MEDICINEINSIGHT

Characterising patients with a request for three-dimensional breast tomosynthesis (3DBT) in the general practice setting.

Australian Government Department of Health

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Independent, not-for-profit and evidence-based, NPS MedicineWise enables better decisions about medicines, medical tests and other health technologies. We receive funding from the Australian Government Department of Health.

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EXECUTIVE SUMMARY

The Australian Government Department of Health (DoH) requested information about the utilisation of three-dimensional breast tomosynthesis (3DBT) in general practice since its listing on the Medicare Benefits Schedule (MBS) in November 2018, using data from the MedicineInsight program. This report aims to describe the indications for ordering 3DBT in general practice by assessing the personal and family history (especially of cancer), presenting symptoms/signs, and socio-demographic characteristics of the cohort of patients in the MedicineInsight general practice program who have a recorded imaging request or result for 3DBT since its listing on the MBS.

Key findings

Socio-demographic profile

- Of the 7,491 patients with a 3DBT recorded between 1 October 2018 and 31 May 2019, 99.5% were women, 50% were 40–59 years old, and 65.5% were from major cities.
- For every 100,000 eligible patients in the MedicineInsight dataset, 358 had a 3DBT recorded.
- For every 100,000 eligible female patients in the MedicineInsight dataset, 628 had a 3DBT recorded.
  - For every 100,000 female patients aged 50 years or over, 1015 had a 3DBT recorded.
  - For every 100,000 female patients aged less than 50 years, 379 had a 3DBT recorded.
- 3DBT records were most common among patients aged 40–49 years (768 per 100,000 patients).
- The proportion of patients with a 3DBT recorded who identified as Aboriginal or Torres Strait Islander was half that of patients who did not identify as Aboriginal or Torres Strait Islander.
- Patients residing in the most socio-economically advantaged areas were more likely to have a 3DBT recorded than patients in the least advantaged areas.

Risk-factor profiles

- Female patients aged less than 50 years were more likely to have a 3DBT recorded if they were overweight or obese, rather than underweight.
- A fifth of patients with a 3DBT recorded had a personal history of breast cancer recorded prior to the 3DBT scan.
- Over a third of patients were considered symptomatic prior to their 3DBT record.
- Just under half of the patients with a 3DBT recorded had a history of menopausal hormonal therapy and/or oral contraceptive pill (OCP).

Indications for use

- The majority of patients (59%) had a relevant indication for 3DBT including being symptomatic or having a personal or family history of breast cancer.
- Just under a third of 3DBT patients were symptomatic but had no personal or family history of breast cancer.
- Just under a quarter of the 3DBT cohort had a personal and/or family history of breast cancer but weren't symptomatic.
- Two fifths of patients had no relevant indication for 3DBT recorded in the MedicineInsight dataset.
- Symptoms and personal/family history recorded in fields not available to MedicineInsight could lead to an underestimate of 3DBT testing according to specified indications in general practice.

Type of 3DBT

- The majority of patients (92.5%) had a bilateral 3DBT recorded.
- 4.5% of patients had a unilateral 3DBT and 0.5% had both a unilateral and a bilateral 3DBT recorded.

BACKGROUND

Three-dimensional breast tomosynthesis (3DBT) is a relatively new digital mammography technology that produces a 3D image of the breast by using several X-rays obtained at different angles. Despite being an established practice, it is an evolution in technology that has not yet been assessed by the Medical Services Advisory Committee (MSAC) for safety, effectiveness and cost-effectiveness. Until recently, there were no Medicare Benefits Schedule (MBS) items that provide rebates to patients who access 3DBT services; instead practitioners or radiologists may have been using one or more existing MBS items of uncertain relevance.

From 1 November 2018 new Medicare Benefits Schedule (MBS) interim items for 3DBT were introduced (59302 & 59305; Table 1). These new items provide interim funding for 3DBT while the Medical Services Advisory Committee (MSAC) is considering an application for the long-term funding of 3DBT (MSAC application 1567).

Information from MBS statistics shows that general practitioners (GPs) are currently requesting over 15,000 services per month of 3DBT (items 59302 & 59305), however information on indications for the 3DBT items are not currently available in the MBS statistics dataset.

TABLE 1: NEW MBS ITEMS FOR 3DBT

59302 Three dimensional tomosynthesis of both breasts, not being a service associated with item 59300 or 59301, if there is reason to suspect the presence of malignancy because of: the past occurrence of breast malignancy in the patient or members of the patient's family; or symptoms or indications of malignancy found on examination of the patient by a medical practitioner (R) (K) Fee: $202.00
59305 Three dimensional tomosynthesis of one breast, not being a service associated with item 59303 or 59304, if there is reason to suspect the presence of malignancy because of: the past occurrence of breast malignancy in the patient or members of the patient's family; or symptoms or indications of malignancy found on examination of the patient by a medical practitioner (R) (K) Fee: $114.00

MedicineInsight program

MedicineInsight is a leading large-scale primary care data set of longitudinal de-identified electronic health records (EHR) in Australia. MedicineInsight was initially established by NPS MedicineWise in 2011, with core funding from the Australian Government Department of Health, to collect general practice data to support quality improvement in Australian primary care and post-market surveillance of medicines. The monthly collation of collected data can be analysed for the purposes of improving patient care, quality improvement and evaluation, performing population health analysis, research and developing health policy.

MedicineInsight utilises third-party data extraction tools which extract, de-identify, encrypt and securely transmit whole-of-practice data from the clinical information systems of over 700 general practices. Patient level data are de-identified 'at source' meaning patients' personal identifiers such as name, date of birth and address are not extracted by the tool (although year of birth and postcode are extracted, enabling the calculation of age and Socio-Economic Indexes for Areas [SEIFA]). The data held in the MedicineInsight database are non-identifiable. However, each patient has a unique identifying number which allows all the records (clinical, prescription, referral etc) held in the database

to be linked to the associated patient identifying number. The process of collecting patient data achieves a data collection that meets the definition of non-identified data in the NHMRC National Statement on Ethical Conduct in Human Research. [chapter 3.2, p.27].

