General points:
- Data is not presented where the number of people was below 10. This is to preserve confidentiality.
- People were assigned to their district health board (DHB) of domicile; where more than one domicile was recorded, the most recent value was selected. This was the same for their primary health organisation (PHO).
- Ethnicity data was analysed by prioritised ethnic group (Māori, Pacific peoples, Asian, Non-Māori non-Pacific). For people reporting multiple ethnic groups, the most recent value was selected.
- The rates for the Asian population were similar to the European/Other group, and in some DHBs the Asian population was small, so it was decided to combine these groups into non-Māori non-Pacific. Data where ethnicity was not specified was excluded from the ethnicity analysis, meaning the sum of ethnicity data does not equal the total.

Exclusions:
- The year of dispensing is the same as or after the year of death, OR
- The patient category is either J or Y (juvenile or youth).

Standard deviation
Data are presented as standard deviation from the mean. Standard deviation is a statistical measure of variation from a mean. Assuming that recorded instances are normally distributed (ie, they are in the usual 'bell-shaped curve') 68 percent of all recorded instances would be expected to be within 1 standard deviation either side of the mean and 95 percent within two standard deviations. The two 'middle' shades will be within one standard deviation of the mean.

Confidence intervals
Upper and lower confidence intervals were calculated to 95 percent level of confidence. All changes in indicator values listed in the landing page are statistically significant changes.

Indicator #1:	The prevalence of identified gout in those enrolled with PHOs, by DHB (percent)
Numerator	Those aged 20 years and over identified with gout using the HealthTracker method[1] (discharge diagnosis of gout (ICD 9 274, ICD 10 M10) from a public hospital admission from 1 January 1988 to 31 December 2016 or who have been dispensed gout-specific urate-lowering therapy (allopurinol, febuxostat, benzbromarone) or colchicine from a community pharmacy between 2001 and 2016) and excluding patients with diagnosis of leukaemia or lymphoma (ICD 10 C81-C96). Only those enrolled with a PHO in each year were included.
Denominator	Statistics New Zealand population aged 20 and over, using 2017 projections

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[1] See page 5 for details on HealthTracker definitions.

Data source	Ministry of Health: National Minimum Dataset, Pharmaceutical Collection, PHO enrolments, Mortality Collection , NZ Cancer Registry (numerator) Statistics NZ: population projections (denominator)
Analysis	By year (2012, 2013, 2014, 2015, 2016), by age (20-44, 45-64, 65 and over) and by ethnicity (Māori, Pacific, Non-Māori non-Pacific)
Comments	The method used to calculate gout prevalence is similar to that described by Winnard (Winnard, Wright et al. 2012). This method is believed to underestimate prevalence by around 20 percent (Jackson, Wright et al. 2012).
Commentary	Why is this important? Rates of gout are particularly high in male Māori and Pacific peoples, meaning district health boards (DHBs) with a high Māori and/or Pacific peoples population have a higher prevalence in their population.

Indicator #2:	People with identified gout who received urate-lowering therapy regularly, by DHB (percent)
Numerator	Number of people aged 20 years and over with a identified gout who were dispensed gout-specific urate-lowering therapy (allopurinol, febuxostat, benzbromarone) for three or four quarters in a year 1 January 2012–31 December 2016.
Denominator	Those aged 20 years and over with identified gout using the HealthTracker method (numerator indicator 1). Only those enrolled with a PHO in each year were included.
Data source	Ministry of Health: National Minimum Dataset, Pharmaceutical Collection, PHO enrolments, Mortality Collection, NZ Cancer Registry
Analysis	By year (2012, 2013, 2014, 2015, 2016), by age (20-44, 45-64, 65 and over) and by ethnicity (Māori, Pacific, Non-Māori non-Pacific). Regular medication use was calculated in the years after the year of diagnosis, eg, people diagnosed during the year 2012 were included in the cohort for 2013 - 2016, but not for 2012.
Medicines	1026 Allopurinol, 4026 Febuxostat, 3754 and 4003 Benzbromarone
Commentary	Why is this important? Long-term urate-lowering therapy is used to prevent gout flares and prevent tophus formation, bony erosions and permanent disability in people with gout. Many studies have demonstrated under-utilisation of urate-lowering therapy. This map suggests there is wide variation in the dispensing of urate-lowering therapy to those with a diagnosis of gout. What questions does this prompt? • Why is there variation in the rate of urate-lowering therapy dispensing between DHBs? • Why are rates of urate-lowering therapy dispensing lower in Māori and Pacific peoples with gout? • What other factors might be contributing to low urate-lowering therapy use?

