Atlas of Healthcare Variation:
Methodology | Asthma

September 2025

He mihi | Acknowledgements

General points:

- In the Atlas, crude rates are reported. This is because they give a true indication of the magnitude of a problem. To make comparisons between ethnic groups, it is recommended to use age-specific rates, provided in the Atlas. While age-standardised rates are commonly used for comparison we do not report them as they are not accurate measures of actual event rates where populations have different age structures.

- Data is not presented where the number of people in the numerator was less than 10. This is to preserve confidentiality.

- In contrast to other atlases, and following advice, we defined regular dispensing as the medication dispensed in two or more quarters of the calendar year. The reason for this difference is that some inhalers can last for more than three months.

Sociodemographic information

- People were assigned to their Health New Zealand Te Whatu Ora district (previously referred to as Health New Zealand District Health Board; DHB) of domicile; where more than one domicile was recorded, the most recent value was selected.

- Ethnicity data presented is total response ethnic group (Māori, Pacific peoples, and European/Other). This means people with more than one recorded ethnic group are presented in each of those ethnic groups. This is different from prior Atlas reporting, which used prioritised ethnic group. Reporting total response ethnicity helps to avoid undercounting of ethnic groupings where individuals identify with multiple ethnicities. This means that, at low levels of disaggregation, counts are larger, and more results reach the threshold for reporting in the Atlas (numerator greater than 10). However, standard statistical methods for comparison between groups assume that group membership is mutually exclusive. With total response ethnicity, this is not the case, and results should be interpreted more cautiously.

- Age group is assigned using 30 June of each calendar year as the cutoff point. For example, if a person turned 45 years old on 1 July 2023, they will still be considered 44 years old for 2023.

- People who died during the calendar year are included in the admission indicators (#1, #2, #3, and #4) and are excluded from the management indicators (#5, #6, #7, #8 and #9).

Where individuals have been transferred between hospitals or services on the same or consecutive days, the associated events in the national minimum dataset are combined into a single multi-day episode of care (ie, a single row)[1]. This avoids double counting a person if they are admitted to one hospital and then transferred to another.

PHO analysis

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[1] Episodes end where the individual is transferred to a residential care facility, aged care facility or hospice. Events with explicitly same-day DRG codes are retained as separate events.

- For PHO analyses, we analysed indicator #1 and #2 to determine asthma admissions among each PHO. Then we categorised them into small (less than 60 admissions), medium (between 60 and 149), medium-large (between 150 and 299) and large (300 or more admissions).

- Please note the following PHOs were combined in the Atlas, this was done where PHOs had changed entities, or where there were regional subsidiaries with enrolled populations that were too small to report separately.

Recorded PHO name	Atlas reporting PHO name
Alliance Health Plus Trust	Included in The Cause Collective
Comprehensive Care PHO - Northland	Included with Comprehensive Care PHO Limited
National Hauora Coalition - Northland	Included with National Hauora Coalition
ProCare Health (PHO) Limited - Northland	Included with ProCare Health (PHO) Limited
Taranaki DHB PHO	Excluded completely due to small numbers (but still included in national total for all PHOs)

Data source

- National minimum dataset (NMDS), Health New Zealand.

- Primary Health Organisation (PHO) Enrolment Collection, Health New Zealand.

- Pharmaceutical Collection, Health New Zealand.

- Proclaim custom extract of flu vaccination data, Health New Zealand.

- Stats NZ population projections by total response ethnic grouping (can be accessed from Stats NZ website)

- All information on demographics is obtained from NHI database.

Exclusions

People who were excluded from analysis include:

- those who aren't enrolled in a PHO in the calendar year. This allowed us to use the number of PHO-enrolled people as the denominator. Our analysis found that of those admitted to hospital with a primary diagnosis of asthma (8,957), 223 people were not enrolled.
- individuals with missing demographics – that is, those with no recorded value for one or more of the NHI fields used to derive the demographic variables of interest (age, gender, ethnicity and district of domicile). For instance, if there are any missing values for age, they are excluded from all analyses. This approach ensures a consistent denominator throughout the analyses.

Confidence intervals

We present indicator data as a percentage or rate per 1,000, calculated for each Health New Zealand district. We use 95% confidence intervals to understand the range of likely values for each result. Each result is compared to the overall New Zealand rate for the same indicator.

Comparing two confidence intervals is a quick heuristic method to determine whether there is a statistically significant difference between rates. If the confidence intervals don't overlap, the difference can be considered statistically significant at the 0.05 level. If they do overlap, the difference may or may not be significant at the 0.05 level.

- If the district's upper limit is below New Zealand's lower limit, we say the district's result is "Significantly lower."
- If the district's lower limit is above New Zealand's upper limit, we say the result is "Significantly higher."
- If the confidence intervals overlap, we say the result is "Not significantly different."

The same method is used for comparisons between demographic groups and time points in key findings on the landing page.