Further information is available online: https://www.nps.org.au/medicine-insight

Ethics approval for MedicineInsight

In December 2017, NPS MedicineWise was granted ethics approval for the standard operations and uses of the MedicineInsight database by NPS MedicineWise. This program approval was given by the RACGP NREEC (NREEC 17-017).

AIMS AND METHODS

Study aims

The purpose of this report is to understand the indications for ordering 3DBT in general practice by describing the personal and family history (especially of cancer), presenting symptoms/signs, and socio-demographic characteristics of the cohort of patients in the MedicineInsight general practice program who have a recorded imaging request or result for 3DBT since its listing on the MBS.

This report will be used to inform the Diagnostic Imaging and Pathology Branch within the Medical Benefits Division at the Department of Health.

Study questions

The study questions of interest included:

1. What is the number and proportion of all MedicineInsight patients with a 3DBT recorded during the study period, overall and by socio-demographic characteristics?
2. What is the socio-demographic profile of the 3DBT cohort in terms of age, gender, Aboriginal and Torres Strait Islander status, state/territory, rurality, and socio-economic status?
3. What proportion of patients in the 3DBT cohort are symptomatic at the time of the 3DBT request? ie, they have a relevant symptom recorded in the 0–90 days prior to the date of the 3DBT record.
4. What are the risk factor profiles of the 3DBT cohort? These include alcohol status, smoking status, BMI category, history of breast cancer, history of other relevant cancer (ovarian, prostrate, and pancreatic cancer), history of menopausal hormonal therapy (combined oestrogen-progestogen), and history of oral contraceptive pill (combined oestrogen-progestogen).
5. What proportion of patients in the 3DBT cohort fall under the following mutually exclusive groups?
    a. Symptomatic with no personal history of breast cancer and no family history (FH) of breast cancer
    b. Symptomatic with no personal history of breast cancer but with FH of breast cancer
    c. Symptomatic with personal history of breast cancer but no FH of breast cancer
    d. Symptomatic with personal history of breast cancer and with FH of breast cancer
    e. Non-symptomatic with no personal history of breast cancer and no FH of breast cancer
    f. Non-symptomatic with no personal history of breast cancer but with FH of breast cancer
    g. Non-symptomatic with personal history of breast cancer but no FH of breast cancer
    h. Non-symptomatic with personal history of breast cancer and with FH of breast cancer
6. What proportion of patients in the 3DBT cohort have a bilateral, unilateral or unspecified 3DBT?

Study design and time period

This was a descriptive longitudinal study, using Australian general practice data from MedicineInsight for the two years from 1 June 2017 to 31 May 2019, inclusive, to identify the general study population of patients regularly attending a MedicineInsight practice (3 visits in the past 2 years) and those with 3DBT imaging requests recorded. Historical records outside of the study period were consulted when identifying patient demographics, family history of breast cancer and personal history of breast and other cancers prior to 3DBT request.

The index date was defined for each patient as the date of their first 3DBT imaging request or result.

Study cohort

General practice sites

De-identified patient data were obtained from 441 Australian general practice sites which met the standard data quality criteria in the MedicineInsight June 2019 download. A general practice site is used to describe one or more practices that share the same general practice database, either because they are operating within a common administrative system (eg, the same corporate entity) or in the same geographical area.

The standard data quality criteria were applied:

- the site had been established for at least 2 years; and
- had no significant interruptions (of longer than 2 months in the 2 years prior) to their practice data; and
- met the minimum threshold of clinical activity (ie, at least 50 patients in the last two years).

Patient population

The **general study population** comprised patients of all ages who met the following inclusion criteria:

- they visited a practice site that contributed data to MedicineInsight and meets specific MedicineInsight data quality requirements
- they had valid information for age and sex
- they had at least three clinical encounters during the study time period (1 June 2017–31 May 2019)

The **3DBT study population** were patients in the general study population who met the following inclusion criteria:

- they had at least one 3DBT request and/or result recorded from 1 October 2018 (one month prior to the 1 November MBS listing of 3DBT to account for requests issued by GPs in anticipation of the listing).

Definitions

Clinical encounters

A clinical encounter, or any professional exchange between a patient and a general practitioner or a nurse, was defined as all those encounters at the practice site that were: a) not identified as administrator entries nor encounters that have been transferred/imported from another practice and b) were not identified by pre-defined administration-type terms found in the ‘reason for encounter’ or ‘visit type’ fields such as ‘administrative reasons’, ‘forms’, and ‘recall’.

Socio-demographics

Socio-demographics included in the report are defined in Table 2.

TABLE 2: SOCIO-DEMOGRAPHIC DEFINITIONS

Characteristic	Definition
Age	Age was calculated at 1 July 2018 based on the patient's date of birth (defined as 1 July in the patient's year of birth) and presented as 10-year age groups. Valid age was defined as 0–112 years.
Gender	As recorded in the clinical information system (CIS) (Male, Female, Indeterminate)
Aboriginal and Torres Strait Islander status	As recorded in the CIS
State in Australia	State was assigned based on each patient's postcode of residence. If patient postcode was missing, the practice postcode was used as a proxy.
Rurality	Rurality was assigned based on a mapping of each patient's postcode of residence using the Australian Bureau of Statistics (ABS) mapping of Postcode 2012 to the Australian Statistical Geography Standard (ASGS) Remoteness Areas 2011 data.[1]
Socioeconomic status (SEIFA)	SEIFA was assigned based on a mapping of each patient's postcode of residence using the Australian Bureau of Statistics (ABS) mapping of Postcode 2012 to the Index of Relative Socioeconomic Advantage and Disadvantage (IRSAD).[2]
Alcohol status	Alcohol status was based on each patient's current alcohol status recorded in the CIS, however this is only completed for approximately 24% of patients.
Smoking status	Smoking status was based on each patient's current smoking status recorded in the CIS (Current smoker, ex-smoker, non-smoker, unknown)
BMI category	BMI was based on the patients' most recent BMI or height and weight recorded during the study period (provided the height and weight were recorded after age 18 for women and 22 for men) Underweight (< 18.5); Healthy weight range (18.5–< 25); Overweight (25–< 30); Obese (30+); Not recorded)
History of cancer (breast, ovarian, prostate and pancreatic cancer)	See Table 3
History of menopausal hormonal therapy and/or oral contraceptive therapy	Patients' medication history was assessed based on ATC codes recorded in the script item table or prescription table prior to the index date

The 3DBT study population

The MedicineInsight team builds search strategies to pick up all relevant terms, abbreviations and synonyms that belong to the test group of interest. Table 3 contains the search strategy used to identify patients with 3DBT recorded during the study period in the 'tests ordered' table and/or the 'test result summaries' table. The date of the first 3DBT request was considered the patient's 'index date'.

