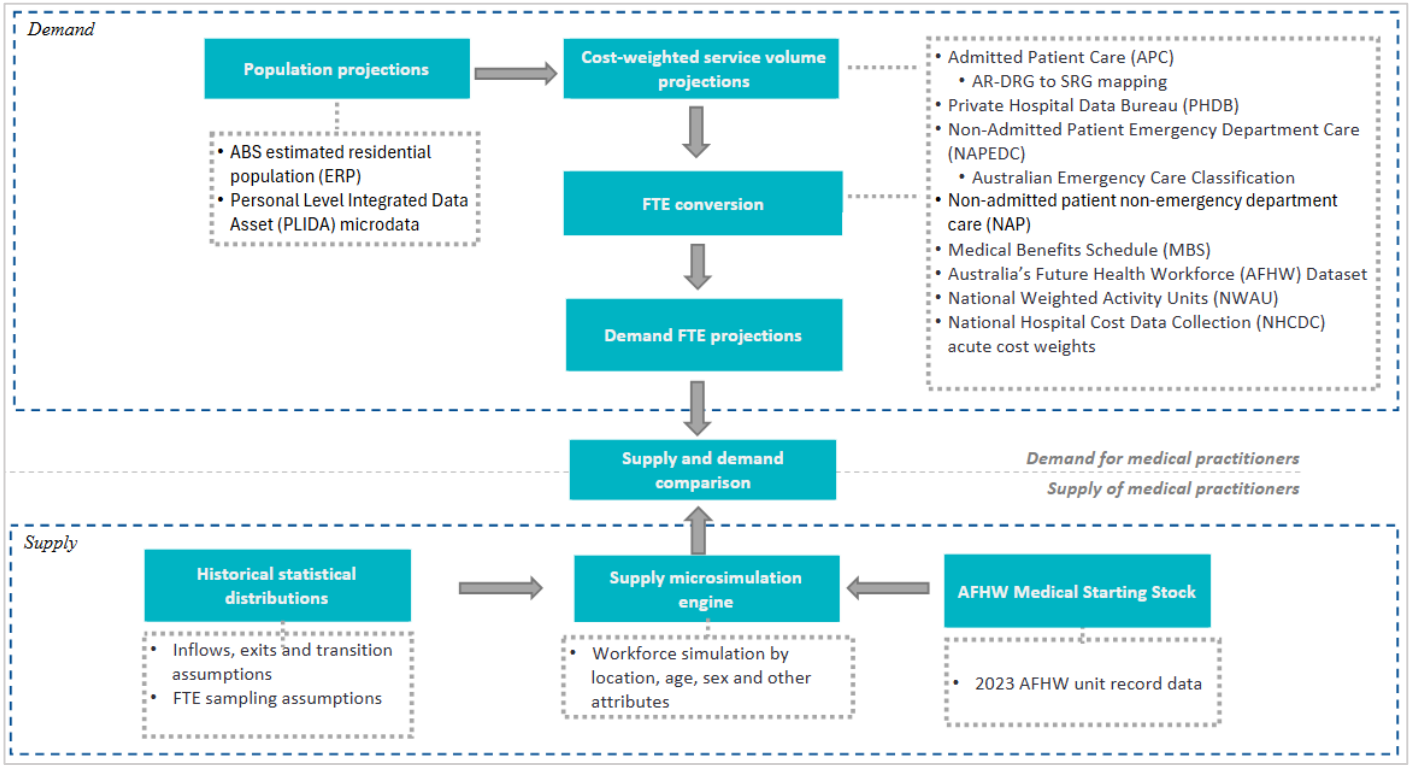
Section 3.2.2 below provides further details on how medical practitioners are categorised.

Modelling has been undertaken at the Statistical Area 4 (SA4) geography (where data availability permitted). However, results will be published at state and territory level, with their aggregation forming the national results.

Figure 1 provides an overview of the modelling process. The following sections will explain the steps in further detail.

[1] The workforce projections have been estimated over a longer period, as compared to the 15-year period for all allied health practitioner supply and demand studies, due to the relatively longer training pipeline for medical practitioners.

Figure 1: Overview of the modelling process



3.0 Whole of Medical Supply

The whole of medical workforce supply model uses the AFHW data on medical practitioners from 2014 to 2023.