Note that this method is a conservative test of statistical significance; results with overlapping confidence intervals may still be significantly different at the 0.05 level if a formal statistical test is undertaken.

Note also that this method assumes that the two groups being compared are independent, and is less robust when there is dependence between groups (for example, when comparing two total response ethnic groups; two yearly rates, or a district rate and the New Zealand total)

Age groups	
Children	The age used in the previous updates of Atlas for children was 0 – 14 years, in line with previous guidelines. In this update, the age used for children is 0 –11 years, in line with the 2020 Asthma and Respiratory Foundation New Zealand (ARFNZ) Child Asthma Guidelines[2].
	The Expert Advisory Group (EAG)[3] developing this Atlas noted the issue of diagnosing asthma in those aged under 5. However, given both their high rate of admissions and that some will go on to develop asthma, it was considered both informative and appropriate to present these data. Due to the uncertainty of diagnosing asthma in this age group, 'wheeze' is included as an alternative diagnosis in indicators reporting hospital admissions in children.
	Children aged 0–4 years were not included in indicators looking at medication use as they are a distinct group. Not all will respond to inhaled corticosteroids (ICS) therapy and of those who do, only

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[2] Sourced from: asthmafoundation.org.nz/resources/nz-child-asthma-guidelines 18 June 2025.

[3] Asthma EAG comprised of Respiratory Physicians, Paediatrician, General Practitioner, Public Health Physicians, and Clinical Pharmacists.

	some will have asthma at school age or as an adult. For these reasons, it was considered including preschool children in an indicator of regular ICS use would be difficult to interpret.
People aged 12 years or over	In the previous Atlas update, all indicators were restricted to people aged less than 50 years, because of the increasing likelihood of a diagnosis of Chronic Obstructive Pulmonary Disease (COPD). Now, after comparing asthma and COPD populations, the maximum age for indicators that look at medication use has been reduced to 44 years. This is to avoid including people with COPD, who are reported separately in the COPD Atlas, where the minimum age is 45 years. The indicators looking at hospital admissions now include adults of all ages (ie, including those aged over 50 years), as preliminary analysis of asthma admissions showed a consistent number of admissions across all adult age groups (15 years and over), providing no clear indication for an age cut-off. This approach was taken in consultation with our Asthma Atlas EAG.

Prevalence

The New Zealand Health Survey presents indicators showing the percent of the resident population who answered yes to the questions 'have you ever been told by a doctor you have asthma' and 'do you use medication (inhalers, medicine, tablets or pills) for this condition?'. The total population prevalence in 2023/24 for 0 to 14 years was 11.5 percent and for those 15 years and over was 12.4 percent. Prevalence is significantly higher in both children and adults for Māori and disabled people[4].

For breakdown by age, gender and ethnicity, please visit https://www.health.govt.nz/statistics-research/surveys/new-zealand-health-survey

A breakdown showing the percent of the population who answered yes by health region is available for download on the Ministry's website:

https://www.health.govt.nz/publications/regional-results-2017-2020-new-zealand-health-surveyAnnual Update of Key Results 2023/24: New Zealand Health Survey | Ministry of Health NZ

Hospital admissions due to asthma

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[4] Sourced from: minhealthnz.shinyapps.io/nz-health-survey-2023-24-annual-data-explorer/_w_a4c06cdb1efa4516841f4c59cdb37a0b/#!/explore-indicators

Admission type	Both acute (AC) and acute arranged (AA) admission types are included. An acute arranged admission is a non-acute admission with an admission less than seven days after the date the decision was made that the admission was necessary.
Emergency department (ED) admissions are included	ED attendances meeting the three-hour rule were included as admissions in this Atlas. This method is consistent with the New Zealand Child and Youth Epidemiology Service (www.otago.ac.nz/nzcyes). For more information on ED admissions and the three-hour rule, please see Appendix. Counting all admissions (ED admission and hospital admissions) is considered the most robust way to ensure consistency between districts, particularly in children as different districts handle admissions differently. Some for example use an inpatient service to manage all their paediatric work, whereas others have short stay units.
Primary diagnosis	As part of this Atlas, we included only those admitted with a primary diagnosis of asthma (or wheeze for children under five years).