Furthermore, bilateral and unilateral 3DBT was categorised according to the following additional terms in addition to those in Table 3 (Bilateral: bilateral, both, breasts (plural); Unilateral: unilateral, left, right).

TABLE 3: SEARCH CRITERIA TO DEFINE 3DBT TESTS ORDERED / RECEIVED

Search terms	Comments
3DBT	
3D AND breast	Mention of "3D and breast" without tomosynthesis and mention of "breast and tomosynthesis" without 3D is unlikely to relate to another type of test and is therefore thought to be specific enough to pick up true instances of 3DBT
three dimensional AND breast	
3 dimensional AND breast	
breast AND tomosynthesis	
3D AND mammography/ mammogram	Mention of mammography with 3D or tomosynthesis, captures further relevant tests and is unlikely to relate to another type of test
Three dimensional AND mammography/ mammogram	
3 dimensional AND mammography/ mammogram	
mammography/ mammogram AND tomosynthesis	

Conditions

For the purposes of this analysis, the relevant clinical conditions were defined as shown in Table 3.

Patients were defined as having any of the conditions described below, if they had a relevant coded (Docle, Pyefinch) or free text entry in one or more of the following fields in the clinical information system: 'Diagnosis', 'Reason for visit', 'Reason for prescription', 'Requested tests', 'Test reason', 'Result name'.

TABLE 4: CLINICAL DEFINITIONS USED TO IDENTIFY MEDICINEINSIGHT PATIENTS

Condition	Definition
History of breast cancer	Patients were defined as having a history of breast cancer, if they had a relevant coded (Docle, Pyefinch) or free text entry in one of the diagnosis or tests fields prior to the index date. Relevant terms included: breast / mammary / lobular AND adenocarcinoma / cancer / carcinoma / DCIS / ductal carcinoma in situ / metastases / metastasis / metastatic
Family history of breast cancer	Patients were defined as having a family history of breast cancer if they had a relevant record at any time (before or after the index date) in one or more of the 'Diagnosis', 'Reason for visit', 'Reason for prescription' 'Requested tests', 'Test reason', 'Result name' fields. Relevant terms included those for breast cancer and: FH. Family history, parent, mother, sister, aunty, grandma
History of other relevant cancer	Patients were defined as having history of a relevant cancer, if they had a record of ovarian, prostate, or pancreatic cancer before the index date in one or more of the 'Diagnosis', 'Reason for visit', 'Reason for prescription' 'Requested tests', 'Test reason', 'Result name' fields.
Symptomatic	Patients were defined as symptomatic, if they had a relevant term recorded in the 0–90 days prior to the index date in one or more of the 'Diagnosis', 'Reason for visit', 'Reason for prescription' 'Requested tests', 'Test reason', 'Result name' fields. Relevant terms included: (breast and dense / pain / tender / lump / mass / nodule / dimple / inflammation / swelling / swollen / irritation / redness / scaliness / thickening / change / abnormal(ity), (nipple and abnormal(ity) / change / discharge / retraction / inversion), ? / query breast cancer recurrence

Data analysis and reporting

Analysis of the data was conducted using SAS version 9.4 (SAS Institute Inc., Cary, NC, USA), including the use of the SURVEYFREQ procedure. Measures included are descriptive statistics, frequencies, proportions and odds ratios as appropriate. To indicate the reliability of the estimates of prevalence and proportion, 95% confidence intervals (CI) and p-values were included as needed. Non-overlap of 95% CIs (adjusted for clustering by practice site) was used to determine if there were significant differences between different time periods when appropriate.

If a particular result was only reported in 1–4 patients, this result has been reported as < 5 in order to preserve the privacy of individuals (with the exception of missing variables). If a particular result was not seen in any patient, the result has been reported using a dash (-).

PATIENT PROFILES

- Of the 7,491 patients with a 3DBT recorded between 1 October 2018 and 31 May 2019, 99.5% were women, 50% were 40–59 years old, and 65.5% were from major cities.
- For every 100,000 eligible patients in the MedicineInsight dataset, 358 had a 3DBT recorded.
- For every 100,000 eligible female patients in the MedicineInsight dataset, 628 had a 3DBT recorded.
  - For every 100,000 female patients aged 50 years or over, 1015 had a 3DBT recorded
  - For every 100,000 female patients aged less than 50 years, 379 had a 3DBT recorded
- 3DBT records were most common among patients aged 40–49 years (768 per 100,000 patients)
- The proportion of patients with a 3DBT recorded who identified as Aboriginal or Torres Strait Islander was half that of patients who did not identify as Aboriginal or Torres Strait Islander
- Patients residing in the most socio-economically advantaged areas were more likely to have a 3DBT recorded than patients in the least advantaged areas.

Study questions

- What is the number and proportion (prevalence per 100,000 patients) of all MedicineInsight patients with a 3DBT recorded during the study period, overall and by socio-demographic characteristics?
- What is the socio-demographic profile (distribution) of the 3DBT cohort in terms of age, gender, Aboriginal or Torres Strait Islander status, state, rurality, and socio-economic status?

Characteristics of patients with 3DBT tests recorded

There were 7,491 patients with a 3DBT recorded between 1 October 2018 and 31 May 2019, equating to a prevalence of 358 patients with a 3DBT recorded per 100,000 patients in the general study population. Table 5 presents the socio-demographic characteristics of the general study population, the 3DBT sub-population and the prevalence of 3DBT records among the general population.