The supply model uses the microsimulation approach where attributes such as entries and exits to the workforce and practitioner FTE are modelled distinctly. The supply methodology begins by identifying the current stock of medical practitioners, analysing their demographic profile and historically observed work patterns. Statistically significant predictors of future medical workforce supply (such as age, sex, etc) are selected, and their historical distributions are measured to allow the development of a microsimulation model.

The microsimulation works at a yearly time-step, tracking the progression of medical practitioners throughout their career. Each year, it accounts for new fellows, removes medical practitioners who take temporary or permanent leave, and simulates transitions of medical practitioners between the groups specified in Section 2.1 and geographic locations. The following sections describe how each component is defined and modelled in the supply model.

The baseline projections assume an initial equilibrium between supply and demand in the base year, 2023.

3.1 Key data inputs

The key datasets used for the supply modelling are extracted from the following sources:

#	Source	Description and use in model
1	Australia's Future Health Workforce (AFHW) dataset	The AFHW datasets are created from the National Health Workforce Datasets (NHWDS) for modelling purposes. A sequence of rules (supply criteria) is applied to each NHWDS to determine which practitioners meet the definition of supply for each profession (and sub-groups where applicable). The headcount and workload of these practitioners, along with other variables required for modelling, are included, derived or imputed in the AFHW datasets. The AFHW dataset contains unit record data on medical practitioners, including demographic variables and information on their qualification, career (such as hours worked which is converted to Full-Time Equivalent).
2	Yearly snapshot of enrolments and graduations for Australian medical students sourced from Medical Deans Australia and New Zealand (MDANZ)	Contains the aggregate number of enrolments and graduations of medical students by university, state, student type (grouped as Commonwealth Supported Place (CSP), full-fee domestic, and international), program length, and level of study.

3.2 Historic and starting stock

The AFHW data is a unit record longitudinal dataset, where each respondent is assigned a unique identifier that can be linked across multiple years.

Medical practitioners covered within the scope of supply include those employed within the medical workforce in Australia. The initial classification steps and inclusion criteria for the total medical workforce supply are as follows:

1. registered (excluding non-practicing) as a medical practitioner
2. working in medicine in Australia including those on extended leave, except for:
    a) provisional registrants as they do not receive the Ahpra workforce survey and therefore they are all assumed to be employed.
3. must work clinical hours, except for:
    a) provisional registrants (their hours are imputed)

b) non-clinical specialists (practitioners working in medical administration, pathology, radiology) do not need to have clinical hours but must have non-zero total specialist hours to be in scope

c) registrars (must have non-zero total hours).

3.2.1 Total Hours (Full-Time Equivalent)

Medical practitioner's total hours (clinical and non-clinical) are used in modelling supply. If a medical practitioner is employed but on extended leave (defined as a period of over 3 months), their hours are halved for simplicity, assuming they worked an average of 6 months during the year.

One Full-Time Equivalent (FTE) is defined as 40 self-reported weekly average hours in the AFHW dataset (across 46 weeks in the year).

3.2.2 Medical Practitioner Type

The following criteria determines which group the total medical workforce supply is allocated. Note that once a medical practitioner is classified as part of the medical workforce 'supply', they are counted once within that group, and all their working hours (and FTE) allocated to it.

#	Medical Practitioner Type	Criteria
1	Interns	○ Provisional registration AND; ○ Initial medical qualifications from an Australian or New Zealand medical school; - Includes graduates from Australian Medical Council (AMC) accredited offshore universities (such as Monash Malaysia).
2	Hospital prevocational doctors	○ General registration and does not have a registered specialty AND; ○ Main job area is 'Hospital non-specialist' OR Main job setting is 'Hospital' OR 'Outpatient' AND; ○ Not classified as a specialist AND; ○ Not classified as a registrar ○ Have intension to enter specialty training ○ If specialty training intentions are unknown, then those whose hospital position was not Career Medical Officer (CMO) or similar.