Indicators

1. Children admitted to hospital one or more times with a primary diagnosis of asthma or wheeze

Indicator #1:	Children aged under 12 years admitted to hospital one or more times in the calendar year with a primary diagnosis of asthma or wheeze, among PHO enrolled population
Numerator	The number of children aged under 12 years admitted one or more times in the calendar year with a primary diagnosis of asthma or wheeze. Code (ICD10 AM): J45 Asthma; J46 Status Asthmaticus; R06.2 Wheeze Notes: • Admissions of neonates under 28 days old are excluded
Denominator	Children aged under 12 years, PHO enrolment collection
Data source	NMDS PHO enrolment collection
By variables	District analysis: By year (2018 –2023), age group (0–4, 5–11), gender (female, male), ethnic group (Māori, Pacific peoples, European/Other) and Health New Zealand district of domicile. PHO analysis: By year (2023), age group, gender, ethnic group, Primary Health Organisation (PHO) most recently enrolled with (for the relevant year), PHO group (small, medium, medium-large and large).
Rationale	Hospital admissions with asthma are considered to be potentially preventable by addressing exposure to risk factors eg, cigarette smoking, poor quality housing, access to primary healthcare and appropriate use of preventer medication. Asthma is a major health problem in New Zealand and our prevalence rates are among some of the highest in the world[5]. The cost burden of Asthma is estimated by the Asthma and Respiratory Foundation New Zealand (ARFNZ) to be $1.195b in direct costs from hospitalisations, prescriptions and primary care visits and $918.9 in indirect costs from work days lost, disability affected life years and mortality[6]

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[5] Beasley R, et al. 2020. Asthma and Respiratory Foundation NZ Adolescent and Adult Asthma Guidelines 2020: a quick reference guide. *NZ Med J* 133(1517). URL: ARFNZ-Adolescent-and-Adult-Asthma-Guidelines.pdf .

[6] Telfar Barnard, L., & Zhang, J. (2024). The impact of respiratory disease in New Zealand: 2023 update. *Wellington: Asthma and Respiratory Foundation NZ*. Available from: Respiratory-Impact-Report-2024sep10-FINAL.pdf.

Commentary	Description:
	This indicator shows the number and rate per 1,000 children under 12 years who were admitted to hospital with asthma or wheeze as the primary diagnosis. Due to the difficulty / uncertainty of diagnosing asthma in under five-year olds, viral-induced wheeze as an alternate diagnosis was included in this analysis. ED attendances meeting the three-hour rule are included as an admission in this indicator. Admissions of neonates under 28 days old are excluded.
	Data are presented by year, ethnicity, age, gender and district of domicile.
	Why is this important?
	Asthma is a chronic condition where good primary care management is believed to reduce the frequency and severity of exacerbations, thereby reducing hospitalisation rates. These data show wide variation between districts in rates over the six years (4-fold variation). Māori and Pacific children had significantly higher admission rates than those identifying as European/Other ethnicity. Admissions were significantly higher in those aged 0-4 years.
	What questions does this prompt?
	• Why are some districts consistently lower or higher than the national mean?
	• How do similar districts compare?
	• Why are Māori and Pacific children more likely to be admitted? Do districts who have high admission rates for these populations, also have high rates for European/Other ethnicity?
	• How is asthma education managed in the districts? Is the education managed in a culturally appropriate way?
	• Can the pandemic control measures that resulted in lower admission rates in 2020 be identified and implemented more broadly to regain and sustain a lower rate of admissions?

2. Adults and adolescents admitted to hospital one or more times with a primary diagnosis of asthma

Indicator #2:	People aged 12 years or over admitted to hospital one or more times in the calendar year with a primary diagnosis of asthma, among PHO enrolled population
Numerator	The number of people aged 12 years or over admitted to hospital one or more times with a primary diagnosis of asthma in the calendar year
	Code (ICD10 AM):
	J45 Asthma;
	J46 Status Asthmaticus;

Denominator	People aged 12 years or over, PHO enrolment collection
Data source	NMDS, PHO enrolment collection
By variables	District analysis: By year (2018 –2023), age group (12 –24, 25 –44, 45 – 64, 65+), gender (female, male), ethnic group (Māori, Pacific peoples, European/Other) and Health New Zealand district of domicile. PHO analysis: By year (2023), age group, gender, ethnic group, Primary Health Organisation (PHO) most recently enrolled with (for the relevant year), PHO group (small, medium, medium-large and large).
Rationale	As for indicator 1.
Commentary	Description: This indicator shows the number and rate per 1,000 adults aged 12 years or over years who were admitted to hospital with asthma as the primary diagnosis. ED admissions meeting the three-hour rule are included in this indicator. Data is presented by year, ethnicity, age, gender and district of domicile. Why is this important? Asthma is a chronic condition where good primary care management is believed to reduce the frequency and severity of exacerbations, thereby reducing hospitalisation rates. As the treatment for Asthma Chronic obstructive pulmonary disease Overlap Syndrome (ACOS) is not well–defined, age was restricted for clarity. What questions does this prompt? • Why are some districts consistently lower or higher than the national mean? • How do similar districts compare? • Why are Māori and Pacific populations more likely to be admitted than European/Other ethnic groups? Do districts who have high admission rates for these populations, also have high rates for the European/Other? • How is asthma education managed in the districts? Is the education managed in a culturally appropriate way?