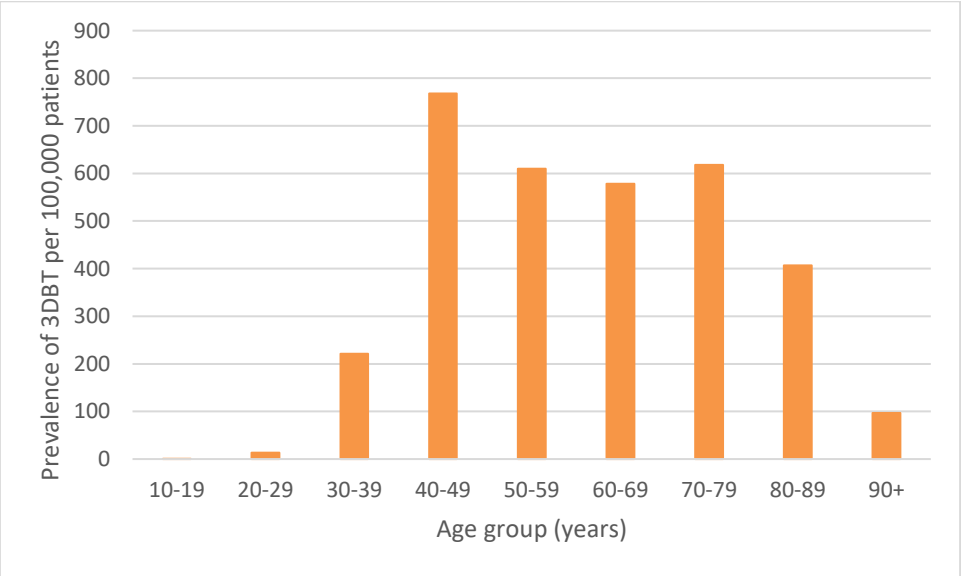

FIGURE 1: AGE-SPECIFIC PREVALENCE OF 3DBT RECORDS PER 100,000 PATIENTS IN THE GENERAL STUDY POPULATION

Female patients accounted for 99.5% of those with a 3DBT recorded. 3DBT records were most common among patients aged 40–49 years (768 per 100,000), followed by patients aged 50–79 years (range: 578–618 per 100,000), and those aged 80–89 years (407 per 100,000) (Figure 1, Table 5 right-hand column).

The likelihood of having a 3DBT recorded was not significantly different for patients residing in major cities, inner regional or outer regional areas, however, those in remote areas had the lowest prevalence of 3DBT testing (145 per 100,000) (Table 5 right-hand column). The prevalence of 3DBT testing in patients who identified as Aboriginal or Torres Strait Islander was half that of patients who did not identify as Aboriginal or Torres Strait Islander (Table 5 right-hand column). Patients residing in the most socio-economically advantaged areas were significantly more likely to have a 3DBT recorded than patients in the least advantaged areas (532 vs 264 per 100,000) (Figure 2, Table 5 right-hand column).

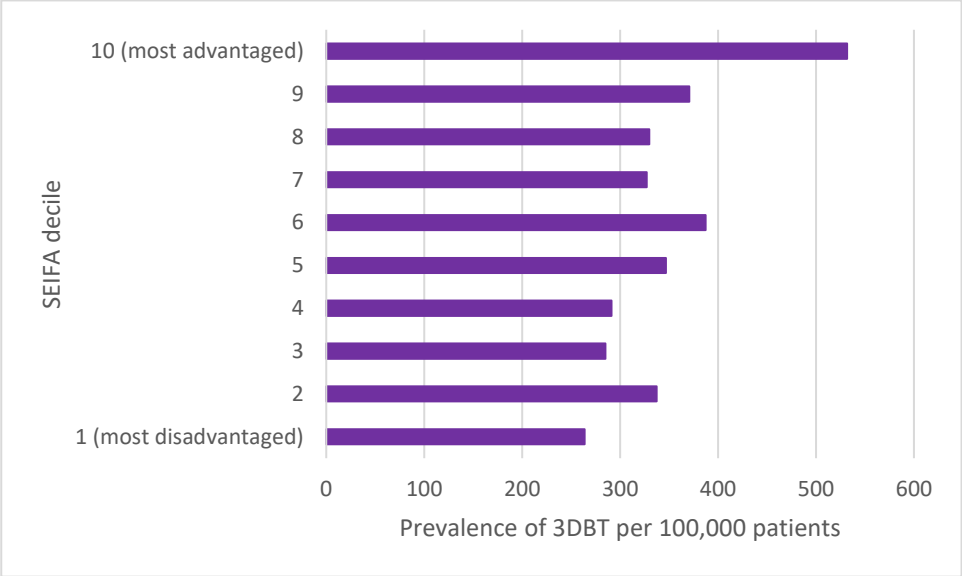

FIGURE 2: SEIFA-SPECIFIC PREVALENCE OF 3DBT REQUEST/RECORD PER 100,000 PATIENTS IN THE GENERAL STUDY POPULATION

The prevalence of 3DBT testing was highest in the Australian Capital Territory (ACT), New South Wales (NSW) and Tasmania (TAS) and lowest in South Australia (SA), Western Australia (WA) and the Northern Territory (NT) (Table 5). Of note, practices were recruited to MedicineInsight using non-random sampling, and systematic sampling differences between regions cannot be ruled out. Comparisons between regions should be interpreted with caution.

TABLE 5: THE SOCIO-DEMOGRAPHIC DISTRIBUTION OF PATIENTS IN THE GENERAL STUDY POPULATION AND THE 3DBT COHORT AND CHARACTERISTIC-SPECIFIC PREVALENCE OF 3DBT IN THE GENERAL POPULATION