Indicator #3:	The dispensing of funded NSAIDs in those with identified gout, by DHB (percent)
Numerator	People with identified gout, aged 20 years and over dispensed publicly funded non-steriodal anti-inflammatory drugs (NSAIDs).

Denominator	Those aged 20 years and over with identified gout using the HealthTracker method (numerator indicator 1). Only those enrolled with a PHO in each year were included.
Data source	Ministry of Health: National Minimum Dataset, Pharmaceutical Collection, PHO enrolments, Mortality Collection, NZ Cancer Registry
Analysis	By year (2012, 2013, 2014, 2015, 2016), by age (20-44, 45-64, 65 and over) and by ethnicity (Māori, Pacific, Non-Māori non-Pacific)
Medicines	NSAIDs included were: diclofenac sodium, ibuprofen, ketoprofen, mefenamic acid, meloxicam, naproxen, naproxen sodium, tenoxicam, and sulindac.
Comment	This indicator only includes NSAIDs dispensed at community pharmacies, ie, medicines given in hospital or purchased over the counter are not included. Note that the NSAID dispensing may not necessarily be related to gout symptoms. • A technical error has been identified which meant that some people were incorrectly ascribed NSAID use in 2012-2014. This means the 55% of people reported in 2014 with gout to have been dispensed NSAIDs was actually 38%. In 2016 this is 37%.
Commentary	Why is this important? NSAIDs are usually the first line of treatment for acute gout flares. This indicator may reflect people experiencing acute gout flares who are not on long-term preventive therapy for gout. Gout management guidelines state that that people experiencing frequent (two or more) acute gout flares per year should be offered long-term urate-lowering therapy. Although NSAIDs are effective at treating acute gout flares, these medicines have important side effects including kidney injury and peptic ulcer disease. This indicator does not capture over-the-counter NSAID use and does not assess the indication for NSAID use. What questions does this prompt? • Should any of those receiving NSAIDs for gout flares be treated with long-term urate-lowering therapy? • Would providing long-term urate-lowering therapy offer a better risk:benefit ratio?

Indicator #4:	The number of colchicine dispensings in people with identified gout not dispensed urate-lowering therapy, by DHB (percent)
Numerator	The number of people aged 20 years and over with identified gout, dispensed colchicine in a year but not dispensed gout-specific urate-lowering therapy (allopurinol, febuxostat, benzbromarone) in the same year.
Denominator	Those aged 20 years and over with identified gout using the

	HealthTracker method (numerator indicator 1).
	Only those enrolled with a PHO in each year were included.
Data source	Ministry of Health: National Minimum Dataset, Pharmaceutical Collection, PHO enrolments, Mortality Collection, NZ Cancer Registry
Analysis	By year (2012, 2013, 2014, 2015, 2016), by age (20-44, 45-64, 65 and over) and by ethnicity (Māori, Pacific, Non-Māori non-Pacific)
Medicines	1026 Allopurinol, 4026 Febuxostat, 3754 and 4003 Benzbromarone, 1341 Colchicine
Commentary	Why is this important? Colchicine is frequently prescribed as treatment for acute gout flares (it is also prescribed as prophylaxis against flares when ULT is commenced but this use is excluded in this indicator). This indicator may reflect people experiencing acute gout flares who are not on long-term preventive therapy for gout. International best practice indicates that people experiencing frequent gout flares (more than one acute gout flare per year) should be offered long-term urate-lowering therapy. Large variation may reflect patient preference and/or variable clinical practice. This indicator does not capture those who manage their acute gout flares with non-steroidal anti-inflammatory drugs or corticosteroids. What questions does this prompt? • Does this reflect under- or over-use of colchicine? • Should any of those receiving colchicine for gout flares be treated with long-term urate-lowering therapy?