3	Hospital Career Medical Officers (CMOs)	○ General registration and does not have a registered specialty AND; ○ Main job area is 'Hospital non-specialist' OR Main job setting is 'Hospital' OR 'Outpatient' AND; ○ Not classified as a specialist AND; ○ Not classified as a registrar ○ No intension of entering specialty training - If specialty training intentions are unknown, then those who had hospital position as CMO or similar.
4	Registrars	○ General or Specialist registration AND; ○ GP trainee is 'yes' OR Main job area is 'Specialist-in-training' OR Hospital position is 'Registrar – accredited' AND; ○ Not classified as a specialist (in any specialty) Note this group includes practitioners with specialist registration who do not work clinical hours but are currently training in another specialty. If they have clinical hours, then they are classified as a specialist).
5	Specialists	○ Specialist registration OR classified as a 'supply specialist' for modelling perspective AND; ○ Has an accredited specialty.
6	Other	○ All remaining medical practitioners who meet the initial criteria for inclusion in the supply model. ○ Note this group includes non-specialists working outside of hospitals and non-vocationally registered GPs.
7	Limited and other provisional (non-intern) registrants	○ Provisional registration AND initial medical qualification from a medical school outside Australia or New Zealand ○ Limited registration and employed Note, this group includes International Medical Graduates (IMGs) who are undertaking their internship in Australia and all other IMGs/Specialist International Medical Graduates (SIMGs) who have

	not yet progressed to general or specialist registration.

3.3 Measuring entries, exits and transitions

The AFHW dataset enables tracking of individuals as they age, relocate, progress in their careers and transition in and out of the workforce. Historical data relating to entries, exits and transitions is used to determine future trends based on the analysis of historical demographic probabilities and distributions.

The demographic probabilities and distributions are sampled to understand the effects age, sex, state of primary workplace, place of initial medical qualification, medical practitioner type and sector on workforce patterns.

3.3.1 New entries

New entries into the medical workforce include graduates of Australian Medical Schools, international migrants with a recognised international qualification, and practitioners returning to the medical workforce after a 4 or more-year absence (long term re-entries).

The supply model incorporates a **training pipeline analysis** that predicts the number of medical students and graduates from Australian Medical Schools (onshore and offshore) and the number that subsequently transition to interns each year. The training pipeline analysis has included the new 140 commencing Commonwealth Supported Places (CSPs) as well as the expansion of 6 (non-CSP) scholarship places through the Northern Territory Medical Program (NTMP).

Enrolments and graduations are modelled based on transition rates between year of study by enrolment type (CSP, Full Fee Domestic or International), university, program length and state. The rate at which university graduates transition to medical internship is estimated by comparing total number of graduates in one year to the total number of new interns the following year.

3.3.2 Exits and re-entries

Exits from medical workforce are derived from historical AFHW data by longitudinally tracking individual practitioner's participation in the workforce. Medical practitioners who are identified in the AFHW data in a given year but not in the following year are classified as exits. Exits are modelled by age, sex, place of initial medical qualification, state of primary workplace, medical practitioner type and sector, as covariates.

These one-period exits are further classified as temporary or permanent exits.

- **Temporary exits or re-entries**: refer to a medical practitioner who leaves the workforce after working for at least one reporting period (i.e. one year) but returns to the medical profession within a 4-year period.[2] The point of re-entry is estimated

[2] The 4-year period is used because practice considerations become less relevant beyond that timeframe. This approach is used for both historical and future workforce exits.

based on the rate at which medical practitioners who leave the workforce, return in subsequent years. The modelling of re-entry probabilities includes the same covariates as exits i.e. age, sex, place of initial medical qualification, state of primary workplace, medical practitioner type and sector.

- **Permanent exits**: refer to a medical practitioner who, after working for at least one reporting period (i.e. one year), leaves the medical workforce and does not return within a 4-year period.

3.3.4 Medical practitioner type transitions

Practitioner type transitions refer to medical practitioners who remain in the workforce but change from one practitioner type to another between two subsequent years. For example, an intern changing to a registrar. These transitions are modelled by examining historical trends, including how often practitioners change type, and the likelihood of transitioning to each specific practitioner type, when a change occurs.

Transition from hospital CMO and hospital prevocational doctor group to registrar group within the supply model is limited by the total number of registrar positions available. This is because the number of prevocational doctors that can enter speciality training programs is determined by the number of available training places. In Australia, speciality training places are determined by specialist medical colleges. The total number of registrar positions available is therefore assumed to follow the historically observed trend from 2018–23 in the AFHW dataset.