Characteristic	General study population		3DBT study population		Patient prevalence of 3DBT
	Number	% (95% CI)	Number	% (95% CI)	Per 100,000 (95% CI)
All patients	2,094,380		7,491		358
Sex					
Male	908,236	43.4 (42.9-43.8)	40	0.5 (0.4-0.7)	4 (3-6)
Female	1,185,983	56.6 (56.2-57.1)	7,451	99.5 (99.3-99.6)	628 (570-686)
Other	161	0.0 (0.0-0.0)	0	–	–
(missing)	(-)		(-)		
Age group (years)					
0-9	261,899	12.5 (12.0-13.0)	0	–	–
10-19	193,639	9.2 (9.0-9.5)	<5	0.0 (0.0-0.0)	1 (0-2)
20-29	244,046	11.7 (11.0-12.3)	33	0.4 (0.3-0.6)	14 (9-18)
30-39	281,430	13.4 (12.9-14.0)	622	8.3 (7.5-9.1)	221 (192-250)
40-49	271,254	13.0 (12.7-13.2)	2,084	27.8 (26.2-29.5)	768 (686-850)
50-59	272,059	13.0 (12.7-13.3)	1,659	22.1 (21.1-23.2)	610 (545-674)
60-69	256,792	12.3 (11.8-12.7)	1,485	19.8 (18.7-20.9)	578 (520-637)
70-79	193,977	9.3 (8.8-9.8)	1,199	16.0 (14.8-17.2)	618 (549-687)
80-89	94,431	4.5 (4.2-4.8)	384	5.1 (4.5-5.8)	407 (349-464)
90+	24,853	1.2 (1.1-1.3)	24	0.3 (0.2-0.4)	97 (58-135)
(missing)	(-)		(-)		
Indigenous status					
Not Aboriginal and/or Torres Strait Islander	1,619,618	96.8 (96.4-97.2)	5,999	98.7 (98.3-99.0)	370 (335-405)
Aboriginal and/or Torres Strait Islander	53,001	3.2 (2.8-3.6)	82	1.3 (1.0-1.7)	155 (118-192)
(not recorded)	(421,761)		(1,410)		

Characteristic	General study population		3DBT study population		Patient prevalence of 3DBT
	Number	% (95% CI)	Number	% (95% CI)	Per 100,000 (95% CI)
Rurality					
Major city	1,328,824	63.8 (58.8-68.7)	4,890	65.5 (59.2-71.9)	368 (323-414)
Inner regional	520,530	25.0 (20.7-29.3)	1,847	24.7 (19.3-30.2)	355 (301-408)
Outer regional	204,248	9.8 (7.2-12.4)	679	9.1 (5.9-12.3)	332 (262-403)
Remote	22,707	1.1 (0.4-1.8)	33	0.4 (0.0-0.8)	145 (59-232)
Very remote	7,904	0.4 (0.1-0.7)	15	0.2 (0.0-0.4)	190 (0-390)
(missing)	(10,167)		(27)		
State/Territory					
ACT	37,357	1.8 (0.2-3.4)	203	2.7 (0.1-5.3)	543 (342-745)
NSW	811,075	38.7 (33.4-44.1)	3,644	48.6 (41.4-55.9)	449 (388-510)
NT	32,832	1.6 (0.4-2.7)	63	0.8 (0.1-1.6)	192 (106-277)
Other Territories	12	0.0 (0.0-0.0)	0	–	–
Qld	385,649	18.4 (14.3-22.5)	1,245	16.6 (11.9-21.4)	323 (263-382)
SA	58,688	2.8 (1.2-4.4)	67	0.9 (0.1-1.6)	114 (61-167)
TAS	124,863	6.0 (3.4-8.6)	546	7.3 (3.9-10.7)	437 (370-504)
VIC	411,613	19.7 (15.0-24.3)	1,385	18.5 (12.8-24.1)	337 (263-410)
WA	232,291	11.1 (7.3-14.9)	338	4.5 (2.3-6.7)	146 (99-192)
(missing)	(-)		(-)		
SES (SEIFA deciles)					
1 (most disadvantaged)	95,917	4.6 (3.5-5.7)	253	3.4 (2.2-4.6)	264 (188-339)
2	198,330	9.5 (7.2-11.8)	669	9.0 (5.7-12.3)	337 (247-428)
3	146,312	7.0 (5.5-8.6)	417	5.6 (4.0-7.2)	285 (230-340)
4	210,867	10.1 (8.0-12.3)	614	8.2 (5.1-11.4)	291 (198-384)
5	216,270	10.4 (8.0-12.8)	750	10.1 (7.5-12.7)	347 (298-396)
6	295,053	14.2 (11.6-16.8)	1,143	15.4 (11.8-18.9)	387 (327-448)
7	185,487	8.9 (7.3-10.5)	607	8.2 (6.1-10.2)	327 (273-381)
8	246,270	11.8 (9.7-14.0)	812	10.9 (8.5-13.4)	330 (270-389)
9	246,530	11.9 (9.6-14.1)	914	12.3 (9.4-15.2)	371 (300-442)
10 (most advantaged)	237,907	11.4 (8.9-14.0)	1,265	17.0 (12.0-21.9)	532 (426-637)
(missing)	(15,437)		(47)		

RISK FACTOR PROFILES

- Female patients aged 0–49 years were more likely to have 3DBT records if they were overweight or obese, rather than underweight
- A fifth of patients with a 3DBT recorded had a personal history of breast cancer prior to the 3DBT scan.
- Over a third of patients were considered symptomatic prior to their 3DBT record
- Just under half of the patients had a history of menopausal hormonal therapy and/or OCP prior to their 3DBT record

Study questions

- What are the risk factor profiles of the 3DBT cohort (alcohol status, smoking status, BMI category)?
- What proportion of the 3DBT cohort have a history of breast cancer, or other relevant cancer (ovarian, prostate, and pancreatic cancer)?
- What proportion of patients in the 3DBT cohort were symptomatic at the time of the 3DBT request? (They have a relevant symptom recorded in the 0–90 days prior to the date of the 3DBT record).
- What proportion of the 3DBT cohort have a history of menopausal hormonal therapy (combined oestrogen-progestogen), and/or a history of oral contraceptive pill (combined oestrogen-progestogen)?

Risk factor profile of patients with 3DBT records

The prevalence of 3DBT testing was highest in ex-smokers (495 per 100,000) and lowest in current smokers (251 per 100,000) (Table 6 right-hand column). The likelihood of having a 3DBT recorded was significantly higher for patients with a recorded alcohol status of ‘light drinker’ (500 per 100,000) compared with non-drinkers and moderate to heavy drinkers (326 and 317 per 100,000 respectively) (Table 6 right-hand column). Recorded information on alcohol status was missing for the large majority of patients (76%) therefore these findings should be interpreted with caution.