3. People with at least two hospital admissions within 90 days of each other with a primary diagnosis of asthma (or wheeze in children)

Indicator #3:	People with at least two admissions within 90 days of each other with a primary diagnosis of asthma (or wheeze in children), among PHO enrolled population
Numerator	The number of people with a hospital admission with a primary diagnosis of asthma within 90 days of discharge. Days were calculated by counting the number of days between the discharge date of the previous admission and the start date of the most recent admission (admit date). Admission could occur at any hospital. Code (ICD10 AM): J45 Asthma (for everyone); J46 Status Asthmaticus (for everyone); R06.2 Wheeze (for children aged under 11 years) Notes: • Admissions where the individual is aged under 1 year at discharge are excluded from numerator and denominator
Denominator	Those with an admission with a primary diagnosis of asthma in the calendar year (or wheeze in children, see numerator).
Data source	NMDS PHO enrolment collection
Exclude	Exclude admissions that result in a transfer
By variables	District analysis: By year (2019 –2023), age group (0–4, 5 –11, 12–24, 25–44, 45–64, 65+), gender (female, male), ethnic group (Māori, Pacific peoples, European/Other) and Health New Zealand district of domicile. PHO analysis: By year (2023), age group, gender, ethnic group, Primary Health Organisation (PHO) most recently enrolled with (for the relevant year), PHO group (small, medium, medium-large and large).
Rationale	A high rate of admission within 90 days of discharge suggests there may be room for improvement in discharge planning (including checking patients' understanding of their disease and / or management plan and inhaler technique), barriers to primary care access and / or the socioeconomic determinants of health.
Commentary	Description: This indicator shows the number and percent of people with at least two admissions within 90 days of each other. ED admissions meeting the three-hour rule are included in this indicator. Data is presented by year, ethnicity, age, gender and district of domicile.

Why is this important?

Two or more hospital admissions with a primary diagnosis of asthma within 90 days suggests there may be room for improvement in discharge planning or continuity of care following discharge.

What questions does this prompt?

• Why is there variation between districts? Does this reflect differences in patient population or other factors?

• What is the impact of length of stay on rates?

• How many of those readmitted did not regularly receive an ICS following discharge?

• How is asthma education managed in the districts? Is the education managed in a culturally appropriate way?

4. People with at least two admissions within 91–365 days of each other with a primary diagnosis of asthma (or wheeze in children)

Indicator #4:	People with at least two admissions within 91–365 days of each other with a primary diagnosis of asthma (or wheeze in children), among PHO enrolled population
Numerator	The number of people with a hospital admission with a primary diagnosis of asthma in the previous 91 to 365 days. Days were calculated by counting the number of days between the discharge date of the previous admission and the start date of the most recent admission (admit date). Code (ICD10 AM): J45 Asthma (for everyone); J46 Status Asthmaticus (for everyone); R06.2 Wheeze (for children aged under 11 years) Notes: • Admissions where the individual is aged under 1 year at discharge are excluded from numerator and denominator
Denominator	Those with an admission with a primary diagnosis of asthma in the calendar year (or wheeze in children, see numerator).
Data source	NMDS PHO enrolment collection
By variables	District analysis: By year (2019 –2023), age group (0–4, 5–11, 12–24, 25–44, 45–64, 65+), gender (female, male), ethnic group (Māori, Pacific peoples, European/Other), and Health New Zealand district of domicile.

	PHO analysis: By year (2023), age group, gender, ethnic group, Primary Health Organisation (PHO) most recently enrolled with (for the relevant year), PHO group (small, medium, medium-large and large).
Rationale	High readmission rates in the 91 –365 post the first admission may suggest sub-optimal disease control. This could potentially be due to issues around patients' understanding of their disease and management plan and /or inhaler technique and / or barriers to primary care access and / or the socioeconomic determinants of health.
Commentary	Description:

This indicator shows the number and percent of people aged zero (more than 28 days old) year of age or over who had at least two admissions with a primary diagnosis of asthma within 91 to 365 days of each other. The method counts back the number of days between the admit date of the most recent admission and the date of discharge of the previous event. ED admissions meeting the three-hour rule are included in this indicator.

presented by year, ethnicity, age, gender and district of domicile.

Why is this important?

High readmission rates between 91 and 365 days of admission with a primary diagnosis of asthma highlight the potential for community follow-up.

What questions does this prompt?

• Are the rates higher or lower than you might expect?

• How many of those readmitted did not regularly receive an ICS following discharge?

• How is asthma education managed in the districts? Is the education managed in a culturally appropriate way?