Unconstrained transitions to registrar group scenario

Under the '*unconstrained transitions to registrar group*' scenario, the number of doctors that transition from hospital prevocational and hospital CMO doctor group to registrar group (in each iteration of the supply microsimulation process) is left unconstrained. The transitions are projected based on the historically observed transition rates and considers the likelihood of transitioning from each of the other practitioner types to registrar group. Applying the historical transition probabilities to a growing pool of prevocational doctors leads to higher than observed projected registrar supply growth.

3.3.5 Interstate transitions

Interstate movement of medical practitioners is calculated based on the probability of medical practitioners changing their primary place of work from one state/territory to another. Covariates used to determine transition rates and destinations are the medical practitioner's current state/territory, place of initial medical qualification and medical practitioner type.

3.3.6 Estimating full-time equivalent (FTE) of entries, re-entries and transitions

The number of FTE that each medical practitioner works, is a central component of the model. FTE is a measure which can vary significantly between individuals and years. One FTE is defined as 40 self-reported weekly average hours worked.

To account for the variations in FTE by various demographics of medical practitioners, the simulated medical workforce FTE distribution is estimated based on age, sex, place of initial medical qualification, state of primary workplace, medical practitioner type and sector. This is done by:

1. Re-sampling an existing medical practitioner's FTE annually to reflect their demographic attributes, as it may change from year to year. Additionally, their FTE is adjusted by a time-dependent modifier based on changes to the average FTE observed over the past 5 years.
2. Additional FTE adjustments, in the form of a series of multipliers, are then applied to a practitioner's FTE, following one of the workforce status changes below:
    a) a workforce exit or entry, or
    b) a change in state of workplace.

These adjustments are applied after the new FTE re-sampling have been applied. This is because the adjustments effectively adjust for breaks in regular employment.

3.4 Supply modelling

A microsimulation process is used to project supply for each type of medical practitioner. An overview of this process is shown in Figure 2 below. The supply model uses the following attributes:

1. Full-Time Equivalent (FTE) based on 40 hours per week
2. sex
3. age
4. practitioner type
5. place of initial medical qualification (domestic or international)
6. primary work location (SA4 and state)

In each iteration of the microsimulation:

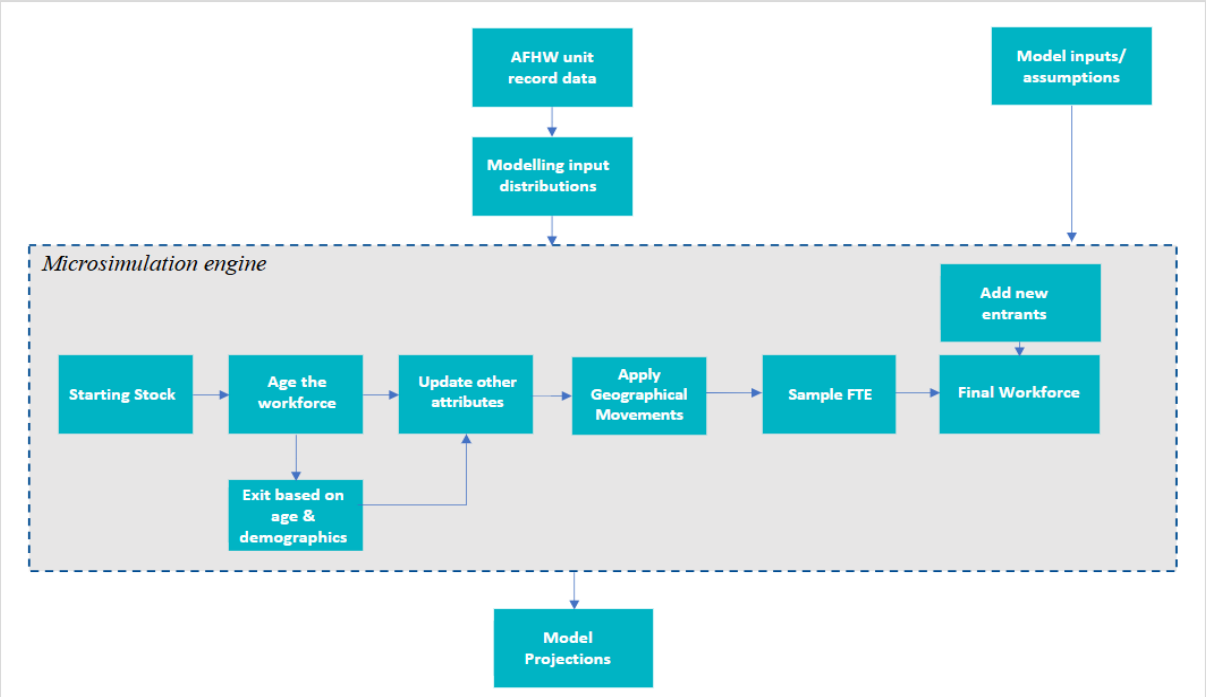
1. The workforce is aged, and some practitioners exit the workforce based on their age, sex, place of initial medical qualification, state of primary workplace, medical practitioner type and sector.
    a) Exits are sampled to determine if the exit is permanent or temporary.
    b) Medical practitioners that temporarily exit will re-enter the workforce during a subsequent period of up to 4 years, in accordance with the historical distribution of re-entries following up to 4 periods of absence.