TABLE 6: THE RISK FACTOR DISTRIBUTION OF PATIENTS IN THE GENERAL STUDY POPULATION AND THE 3DBT COHORT AND THE RISK FACTOR-SPECIFIC PATIENT PREVALENCE OF 3DBT IN THE GENERAL POPULATION

Characteristic	General study population		3DBT study population		Patient prevalence of 3DBT
	Number	% (95% CI)	Number	% (95% CI)	Per 100,000 (95% CI)
All patients	2,094,380		7,491		358
Alcohol status					
Non-drinker	344,770	69.2 (67.4-71.0)	1,124	62.4 (59.1-65.7)	326 (279-373)
Light	104,423	21.0 (19.7-22.2)	522	29.0 (26.1-31.9)	500 (424-576)
Moderate or heavy	48,893	9.8 (9.0-10.6)	155	8.6 (7.1-10.1)	317 (258-376)
(missing)	(1,596,294)		(5,690)		
Smoking status					
Never	1,132,347	66.2 (65.3-67.1)	4,638	66.6 (65.0-68.2)	410 (369-451)
Ex-smoker	360,905	21.1 (20.4-21.8)	1,785	25.6 (24.3-27.0)	495 (445-544)
Current	216,535	12.7 (12.1-13.3)	543	7.8 (6.9-8.7)	251 (220-281)
(missing)	(384,593)		(525)		
BMI class (all ages and genders)					
Underweight	7,624	1.2 (1.1-1.2)	36	1.1 (0.8-1.4)	472 (325-619)
Normal	173,628	26.9 (26.1-27.7)	968	28.8 (26.8-30.8)	558 (488-627)
Overweight	217,898	33.7 (33.4-34.1)	1,047	31.2 (29.5-32.8)	481 (425-536)
Obese	246,513	38.2 (37.2-39.1)	1,310	39.0 (36.9-41.1)	531 (480-583)
(missing)	(1,448,717)		(4,130)		

Among male and female patients of all ages, recorded BMI was not associated with the likelihood of 3DBT. However, when female patients aged 0–49 years were analysed separately, overweight and obese females were more likely to have 3DBT compared to underweight patients. A similar trend was not observed among females aged 50+ years (Table 7).

It is important to note that data availability in MedicineInsight depends on whether risk factor information has been recorded in the patient's general practice record and whether it has been recorded in fields from which data can be extracted and analysed. In addition to this, BMI is more likely to be recorded for an overweight patient, because the GP will see that the patient is overweight and will consider it clinically relevant and worthy of measuring and recording. Only the patient's most recent alcohol and smoking status has been analysed for this study and may have changed over time.

TABLE 7: THE RISK FACTOR DISTRIBUTION OF FEMALE PATIENTS IN THE GENERAL STUDY POPULATION AND THE 3DBT COHORT AND THE RISK FACTOR-SPECIFIC FEMALE PATIENT PREVALENCE OF 3DBT IN THE GENERAL POPULATION

Characteristic	Female general study population		Female 3DBT study population		Female patient prevalence of 3DBT
	Number	% (95% CI)	Number	% (95% CI)	Per 100,000 (95% CI)
All female patients	1,185,983		7,451		628 (570-686)
Age group (years)					
0-49	720,853		2,732		379 (339-419)*
50+	465,130		4,719		1,015 (922-1,107)**
BMI class (females aged 0-49)					
Underweight	3,637	2.2 (2.0-2.3)	11	1.1 (0.5-1.7)	302 (131-474)
Normal	61,947	36.8 (35.4-38.1)	336	33.1 (29.9-36.3)	542 (459-626)
Overweight	44,205	26.2 (25.8-26.7)	290	28.6 (25.6-31.5)	656 (546-766)
Obese	58,739	34.9 (33.5-36.2)	378	37.2 (33.9-40.6)	644 (550-737)
(missing)	(552,325)		(1,717)		
BMI class (females aged 50+)					
Underweight	2,688	1.3 (1.2-1.4)	24	1.0 (0.7-1.4)	893 (554-1,232)
Normal	55,084	26.7 (26.1-27.4)	628	27.0 (24.8-29.2)	1,140 (986-1,295)
Overweight	65,975	32.0 (31.7-32.3)	753	32.3 (30.4-34.3)	1,141 (1,008-1,274)
Obese	82,347	40.0 (39.1-40.8)	923	39.6 (37.1-42.2)	1,121 (1,012-1,229)
(missing)	(259,036)		(2,391)		

**3DBT prevalence for females aged 0-49 years, where BMI not missing: 602 (528-676)*

***3DBT prevalence for females aged 50+ years, where BMI not missing: 1,130 (1,021-1,238)*

Table 8 presents the personal history of breast cancer and other relevant cancers among the 3DBT cohort, prior to the date of the 3DBT. A fifth of patients with a 3DBT recorded had a personal history of breast cancer prior to the 3DBT scan and 78.9% of patients had no personal history of a relevant cancer in the records available to MedicineInsight. Information that is provided to general practices in PDF format about procedures, diagnoses and tests that occur in specialist or hospital settings (such as discharge summaries, letters, faxes etc) is not available to MedicineInsight. Therefore, conditions such as cancers, that are managed in specialist or hospital settings, may not be captured in general practice datasets, potentially leading to an underestimate of the true proportion of patients with cancer.

Table 8 also present the proportion of patients who were considered symptomatic prior to their 3DBT – that is they had a relevant breast symptom recorded in the 0–90 days prior to 3DBT. More than a third of patients (35.9%) were considered symptomatic based on the records available to MedicineInsight. It is important to note that symptoms recorded only in the progress notes will not be captured in MedicineInsight and could lead to an underestimate of the true proportion of symptomatic patients.