Indicator #5:	**The dispensing of funded NSAIDs in those with identified gout who were not dispensed urate-lowering therapy, by DHB (percent)**
Numerator	People with identified gout, aged 20 years and over dispensed publicly funded non-steriodal anti-inflammatory drugs (NSAIDs) in a year but not dispensed gout-specific urate-lowering therapy (allopurinol, febuxostat, benzbromarone) in the same year.
Denominator	Those aged 20 years and over with identified gout using the HealthTracker method (numerator indicator 1). Only those enrolled with a PHO in each year were included.
Data source	Ministry of Health: National Minimum Dataset, Pharmaceutical Collection, PHO enrolments, Mortality Collection, NZ Cancer Registry
Analysis	By year (2012, 2013, 2014, 2015, 2016), by age (20-44, 45-64, 65 and over) and by ethnicity (Māori, Pacific, Non-Māori non-Pacific)
Medicines	NSAIDs included were: diclofenac sodium, ibuprofen, ketoprofen, mefenamic acid, meloxicam, naproxen, naproxen sodium, tenoxicam, and sulindac. 1026 Allopurinol, 4026 Febuxostat, 3754 and 4003 Benzbromarone
Comment	This indicator only includes NSAIDs dispensed at community pharmacies, ie, medicines given in hospital or purchased over the counter are not included. Note that the NSAID dispensing may not necessarily be related to gout symptoms. • A technical error has been identified which meant that some people were incorrectly ascribed NSAID use in 2012-2014. This means the 21% of people reported in 2014 with gout to have been dispensed NSAIDs was actually 15%. In 2016 this is about 15%.

Commentary	Why is this important? While it is not known whether it was gout that led to an NSAID being dispensed, high rates of NSAID dispensing without urate-lowering therapy use may reflect people using NSAIDs to manage their acute gout flares. International best practice indicates that people experiencing frequent gout flares (more than one acute gout flare per year) should be offered long-term urate-lowering therapy. Large variation may reflect patient preference and/or variable clinical practice. This indicator does not capture those who use over-the-counter medicine. What questions does this prompt? • Are people with gout using more or less NSAIDs without urate-lowering therapy than might be expected? • Should any of those receiving NSAIDs for acute gout flares be treated with urate-lowering therapy?

Indicator #6:	**Serum urate testing in the six months following urate-lowering therapy dispensing, by DHB (percent)**
Numerator	Number of people with identified gout aged 20 years and over who had a recorded serum urate laboratory test in the six months following gout-specific urate-lowering therapy (allopurinol, febuxostat, benzbromarone) dispensing.
Denominator	Those aged 20 years and over with an indication of gout using the HealthTracker method (numerator indicator 1). Only those enrolled with a PHO in each year were included.
Data source	Ministry of Health: National Minimum Dataset, Pharmaceutical Collection, PHO enrolments, Laboratory Claims Mortality Collection, NZ Cancer Registry
Analysis	By year (2012, 2013, 2014, 2015, 2016), by age (20-44, 45-64, 65 and over) and by ethnicity (Māori, Pacific, Non-Māori non-Pacific) Laboratory testing was calculated in the years after the year of diagnosis, eg, people diagnosed during the year 2012 were included in the cohort for 2013 - 2016, but not for 2012.
Medicines	1026 Allopurinol, 4026 Febuxostat, 3754 and 4003 Benzbromarone
Comment	This indicator differs from that reported for gout in the Equity Explorer (www.hqsc.govt.nz/atlas/equity-explorer).
Commentary	Why is this important? Best practice guidelines recommend that people with gout who are prescribed urate-lowering therapy should have their serum urate level monitored at least every six months. Long-term urate-lowering therapy is not recommended for people with asymptomatic hyperuricaemia. The data presented in this indicator cannot tell us what

the result was, only whether or not a test was performed.