c) Practitioners are transitioned to a different practitioner type based on the transition probability.

2. Geographical movements are applied to medical practitioners based on historic state/territory migration patterns broken down by the medical practitioner's current state/territory, place of initial medical qualification and medical practitioner type.
3. FTE is updated based on smoothed historical FTE year-on-year changes by age, unless a medical practitioner:
    a) geographically transitions to a different state/territory and/or
    b) transitions to another practitioner type.
4. Medical practitioners that are flagged for re-entry are brought back into the workforce based on a re-entry probability, which is determined by factors such as age, sex, place of initial medical qualification, state of primary workplace, medical practitioner type and sector. The FTE for re-entering practitioners is sampled from a distribution modelled on historical AFHW data.
5. New medical practitioners are added to the workforce.
6. The modelling process iterates annually, where the number of medical practitioners in each group in the following year is calculated as the number of employed medical practitioners in the current year, minus the number of medical practitioners exiting and transitioning-out, plus those entering the workforce and transitioning-in in the new year. In other words:

$$\text{Supply}_{(t+1)} = \text{Supply}_{(t)} - \text{Exits}_{(t+1)} + \text{Entries}_{(t+1)} + \text{Net transitions while staying employed}_{(t+1)}$$

Figure 2: The supply microsimulation process



3.5 Assumptions for Supply Model

#	Caveat/Limitation	Description and implications
1	Static sampling assumptions	The microsimulation module applies static sampling distributions based on historical data from 2018 to 2022 to simulate projected behavior, except for average FTE distribution which is adjusted based on historical trends.
2	New entries	The forecasts assume that the number of first year enrolments will remain constant from 2026 onwards. International migration and long-term re-entries are estimated based on the observed AFHW data historically.
3	Registrar Cap	Transition from hospital CMO and hospital prevocational doctor group to registrar group within the supply model is constrained by imposing a cap on the total number of registrar positions available. The total number of registrar positions available is assumed to follow the historically observed trend from 2018–23 in the AFHW dataset.
4	COVID-19 impact	The effects of COVID-19 on the affected years (2020–21) remain unclear and will be clarified with further analysis of updated data. It is likely that some trainees were unable to progress due to the pandemic. If so, stage transition disruptions could impact subsequent years as well.
5	Technological change	Technological improvements during the projection period that may affect workforce FTE in providing primary care are not considered.

4.0 Whole of Medical Demand

Demand is measured in terms of observed utilisation of medical services which captures expressed (observed) service demand for medical services across a variety of care settings and is specific to each of the practitioner type used in the model. Historical patterns of usage are examined and used to estimate the future demand for medical practitioners, accounting for differences in service demand across specialities, age groups and geographies.

This approach does not directly capture need for services in the population, nor does it account for those who require medical care but are unable to access it due to factors such as affordability or availability.

The model, known as the Medical Specialist Health Workforce Prediction of Demand (MeSHWPoD) model is used by the Department to provide demand projections for medical workforce. For further details on MeSHWPoD methodology with worked examples, please refer to ***Attachment A***.