TABLE 8: PERSONAL HISTORY OF BREAST CANCER AND OTHER RELEVANT CANCERS (OVARIAN, PROSTATE OR PANCREATIC) AND PRESENCE OF BREAST SYMPTOMS AMONG PATIENTS IN THE 3DBT COHORT

Characteristic	3DBT study population	
	Number	% (95% CI)
All patients	7,491	
Cancer history		
Breast cancer only	1,526	20.4 (18.7-22.0)
Other relevant cancer only	32	0.4 (0.3-0.6)
Both breast cancer and other relevant cancer	25	0.3 (0.2-0.5)
Neither breast nor other relevant cancer	5,908	78.9 (77.2-80.5)
Symptomatic*		
Yes	2,688	35.9 (33.6-38.2)
No	4,803	64.1 (61.8-66.4)

Breast symptoms (recorded 0-90 days prior to 3DBT)

Table 9 describes the proportion of patients in the 3DBT cohort with a prescription for hormonal menopausal therapy and/or oral contraceptive pill (OCP), prior to the date of the 3DBT. Just under half of the patients with a 3DBT recorded had a history of menopausal hormonal therapy and/or OCP (23.5% menopausal hormonal therapy only, and 20.7% OCP only). 52.1% of patients in the 3DBT cohort had neither menopausal hormonal therapy nor OCP prescriptions in the records available to MedicineInsight. Please note that medicines prescribed at non-MedicineInsight practices or by specialists will not be available to MedicineInsight and may lead to an underestimate of the true history of hormonal therapy.

TABLE 9: HISTORY OF MENOPAUSAL HORMONAL THERAPY AND/OR ORAL CONTRACEPTIVE PILL PRIOR TO 3DBT

Characteristic	3DBT study population	
	Number	% (95% CI)
All patients	7,491	
Menopausal therapy		
Menopausal hormonal therapy only	1,762	23.5 (22.0-25.0)
Oral contraceptive pill (OCP) only	1,554	20.7 (19.3-22.2)
Both menopausal hormonal therapy and OCP	273	3.6 (3.1-4.2)
Neither menopausal hormonal therapy nor OCP	3,902	52.1 (50.0-54.2)

INDICATIONS FOR USE OF 3DBT

- The majority of patients (59%) had a relevant indication for 3DBT including being symptomatic or having a personal or family history of breast cancer.
- Just under a third of 3DBT patients were symptomatic but had no personal or family history of breast cancer.
- Just under a quarter of the 3DBT cohort had a personal and/or family history of breast cancer but weren't symptomatic.
- Two-fifths of patients had no relevant indication for 3DBT recorded in the MedicineInsight dataset.
- Symptoms and personal or family history recorded in fields not available to MedicineInsight (such as progress notes or specialist/hospital communications) could lead to an underestimate of 3DBT testing according to specified indications in general practice.

Study questions

- What proportion of patients in the 3DBT cohort fall under the following mutually exclusive groups?
  - Symptomatic with no personal history of breast cancer and no family history (FH) of breast cancer
  - Symptomatic with no personal history of breast cancer but with FH of breast cancer
  - Symptomatic with personal history of breast cancer but no FH of breast cancer
  - Symptomatic with personal history of breast cancer and with FH of breast cancer
  - Non-symptomatic with no personal history of breast cancer and no FH of breast cancer
  - Non-symptomatic with no personal history of breast cancer but with FH of breast cancer
  - Non-symptomatic with personal history of breast cancer but no FH of breast cancer
  - Non-symptomatic with personal history of breast cancer and with FH of breast cancer

Indications for use of 3DBT in general practice

Figure 3 and Table 10 present the mutually exclusive groups of patients in the 3DBT cohort in terms of presence of symptoms, personal history of breast cancer and family history of breast cancer. The majority of patients (59.0%) had a relevant indication for 3DBT including being symptomatic or having a personal or family history of breast cancer. Two-fifths of patients with a 3DBT recorded were considered non-symptomatic and had no personal or family history of breast cancer. Just under a third of 3DBT patients were symptomatic but had no personal or family history of 3DBT. Just under a quarter of the 3DBT cohort had a personal and/or family history of breast cancer but weren't symptomatic.

Importantly, symptoms and personal or family history recorded in fields not available to MedicineInsight (such as progress notes or specialist/hospital communications) could lead to an underestimate of 3DBT testing according to specified indications in general practice.