5. People not dispensed ICS regularly in the year after admission

Indicator #5:	People aged 5–44 not dispensed ICS regularly in the year after admission, among PHO enrolled population
Numerator	People aged 5–44 who:

a) had at least one hospital stay with a primary diagnosis of asthma (or wheeze for children), with a discharge date in the calendar year, and

b) subsequently were not dispensed ICS in at least two of the following quarters:

• the same quarter as the last hospital discharge date in the calendar year (looking at the last discharge date avoids |

	double-counting people who have multiple hospital admissions) • the four quarters after the last hospital discharge date.
Denominator	Those aged 5–44 admitted with a primary diagnosis of asthma (adults) or children admitted with a primary diagnosis of asthma or wheeze. Code (ICD10 AM): J45 Asthma (for everyone); J46 Status Asthmaticus (for everyone); R06.2 Wheeze (for children aged 5–11 years)
Data source	Pharmaceutical Collection NMDS PHO enrolment collection
By variables	District analysis: By year (2019 –2023), age group (5 –11, 12 –24, 25 – 44), gender (female, male), ethnic group (Māori, Pacific peoples, European/Other), and Health New Zealand district of domicile. PHO analysis: By year (2023), age group, gender, ethnic group, Primary Health Organisation (PHO) most recently enrolled with (for the relevant year), PHO group (small, medium, medium-large and large).
Medicines included	Inhaled corticosteroids: 110801,110802, 110803, 110804, 110805, 110806, 110807, 110808, 110809, 110815, 110816, 110825, 110826 & 110827 Beclomethasone dipropionate; 116801, 116802, 116803, 116804 & 116805 Budesonide; 106501, 106502, 106503, 106504, 106505, 106506, 106507, 106508, 106509, 106510, 106511, 106512, 106513, 106514 & 106525 Fluticasone Inhaled corticosteroids with long-acting beta-adrenoceptor agonists: 375825, 375826, 375827, 375828, 375829, 375830 & 375831 Budesonide with eformoterol; 385825, 385826, 385827 & 385828 Fluticasone with salmeterol; 405625 Fluticasone furoate with vilanterol
Rationale	High rates of people not receiving regular ICS in the year post discharge suggests non-adherence to best practice guidelines and suboptimal disease management.
Commentary	Description: This indicator shows the number and percent of people aged 5 –44 years who were not regularly dispensed ICS in the four quarters after discharge for an admission with a primary diagnosis of asthma. Regular dispensing was defined as dispensing in two or more quarters in the year post-discharge. This was calculated using the date of discharge and dividing the following 365 days into four quarters.

	Data is presented by year, ethnicity, age, gender and district of domicile.
	Why is this important? The 2020 New Zealand Adolescent and Adult Asthma Guidelines[7] recommend that patients presenting with an acute exacerbation of asthma should have an ICS started or current use reinforced on discharge. Children aged 0 to 4 years of age are not included in this indicator, see the methodology for more detail. **What questions does this prompt?** • How much of this gap can be explained by people taking home ICS provided during their inpatient stay? • What do patients understand with regards to the use of ICS and reliever medication? • What proportion of those not receiving an ICS were readmitted? Is there the potential to improve care? • How much of this gap can be explained by preventers prescribed just prior to admission? • How many of this group received oral steroids? • How is asthma education managed in the districts? Is the education managed in a culturally appropriate way?

6. PHO enrolled population not given a funded influenza vaccine in the year after admission

Indicator #6:	People not given a funded influenza vaccine in the year after admission, among PHO enrolled population
Numerator	People admitted in the previous year with a primary diagnosis of asthma (or wheeze for children; see denominator for codes) who did not receive a funded influenza vaccine in the year following discharge Notes: • Influenza vaccination claims in the calendar year after the year of discharge are included. The year presented is that of the vaccination. • Publicly funded flu vaccinations administered in general practice and community pharmacy settings are included. Flu vaccinations that are administered in hospital, or self-funded or funded by another third party won't be included here. It is expected that self-funded/alternately funded is likely to biased towards working age groups. Vaccination in hospital may be biased towards children, depending on local practice.

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[7] Beasley R, et al. 2020. Asthma and Respiratory Foundation NZ Adolescent and Adult Asthma Guidelines 2020: a quick reference guide. *NZ Med J* 133(1517). URL: ARFNZ-Adolescent-and-Adult-Asthma-Guidelines.pdf

Denominator	Those admitted in the previous year with a primary diagnosis of asthma (adults) or children admitted with a primary diagnosis of asthma or wheeze. Code (ICD10 AM): J45 Asthma (for everyone); J46 Status Asthmaticus (for everyone); R06.2 Wheeze (for children aged 0 –11 years)
Data source	NMDS Proclaims dataset
By variables	District analysis: By year (2019 –2023), age group (0–4, 5 –11, 12 –24, 25 –44, 45 –64, 65+), gender (female, male), ethnic group (Māori, Pacific peoples, European/Other) and Health New Zealand district of domicile. PHO analysis: By year (2023), age group, gender, ethnic group, Primary Health Organisation (PHO) most recently enrolled with (for the relevant year), PHO group (small, medium, medium-large and large).
Rationale	Those who have a hospital admission for asthma are recommended to receive an influenza vaccination as they are at greater risk of severe illness and hospitalisation if they contract influenza. Pharmac funds the influenza vaccine for this group. The criteria for funding include (only relevant criteria are shown): a) all people 65 years of age and over; or b) people under 65 years who have asthma, if on a regular preventative therapy, or b) children aged four years and under who have been hospitalised for respiratory illness or have a history of significant respiratory illness. High rates of people not receiving a free funded flu vaccination in the year post discharge suggests suboptimal disease management or barriers to access.
Commentary	Description: This indicator shows the number and percent of people admitted to hospital with a primary diagnosis of asthma who were not given a funded influenza vaccine in the year following admission. Hospital discharges occurring in the prior calendar year are included; pharmaceutical claims in the post-discharge calendar year are included. ED admissions meeting the three-hour rule are included in this indicator. People given their vaccination in hospital are not included in this indicator, neither are those who self-funded nor received a vaccination funded by a third- party, eg, workplace. However, it is not thought the inclusion of these data is likely to close the treatment gap. Data is presented by year, ethnicity, age, gender and district of domicile. Why is this important? Those who have a hospital admission for asthma are recommended to receive regular preventative therapy to manage their asthma. Influenza