4.1 Key data inputs

The key datasets used for the demand modelling are extracted from the following sources:

#	Source	Description and use in model
1	Medical Benefits Schedule (MBS) data	Contains data on patients billed through the MBS, including patient demographics such as age, sex, location of residence, service provider location, the specific MBS item, and benefit paid. A hospital flag indicator is used to exclude any MBS services delivered in hospitals to avoid overlap with Admitted Patient Care (APC)/Private Hospital Data Bureau (PHDB) data.
2	Admitted Patient Care (APC) data	Contains data on episodes of care for admitted patients in all public and private acute hospitals, free standing day hospital facilities, alcohol and drug treatment centres, and hospitals specialising in other acute medical or surgical care. The data includes patient demographics such as sex, age, and location of residence, service provider location, and type of facility (used to derive sector). It also includes detailed data on procedures and diagnoses based on the AR-DRG classification.
3	Private Hospital Data Bureau (PHDB)	Contains data on episodes of care for admitted patients in private hospitals (although three of these hospitals are treated as public for reporting purposes). The structure and variables collected is similar to those in the APC data.
4	Non-Admitted Patient Emergency Department Care (NAPEDC) data	Contains data on episodes of care for patients who physically present to emergency departments. The data includes patient demographics such as age, sex, location of residence, service provider location, the length of stay measured in minutes, and various classifications relating to the principal diagnosis of each presentation.
5	National Non-Admitted Patient Database (NNAPD)	Contains data on services provided to non-admitted patients in Australian public hospitals, including the types of services provided, service delivery settings and selected patient characteristics.

		This data excludes non-admitted patient services provided during emergency department care and to admitted patients.
6	Population and household projections based on ABS data	Population and household projections developed by the Department of Health, Disability and Ageing (the Department) based on ABS Series B population projections and the ABS Census household distribution type. Population projections are by age group, sex, geography and year.
7	National Weighted Activity Unit (NWAU)	NWAU is used as part of the National Funding Model and is a measure of health service activity expressed as a common unit, against which the National Efficient Price (NEP) is paid. It provides a way of comparing and valuing each public hospital service, including emergency care, subacute care, admitted care and non-admitted care, weighted for clinical complexity.
8	National Hospital Cost Data Collection (NHCDC)	NHCDC public sector, collected through the states and territories, is an annual and voluntary collection of public hospital data. The NHCDC is used to develop the national efficient price, which determines the level of funding public hospitals receive annually.

4.2 How services for medical practitioners are defined

Defining services within the scope of practice for medical practitioners is done using dataset-specific methods, explained below.

4.2.1 MBS data and Derived Major Specialty

A provider may have more than one registered specialty with Medicare. The Derived Major Specialty (DMS) classification provides a single specialty, derived to represent the major/highest qualification and/or major activity of a provider during the observed period according to the type of services delivered.

More specifically, DMS codes have 3 progressive levels. The first level is determined solely by the provider's highest registered specialty. The second and third levels are determined by the provider's qualifications and major services provided.

4.2.2 APC and PHDB data

Each separation within the APC and PHDB data has a Diagnostic Related Group (DRG) and an Adjacent Diagnostic Related Group (ADRG) attached to group patients with similar diagnoses and/or interventions, reflecting similar resource use. These two classifications (i.e.

DRG and ADRG) can be mapped to Enhanced Service-Related Groups (ESRGs), which group patients by specific diagnoses and/or procedures, derived from the specialty of the attending medical officer.

The APC dataset contains patient and diagnosis data for public hospitals while the PHDB dataset contains data on private hospitals.

The APC and PHDB datasets do not include information about the specialty of the attending medical officers involved in a care episode. A single episode of care may involve multiple attending medical officers across various medical practitioner types. The same underlying hospital activity informs the projected demand for all practitioner types, as explained in section 3.4.

4.2.3 NAPEDC data

To determine medical episodes within the NAPEDC data, principal diagnosis codes (based on ICD-10 codes) are mapped to Emergency Department Diagnosis Groups (EDDG).

4.2.4 NNAPD data

To determine in-scope outpatient services within the NNAPD data, the Non-Admitted Services Classification (Tier 2) is used. Tier 2 categorises a hospital's non-admitted services into classes which are generally based on the nature of the service provided and the type of clinician providing the service. All services where the usual provider is a medical practitioner as per the Tier 2 classification definitions, are considered in-scope.[3]

4.3 Definition of Demand Activity

Medical separations and services from each data source are grouped into 4 categories:

1. MBS billings
2. Public Hospital (Admitted)
3. Private Hospital (Admitted)
4. Public Hospital Non-admitted (Emergency Department and NNAPD)

It is worth noting that the number of services or separations alone is not a sufficient metric for comparison, as each require varying levels of resources, particularly in terms of workforce effort. This measure does not consider the severity of conditions, complexity of procedures, or degree of medical input required.