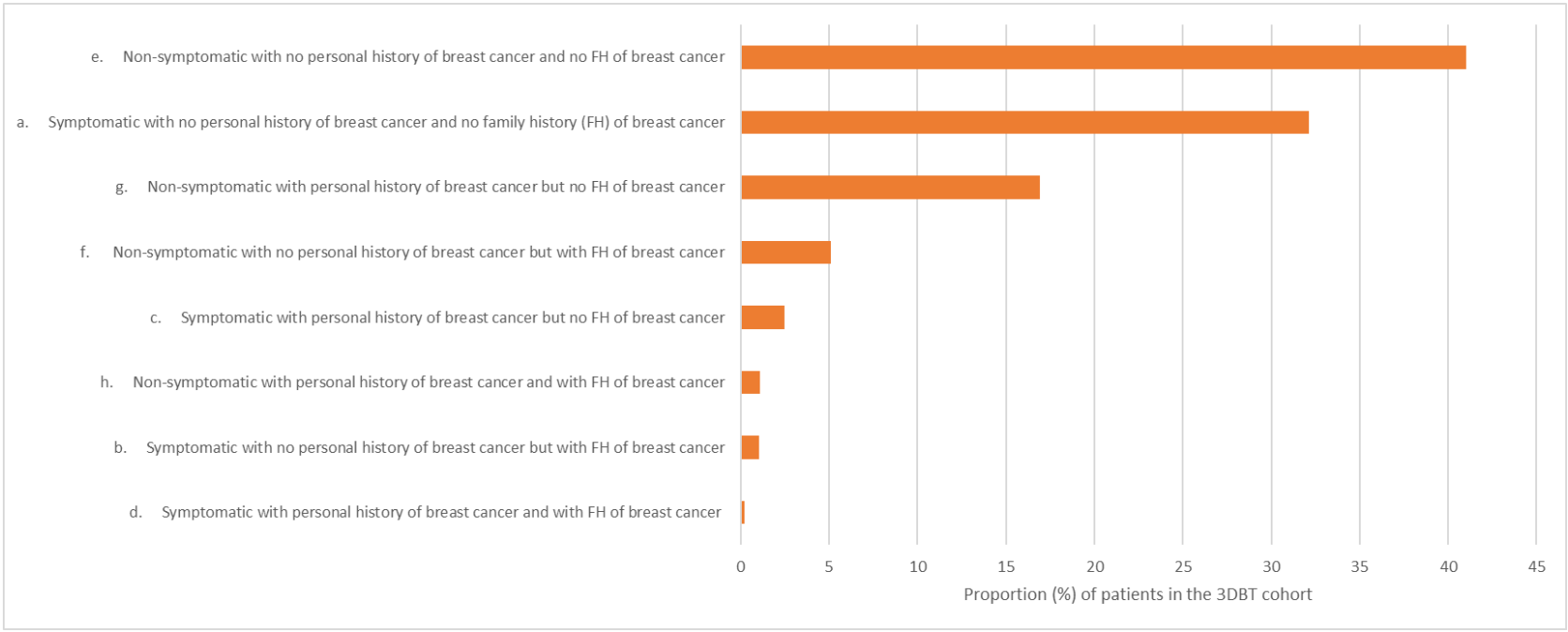

FIGURE 3 PROPORTION (%) OF PATIENTS IN THE 3DBT COHORT WITH THE MUTUALLY EXCLUSIVE RISK FACTOR PROFILES (N=7,491)

TABLE 10: MUTUALLY EXCLUSIVE RISK FACTOR CATEGORIES FOR PATIENTS IN THE 3DBT COHORT

	Number	% (95% CI)
All patients	7,491	
a. Symptomatic: YES, Personal history of breast cancer: NO, FH of breast cancer: NO	2,407	32.1 (30.2-34.1)
b. Symptomatic: YES, Personal history of breast cancer: NO, FH of breast cancer: YES	79	1.1 (0.8-1.3)
c. Symptomatic: YES, Personal history of breast cancer: YES, FH of breast cancer: NO	187	2.5 (2.0-3.0)
d. Symptomatic: YES, Personal history of breast cancer: YES, FH of breast cancer: YES	15	0.2 (0.1-0.3)
e. Symptomatic: NO, Personal history of breast cancer: NO, FH of breast cancer: NO	3,073	41.0 (37.8-44.2)
f. Symptomatic: NO, Personal history of breast cancer: NO, FH of breast cancer: YES	381	5.1 (4.1-6.1)
g. Symptomatic: NO, Personal history of breast cancer: YES, FH of breast cancer: NO	1,266	16.9 (15.4-18.4)
h. Symptomatic: NO, Personal history of breast cancer: YES, FH of breast cancer: YES	83	1.1 (0.8-1.4)

TYPES OF 3DBT REQUESTS

- The majority of patients (92.5%) had a bilateral 3DBT recorded.
- 4.5% of patients had a unilateral 3DBT and 0.5% had both a unilateral and a bilateral 3DBT recorded.

Study questions

- What proportion of patients in the 3DBT cohort have a bilateral, unilateral or unspecified 3DBT?

Results

Among patients with a 3DBT recorded, the majority had a bilateral (92.5%) scan with only 4.5% having a unilateral scan. 0.5% of patients had both a unilateral and a bilateral 3DBT recorded. Laterality status could not be ascertained for 2.5% of patients with a 3DBT recorded. (Table 11)

TABLE 11: IMAGING LATERALITY STATUS

Imaging laterality status	3DBT study population	
	Number	% (95% CI)
All patients	7,491	
Bilateral only	6,931	92.5 (91.5-93.6)
Unilateral only	337	4.5 (3.8-5.2)
Both bilateral and unilateral	37	0.5 (0.3-0.7)
Unspecified	186	2.5 (1.7-3.2)

GUIDE TO INTERPRETING THE DATA

When interpreting the information presented in this report, readers should note the following caveats and/or assumptions related to the MedicineInsight data.

- MedicineInsight data are dependent on the accuracy and completeness of data recorded in, and available for extraction from, the general practice clinical systems.
- Identification of conditions is dependent on GPs recording these items in their clinical software systems. Conditions may be underreported in MedicineInsight data depending on GPs' recording practices.
- Information on procedures, diagnoses and imaging tests from non-MedicineInsight practices and specialist / hospital settings aren't necessarily available to MedicineInsight, depending on GPs' recording practices. Information from other settings provided to GPs in PDF format (such as discharge summaries, letters, faxes etc) are not extracted by MedicineInsight. Therefore, conditions such as cancers, that are managed in specialist or hospital settings, may not be fully captured in general practice datasets potentially leading to an underestimate of the true proportion of patients with cancer, or relevant indications for 3DBT.
- Breast symptoms and personal or family history recorded in fields not available to MedicineInsight (eg. Progress notes) could lead to an underestimate of the 3DBT testing according to specified indications in general practice
- Calculation of the relative proportion of different indications assumes that non-recording of conditions occurs at random.
- Medicines prescribed or medical imaging requested at non-MedicineInsight practices or by specialists will not routinely be available to MedicineInsight and may lead to an underestimate of the true history of hormonal therapy.
- Medicine and medical test information from MedicineInsight includes current medications/ medication list and prescriptions issued. Records include prescriptions migrated from other practices and those prescribed elsewhere, such as by a specialist, but recorded by the GP in the medication list.
- Identification of risk factor information is dependent on whether this information has been recorded in fields from which data can be extracted and analysed.
- Practices were recruited to MedicineInsight using non-random sampling, and systematic sampling differences between regions cannot be ruled out. Comparisons between regions should be interpreted with caution.
- Due to confidentiality issues we do not have access to progress notes, which may contain further information on symptoms, family history, reasons for encounters and diagnoses.
- Patients are free to visit multiple other practices. We do not have data on patients from non-MedicineInsight clinics. Currently we cannot identify patients who have attended multiple MedicineInsight practices.

REFERENCES

1. Australian Bureau of Statistics. 1270.0.55.006 - Australian Statistical Geography Standard (ASGS): Correspondences, July 2011. Canberra: ABS, 2011. http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/1270.0.55.006July%202011?OpenDocument (accessed 20 February 2014).
2. Australian Bureau of Statistics. 2033.0.55.001 - Census of Population and Housing: Socioeconomic Indexes for Areas (SEIFA), Australia, 2011. Canberra: ABS, 2011. http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/2033.0.55.001~2011~Main%20Features~Technical%20Paper~5 (accessed 20 February 2014).