What questions does this prompt?
• Why is serum urate testing not occuring at recommended intervals in most patients with gout?
• Why is there variation in rates of serum urate testing between different DHBs?

Indicator #7:	**The number of admissions with a primary diagnosis of gout, by DHB (rate per 100,000)**
Numerator	The number of admissions in people aged 20 years and over with a publicly funded hospital discharge with primary diagnosis of gout (ICD 9 274, ICD 10 M10), by DHB.
Denominator	Statistics New Zealand population aged 20 and over, using 2017 projections
Data source	Ministry of Health: NMDS (numerator) Statistics NZ: population projection (denominator)
Analysis	By year (2012, 2013, 2014, 2015, 2016), by age (20-44, 45-64, 65 and over) and by ethnicity (Māori, Pacific, Non-Māori non-Pacific
Commentary	Why is this important? Variation in admission rates to hospital due to gout may indicate different admission criteria between DHBs, poor gout control or limited access to primary care. What questions does this prompt? • How much of the variation is due to differing prevalence of disease and how much is modifiable? • Could some of the high rates of admissions be prevented by more intensive primary care management? • Do some of these admissions reflect higher disease severity?

Indicator #8:	**The dispensing of funded NSAIDs in the rest of the New Zealand resident population, by DHB (percent)**
Numerator	PHO enrolled population aged 20 years and over who were dispensed NSAIDs, excluding those with identified gout.
Denominator	Stats NZ population projection aged 20 years and over, using 2017 projections.
Data source	Ministry of Health: Pharmaceutical collection and PHO enrolments (numerator) Statistics NZ: population projection (denominator)
Analysis	By year (2012, 2013, 2014, 2015, 2016), by age (20-44, 45-64, 65 and over) and by ethnicity (Māori, Pacific, Non-Māori non-Pacific)
Medicines	NSAIDs included were: diclofenac sodium, ibuprofen, ketoprofen, mefenamic acid, meloxicam, naproxen, naproxen sodium, tenoxicam, and sulindac.
Comment	This indicator only includes NSAIDs dispensed at community pharmacies, ie, medicines given in hospital or purchased are not included.

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HealthTracker:
This definition aligns with the definition used by Winnard et al (2012) with two exceptions:
  i) the cancer exclusion codes used in this indicator were C81–C96 (not C80–C96),
  ii) Benzbromarone and Febuxostat were added to allopurinol in the definition to become urate-lowering therapy. Febuxostat, but not Benzbromarone, was excluded alongside allopurinol as an indicator of gout when the relevant cancer(s) were diagnosed in the 24 months before the period end date.

Data sources used:
- National Minimum Dataset
- Laboratories Collection
- Mortality Collection
- Pharmaceutical Claims
- PHO enrolment
- Cancer Registrations

Values of the main indicator variable:
1= Yes, the person showed an indication of having gout, as recorded in national health information systems.

A person is counted as having showed an indication of gout if they have one of the codes specified below (from any data collection) within the time period searched (eg, 12-month or lifetime):

National Minimum Dataset codes:
- ICD10 diagnosis codes: M10
- ICD 9 CM diagnosis codes: 274

Pharmaceutical Collection:
-
- 1341 – Colchicine
- 1026 – Allopurinol*
- 4026 – Febuxostat*
- 3754 – Benzbromarone
- 4003 – Benzbromarone

*Dispensings of Allopurinol or Febuxostat are excluded as indications of gout if there is a diagnosis of malignant neoplams of lymphoid, haematopoietic and related tissues (ICD-10-AM C81-C96) recorded in either the Cancer registry or in the publicly funded hospitalisations in the National Minimum Dataset in the 24 months before the period end date.

Reference

Winnard D, Wright C, Taylor W, et al. 2012. National prevalence of gout derived from administrative health data in Aotearoa New Zealand. *Rheumatology* 51(5): 901–09.

Jackson G, Wright C, Thornley S, et al. 2012. Potential unmet need for gout diagnosis and treatment: capture-recapture analysis of a national administrative dataset. *Rheumatology* 51(10): 1820–1824.