To address this, services or separations are converted into a more universal metric known as units of demand activity. This metric is weighted to better represent the relative effort required by specialists for each service or separation and allows for a more accurate comparison of resource use within each category.

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[3] Australian Institute of Health and Welfare, 2024, Tier 2 Non-Admitted Services classification (version 9.1), Metadata Online Registry (METEOR), accessed 22 January 2025.

MBS billings

The weighting factor is calculated as the benefits paid for in-scope services (Year x Provider location x Patient Sex x Patient Age x Patient location) divided by the reference cost which is the average benefit paid for in-scope services for a given specialty and year. The number of services is then multiplied by this weighting factor to get the weighted demand activity.

An adjustment is applied to specialist telehealth items in the historical data used in the demand activity projections. Previous analysis undertaken relating to the telehealth impact on GP FTE estimation indicated that telehealth items required 20% less FTE than the equivalent face to face items. This 20% adjustment factor is applied across all telehealth items claimed by specialists in the historical data.

Public and Private Hospital (Admitted) separations

Public and private hospital separations within the APC and PHDB dataset are weighted through the application of NWAU cost weights, which reflect the relative cost or resource intensity associated with different types of care. These cost weights are linked to separations based on DRG classifications.

Public Hospital Non-admitted (NAPEDC and NNAPD)

Emergency Department (ED) episodes are also weighted using NWAU cost-weights and linked to patient records based on ED-specific classification codes. For episodes up to 2020, the Urgency Related Group (URG) classification is used, while the Urgency Disposition Groups (UDG) applies for 2021, transitioning to the Australian Emergency Care Classification (AECC) from 2021 onwards. These cost weights are used to calculate the weighted length of stay.

The NNAPD services are weighted using NWAU cost-weights published by the Tier 2 classification. The NNAPD services are combined with NAPEDC episodes by applying an adjustment factor to NNAPD services to improve comparability. The adjustment factor is calculated based on the relative ratio of cost-weighted NNAPD service volumes to cost-weighted NAPEDC episode volumes.

4.4 Projection of Demand Activity

The process of projecting the demand activity over the forecast period consists of the following key steps:

1. Calculate and project service utilisation using a Generalised Linear Model (GLM). The covariates in the GLM model include year, patient age group, patient sex, and patient/provider location. Population projections are used for estimation of the population at risk.
2. Demand activity projections are then converted to specialist medical practitioner FTE by comparing the demand values against the supply FTE from AFHW dataset for a specified reference base year. Specifically, the base year supply FTE is divided by the base year demand activity to yield an FTE-to-activity ratio, which is then

multiplied by the demand projections for each forecast year. This forms the baseline projection.

3. Demand FTE for non-specialist medical practitioner types is calculated based on the ratio of non-specialist FTE to specialist FTE from the AFHW dataset in the base year. This is then multiplied by the specialist FTE projections calculated in step 2.

4.5 Demand by Practitioner Type

Specialist medical practitioners

The approach outlined in section 3.3 is first used to project the demand for specialist medical practitioners. Demand activity from each of the four categories of services/separations (defined in section 3.2) is attributed to supply FTE reported by specialist medical practitioners within the AFHW dataset.

Non-specialist practitioner types

Demand FTE for each non-specialist practitioner type is calculated using the ratio of non-specialist FTE to specialist FTE from AFHW dataset. This approach accounts for the fact that the same underlying activity involves contributions from multiple attending medical practitioners across various levels and practitioner types.

The FTE ratios are dynamic and projected to evolve based on historical trends. For each year, care setting and provider location, the non-specialist supply to specialist FTE ratio is calculated as:

$$FTE\ Ratio = \frac{Non-specialist\ FTE}{Specialist\ FTE} \text{ for } each\ year, sector, location\ and\ practitioner\ type$$

Table 1 presents the calculated FTE ratios for each non-specialist medical practitioner type in 2023. *MBS billings* primarily involve specialist medical practitioners privately billing for services within their specialty, with minimal FTE contributions from non-specialist practitioner types. As expected, the FTE ratios for non-specialist practitioners in the *MBS billings* category are very low, indicating that any projected increase in MBS billings would primarily impact specialist FTE projections.