vaccine is part of this, and Pharmac funds the influenza vaccine for this group. Pharmac's criteria for funding includes (only relevant criteria are shown):

• a) all people 65 years of age and over; or

• b) people under 65 years who have asthma, if on a regular preventative therapy, or

• c) children aged four years and under who have been hospitalised for respiratory illness or have a history of significant respiratory illness.

What questions does this prompt?

• How many of this group received a vaccination in hospital?

• What proportion of people self-fund influenza vaccine? Is this likely to increase rates more in some districts than others?

• How is asthma education managed in the districts? Is the education managed in a culturally appropriate way?

7. People regularly dispensed a short-acting beta agonist (SABA) who were not dispensed preventer during the year

Indicator #7:	People aged 5–44 regularly dispensed a short-acting beta agonist (SABA) who were not dispensed preventer anytime during the year, among PHO enrolled population
Numerator	The number of people who were dispensed SABA in two or more quarters and who were not dispensed preventer in the year
Denominator	People dispensed SABA in two or more quarters in a year
Data source	Pharmaceutical Collection
By variables	District analysis: By year (2018 –2023), age group (5 –11, 12 –24, 25 – 44), gender (female, male), ethnic group (Māori, Pacific peoples, European/Other), and Health New Zealand district of domicile. PHO analysis: By year (2023), age group, gender, ethnic group, Primary Health Organisation (PHO) most recently enrolled with (for the relevant year), PHO group (small, medium, medium-large and large).
Medicines included	**SABA (relievers):** beta-adrenoceptor agonists 209606, 209609, 209611, 209612, 209613, 209614, 209615, 209616, 209617 Salbutamol; 240406, 240407, 240408, 240409, 240410, 240425 Terbutaline Sulphate **Preventers:** **Inhaled corticosteroids:** 110801,110802, 110803, 110804, 110805, 110806, 110807, 110808, 110809, 110815, 110816, 110825, 110826 & 110827 Beclomethasone dipropionate; 116801, 116802, 116803, 116804 & 116805 Budesonide;

	106501, 106502, 106503, 106504, 106505, 106506, 106507, 106508, 106509, 106510, 106511, 106512, 106513, 106514 & 106525 Fluticasone **Inhaled long-acting beta-adrenoceptor agonists:** 106601, 106602, 106603 & 106625 Salmeterol; 108301, 108302 & 108303 Eformoterol fumarate; 404225 & 404226 Indacaterol 411225 Eformoterol fumarate dihydrate **Inhaled corticosteroids with long-acting beta-adrenoceptor agonists:** 375825, 375826, 375827, 375828, 375829, 375830 & 375831 Budesonide with eformoterol; 385825, 385826, 385827 & 385828 Fluticasone with salmeterol; 405625 Fluticasone furoate with vilanterol
Rationale	High rates of people not receiving any preventer medication despite regular SABA suggests non-adherence to best practice guidelines and suboptimal disease management. The ARFNZ Adolescent and Adult Asthma guidelines (2020) identifies that good control of asthma shows little use of reliever medication (less than two days per week). The guideline recommends that ICS or ICS/long-acting beta agonist (LABA) therapy should be introduced if patients have symptoms consistent with a diagnosis of asthma.
Commentary	Description: This indicator shows the number and percent of people who were dispensed SABA in at least two quarters in a year and not dispensed preventer in the same year. Data is presented by year, ethnicity, age, gender and district of domicile. Why is this important? The New Zealand Adolescent and Adult Asthma guideline (2020) identifies that good control of asthma shows little use of reliever medication (SABA), less than two days a week. It recommends that ICS (preventer) therapy be initiated if people have symptoms more than twice a week. The data presented do not allow for analysis of patients' condition or the effectiveness of dose provided. This means it was not possible to assess the appropriateness or otherwise of prescribing. What questions does this prompt? • Why do 20 percent of people regularly dispensed SABA not receive any preventer in the same year? • What do patients understand with regards to the use of ICS and reliever medication? Does this group not experience any symptomatic benefit from preventer therapy? • What other reasons might explain this gap?

	• How is asthma education managed in the districts? Is the education managed in a culturally appropriate way?

8. People regularly dispensed SABA and not regularly dispensed preventer during the year

Indicator #8:	People aged 5–44 regularly dispensed SABA and not regularly dispensed preventer during the year, among PHO enrolled population
Numerator	The number of people who were dispensed SABA in two or more quarters and who were not dispensed preventer in two or more quarters in the year
Denominator	People dispensed SABA in two or more quarters in a year
Data source	Pharmaceutical collections
By variables	District analysis: By year (2018 –2023), age group (5 –11, 12 –24, 25 – 44), gender (female, male), ethnic group (Māori, Pacific peoples, European/Other), and Health New Zealand district of domicile. PHO analysis: By year (2023), age group, gender, Primary Health Organisation (PHO) most recently enrolled with (for the relevant year), PHO group (small, medium, medium-large and large).
Medicines included	**SABA (relievers):** beta-adrenoceptor agonists 209606, 209609, 209611, 209612, 209613, 209614, 209615, 209616, 209617 Salbutamol; 240406, 240407, 240408, 240409, 240410, 240425 Terbutaline Sulphate **Preventers:** **Inhaled corticosteroids:** 110801,110802, 110803, 110804, 110805, 110806, 110807, 110808, 110809, 110815, 110816, 110825, 110826 & 110827 Beclomethasone dipropionate; 116801, 116802, 116803, 116804 & 116805 Budesonide; 106501, 106502, 106503, 106504, 106505, 106506, 106507, 106508, 106509, 106510, 106511, 106512, 106513, 106514 & 106525 Fluticasone **Inhaled long-acting beta-adrenoceptor agonists:** 106601, 106602, 106603 & 106625 Salmeterol; 108301, 108302 & 108303 Eformoterol fumarate; 411225 Eformoterol fumarate dihydrate; 404225 & 404226 Indacaterol; **Inhaled corticosteroids with long-acting beta-adrenoceptor agonists:** 375825, 375826, 375827, 375828, 375829, 375830 & 375831 Budesonide with eformoterol; 385825, 385826, 385827 & 385828 Fluticasone with salmeterol; 405625 Fluticasone furoate with vilanterol

Rationale	High rates of people not receiving regular preventer therapy despite regular SABA use demonstrates non –adherence to best practice guidelines and suboptimal disease management.
	The ARFNZ Adolescent and Adult Asthma guidelines (2020) defines good control of asthma as requiring a SABA reliever on ≤2 days per week.
	The guideline recommends that ICS or ICS/LABA therapy is introduced if patients have symptoms consistent with a diagnosis of asthma.
	This indicator replaces the previous indicator of reliever: preventer ratio.
Commentary	Description:
	This indicator shows the number and percent of people who were dispensed SABA in at least two quarters in a year and were not dispensed preventer in two or more quarters in the same year.
	Data is presented by year, ethnicity, age, gender and district of domicile.
	Why is this important?
	The New Zealand Adolescent and Adult Asthma guideline identifies that good control of asthma shows little use of reliever medication (SABA), less than two days a week. It recommends that ICS (preventer) therapy be initiated if people have symptoms more than twice a week.
	Limitations: The data presented do not allow for analysis of patients' condition or the effectiveness of dose provided. This means it was not possible to assess the appropriateness or otherwise of prescribing.
	What questions does this prompt?
	• Why do nearly one-third of people regularly dispensed SABA not regularly receive preventer in the year?
	• What do patients understand with regards to the use of ICS and reliever medication?
	• What other reasons might explain this gap?
	• How is asthma education managed in the districts? Is the education managed in a culturally appropriate way?

9. People aged 12–44 dispensed a combined budesonide + formoterol inhaler

Indicator #9:	People aged 12–44 dispensed a combined budesonide + formoterol inhaler in the calendar year
Numerator	PHO enrolled population aged 12–44 years who received a combined budesonide + formoterol inhaler in the calendar year