Specifically, the 2023 ratios show that for every one specialist FTE in the MBS sector, there were 0.001 FTE hospital CMOs, 0.003 FTE hospital prevocational doctors, 0.102 FTE registrars and 0.044 FTE other medical practitioners, as observed in the supply data. In contrast, the public hospital category has comparatively higher non-specialist FTE ratios, indicating that rising demand for specialists in the public sector will be associated with increased demand for non-specialist practitioners.

Table 1: Non-specialist practitioner type FTE ratios for 2023

Provider location	Sector	Hospital CMO	Hospital prevocational doctors	Registrar	Other
National	MBS billings	0.001	0.003	0.102	0.044
National	Private	0.067	0.082	0.103	0.019
National	Public	0.076	0.587	0.875	0.021
National	Public non-admitted	0.033	0.168	0.386	0.011

Table 2 shows the trends in non-specialist FTE ratios.

Table 2: Non-specialist practitioner FTE ratios trends

Practitioner Type	Sector	2020	2021	2022	2023	2030	2040	2048
Hospital CMO	MBS	0.002	0.001	0.001	0.001	0.000	0.000	0.000
	Public non-admitted	0.036	0.033	0.029	0.033	0.030	0.029	0.029
	Private	0.068	0.063	0.063	0.067	0.074	0.082	0.085
	Public	0.053	0.056	0.061	0.076	0.109	0.113	0.105
Hospital prevocational	MBS	0.003	0.002	0.003	0.003	0.004	0.004	0.004
	Public non-admitted	0.169	0.142	0.158	0.168	0.187	0.191	0.184
	Private	0.076	0.072	0.076	0.082	0.105	0.122	0.124
	Public	0.544	0.518	0.591	0.587	0.695	0.761	0.758
Registrar	MBS	0.118	0.097	0.099	0.101	0.102	0.103	0.103
	Public non-admitted	0.450	0.431	0.406	0.386	0.330	0.282	0.267
	Private	0.105	0.092	0.099	0.103	0.117	0.132	0.137
	Public	0.940	0.917	0.886	0.875	0.728	0.581	0.493
Other	MBS	0.142	0.046	0.043	0.044	0.043	0.043	0.043
	Public non-admitted	0.017	0.012	0.011	0.010	0.007	0.005	0.003
	Private	0.022	0.018	0.017	0.019	0.020	0.022	0.023
	Public	0.029	0.022	0.019	0.021	0.017	0.013	0.011

Note: Shaded values denote historically observed values.

4.6 Assumptions for Demand Model

#	Caveat/Limitation	Description and implications
1	COVID-19 impact	The effects of COVID-19 are not explicitly modelled, but are indirectly captured in two ways: 1) the latest hospital and MBS data, available up to 2022, incorporates pandemic-driven changes in demand, which subsequently influence future predictions, and 2) the provision of COVID-19 telehealth and

		telephone MBS item codes reflect some of the pandemic-related adjustments. The model may not fully reflect the long-term shifts in demand patterns resulting from the pandemic.
2	Activity for patients in each ESRG	The time a clinician spends caring for a patient is assumed to be consistent with other patients within the same ESRG, regardless of the patient's conditions. However, in practice, the time required by a clinician, and consequently the actual level of demand, may vary between patients within the same ESRG.
3	Non-specialist practitioner FTE ratio trend projection	Non-specialist practitioner FTE ratios trends by sector are projected at the national and state levels to capture the different trends by jurisdiction. Historical ratios from 2020 to 2023 are projected to capture the recent trends in the medical workforce composition – with the exceptions: 1. ‘Other’ medical practitioners use ratios from 2021-2023 2. Registrars billing MBS use ratios from 2021-2023 These exceptions are made due to the Commonwealth Government changes to the Health Insurance Act which came into effect in 2021. These changes linked access to Medicare rebates with specialist registration with the Medical Board. The effect of this change was the reclassification of non-VR GPs in the Ahpra registration data to specialist GPs – causing practitioners to be reclassified from Other to specialists. A small number of state/sectors had insufficient historical data to allow for stable ratio projections – for these state/sectors the national trends were used.

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All information in this publication is correct as at June 2026