Denominator	PHO enrolled population aged 12–44 years who received SABA, or LABA or ICS or LABA/ICS in the calendar year.
Data source	Pharmaceutical collection PHO enrolment collection
Medicines	**Numerator:** Chemical ID 3758 Budesonide with eformoterol. Include formulation IDs 375825, 375826, 375828, 375829 and 375830 Exclude formulation IDs 375827 and 375831[8] **Denominator:** **SABA:** 209606, 209609, 209611, 209612, 209613, 209614, 209615, 209616, 209617 Salbutamol; 240406, 240407, 240408, 240409, 240410, 240425 Terbutaline Sulphate **LABA:** 106601, 106602, 106603 & 106625 Salmeterol; 108301, 108302 & 108303 Eformoterol fumarate; 404225 & 404226 Indacaterol; 411225 Eformoterol fumarate dihydrate **ICS:** 110801,110802, 110803, 110804, 110805, 110806, 110807, 110808, 110809, 110815, 110816, 110825, 110826 & 110827 Beclomethasone dipropionate; 116801, 116802, 116803, 116804 & 116805 Budesonide; 106501, 106502, 106503, 106504, 106505, 106506, 106507, 106508, 106509, 106510, 106511, 106512, 106513, 106514 & 106525 Fluticasone **LABA/ICS:** 375825, 375826, 375827, 375828, 375829, 375830 & 375831 Budesonide with eformoterol; 385825, 385826, 385827 & 385828 Fluticasone with salmeterol; 405625 Fluticasone furoate with vilanterol
By variables	District analysis: By year (2018 –2023), age group (12 –24, 25 –44), gender (female, male), ethnic group (Māori, Pacific peoples, European/Other), and Health New Zealand district of domicile. PHO analysis: By year (2023), age group, gender, Primary Health Organisation (PHO) most recently enrolled with (for the relevant year), PHO group (small, medium, medium-large and large).
Rationale	Single Maintenance And Reliever Therapy (SMART) with Formoterol/ICS provides a comprehensive approach to asthma management. It provides both immediate symptom relief and long-term control, helping to reduce exacerbations, and improve treatment adherence. This approach uses a single inhaler for both maintenance and reliever therapy, simplifying

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[8] High dose 400/12 budesonide-formoterol inhalers are excluded as the 2020 NZ Asthma Adolescent and Adult Guidelines state this dose should not be used for AIR/SMART therapy (p. 7)

	asthma care. SMART therapy is particularly recommended for individuals aged 12 and over with moderate to severe asthma. Understanding variation in the dispensing of SMART therapy for asthma is important for ensuring that patients receive the most appropriate treatment.
Commentary	Description:
	This indicator shows the number and percent of people aged 12-44 years who were regularly dispensed SMART Formoterol/Budesonide therapy. Regular dispensing was defined as dispensing in two or more quarters in the year. This indicator measures uptake of this inhaler, relative to other asthma inhalers. Specifically, of all people who were dispensed any asthma inhaler (SABA, LABA, ICS or LABA/ICS combination), what percentage were dispensed a combined budesonide + formoterol inhaler.
	Data is presented by year, ethnicity, age, gender and district of domicile.
	Why is this important?
	SMART therapy using a combination of Formoterol/ICS offers a comprehensive approach to asthma management. It provides both immediate symptom relief and long-term control, helping to reduce exacerbations, and improve treatment adherence. This approach uses a single inhaler for both maintenance and reliever therapy, simplifying asthma care. SMART therapy is particularly recommended for individuals aged 12 and over with moderate to severe asthma. Understanding variation in the dispensing of SMART therapy for asthma is important for ensuring that patients receive the most appropriate treatment.
	What questions does this prompt?
	• How do districts with similar admission rates compare?
	• What factors contribute to district variation in SMART therapy dispensing?
	• How do ethnic groups compare?
	• How do dispensing rates compare to prescribing rates?

Appendix: Guide for Use of Emergency Department (ED) Event End Type Codes

Arrive at Emergency Department (ED), Observation Unit, Acute Assessment Unit (AAU), Short Stay Unit (SSU)

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Is the patient treated in ED and admitted to an inpatient ward? — Yes →

↓ No

Is the patient treated in ED/AAU/SSU for three hours or more (≥3hrs) or did they die*? — Yes →

*All deceased patients are to be admitted and discharged in your PMS regardless of treatment time and reported to the NMDS.

↓ No

Report ED attendance to NNPAC ONLY

↓

Use ED event end type codes starting with E, eg, ER, ED, EI, ES, EA ET with PUC ED0x001

Admit patient and report to both NNPAC and NMDS

NNPAC EVENT
ED attendance with PUC ED0x001A

- Patient discharged home, self discharged, died or transferred to another facility from your ED/AAU/SSU?
  → Use ED event end type codes starting with E, eg, ER, ED, EI, ES, EA, ET
- Patient transferred to an inpatient ward
  → Use event end type code DW

NMDS EVENT

- Patient discharged home, self discharged, died or transferred to another facility from your ED/AAU/SSU?
  → Use ED event end type codes starting with E, e.g., ER, ED, EI, ES, EA, ET
- Patient transferred to an inpatient ward
  → Use inpatient event end type codes starting with D, e.g., DR, DD or DT etc.

PUC = Purchaser Unit Code
NNPAC = National Non Admitted Patient Collection
NMDS = National Minimum Dataset

*Please note: when calculating the three hours, exclude waiting time in the waiting room, exclude triage and use only the duration of assessment/treatment. If part of the assessment/treatment includes observation, then this time contributes to the three hours. 'Assessment/treatment' is clinical assessment, treatment, therapy, advice, diagnostic or investigatory procedures from a nurse or doctor or other health professional.