The Cost-effectiveness of Biannual Serum Urate (SU) Monitoring after Reaching Target in Gout: A Health Economic Analysis Comparing SU Monitoring

Philip C. Robinson, Nicola Dalbeth, and Peter Donovan

ABSTRACT. ***Objective.*** The 2012 American College of Rheumatology gout management guidelines recommend monitoring serum urate (SU) every 6 months after target SU has been achieved. Our objective was to determine through modeling whether this testing would be cost-effective, considering financial cost, quality of life, and estimated change in adherence.

Methods. A cost-utility analysis was completed with a 3-arm model: (1) no regular urate monitoring; (2) annual urate monitoring; and (3) biannual urate monitoring. Inputs to the model for health-related quality of life, flare rate, and treatment location were drawn from the medical literature and modeled over a lifetime horizon.

Results. No monitoring was the least costly (Australian$6974) but least effective [13.51 quality-adjusted life-yrs (QALY)], while annual urate monitoring [A$7117; 13.53 QALY; incremental cost-effectiveness ratio (ICER) A$13,678/QALY gained] and biannual monitoring [A$7298; 13.54 QALY; ICER A$15,420 per QALY gained] were both cost-effective alternatives in base case analysis. Sensitivity analysis on both an individual component level and a probabilistic sensitivity analysis (PSA) demonstrated that the result was robust to changes in input variables. An improvement in adherence of ≥ 3.5% with biannual monitoring was all that was required to demonstrate cost-effectiveness. In PSA, the probability of biannual monitoring was 78%, no monitoring was 20%, and annual monitoring was 2%.

Conclusion. The results suggest that biannual SU monitoring after attaining target SU is the most cost-effective, compared with no testing and annual testing. (First Release February 15 2018; J Rheumatol 2018;45:697–704; doi:10.3899/jrheum.170199)

Key Indexing Terms:
GOUT GOUTY ARTHRITIS PATIENT COMPLIANCE

Gout is the most common inflammatory arthritis in men and it increases in frequency in women after menopause[1]. Gout has a substantial economic effect, with studies estimating all-cause direct costs per capita in different patient subgroups with gout from US$5000 to US$18,000[2,3].

Guidelines for the management of gout were published by the American College of Rheumatology (ACR) in 2012[4]. These guidelines include the following statements: "The TFP [Task Force Panel] recommended regular monitoring of serum urate … once the serum urate target is achieved (every 6 months)(Evidence C). The TFP weighed this measure as particularly useful to monitor adherence, given that poor adherence to ULT [urate-lowering therapy] is a common problem in gout patients[4]."

During the development of the ACR guidelines, Evidence C grading was "assigned to consensus opinion of experts, case studies, or standard-of-care[4]."

It is well recognized in many studies that adherence is poor in gout and this is likely to affect the health outcomes of patients with gout[5,6,7,8,9,10,11]. One representative study of > 9000 Medicare patients in Pennsylvania found that the proportion of days covered (PDC) was only 54%, with 64% considered poorly compliant[11]. A PDC value < 80% is considered poor adherence.

In view of the low level of evidence on which the recommendation was based and the multiple implications of this recommendation, we chose to examine the health economic effect of serum urate (SU) monitoring. Our aim was to determine whether annual or biannual monitoring of SU once SU target was achieved was a cost-effective intervention in gout management. The study population included patients with gout who had recently reached their SU target and were therefore aiming to stay under target with urate-lowering

From the departments of Rheumatology and Clinical Pharmacology, Royal Brisbane and Women's Hospital; School of Medicine, University of Queensland, Brisbane, Australia; Department of Medicine, University of Auckland, Auckland, New Zealand.

P.C. Robinson, MBChB, PhD, FRACP, Department of Rheumatology, Royal Brisbane and Women's Hospital, and School of Medicine, University of Queensland; N. Dalbeth, MBChB, MD, FRACP, Department of Medicine, University of Auckland; P. Donovan, MAppSci, MBBS, MSc, FRACP, School of Medicine, University of Queensland, and Department of Clinical Pharmacology, Royal Brisbane and Women's Hospital.

Address correspondence to Dr. P.C. Robinson, Department of Rheumatology, Royal Brisbane and Women's Hospital, Bowen Bridge Road, Herston QLD 4006, Australia. E-mail: philip.robinson@uq.edu.au

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therapy (ULT). We modeled 3 groups of these patients: no monitoring, annual, and biannual SU monitoring.

MATERIALS AND METHODS

The reporting of our methods and results of this economic analysis conforms with the Consolidated Health Economic Evaluation Reporting Standards statement[12].

Different measures of adherence are used in our research and reported in previous research discussed in our paper. PDC is a measure that takes the number of days "covered" with medication, divides this by the number of days in the period concerned, then multiplies the quotient by 100 to get a percentage figure. The medication possession ratio (MPR) takes the sum of all supplied days of medication for a period and divides that by the number of days in the period. The difference between MPR and PDC is that a patient filling a prescription early may accumulate more medication than required and artificially elevate their MPR, whereas the PDC measure adjusts for this by allocating only 1 day of medication to each available day. Therefore, the PDC is a more conservative measure of adherence and cannot go > 100%, whereas the MPR has this potential.

A cost-utility analysis was conducted using TreeAge Pro 2015 R2 (TreeAge Software). We used a Markov cohort, with a Markov cycle length of 1 year, and the following 3 arms to the model: (1) no regular urate monitoring; (2) annual urate monitoring; and (3) biannual urate monitoring. Figure 1 provides a simplified representation of a single cycle of the Markov cohort. A Markov cohort was chosen because gout is a chronic condition, with the likelihood of recurrent events (e.g., gout flares). We modeled a lifetime horizon, assuming an age at entry to the Markov cohort of 30 years, and included Australian-specific death rates (using rates for men, given the preponderance of gout in men), with the model terminating when the age of the cohort was > 100 years. We did this to incorporate the cost and benefits associated with recurrent gout flares over a lifetime and the need for chronic prophylactic therapy and physician followup.

At entry to the model, we assumed that patients in the Markov cohort started in the state of below-SU target (< 0.36 mmol/l or < 6 mg/dl), and for arm 1 (no urate monitoring), we reverted to the baseline observed adherence rate of 40% (MPR). This value is a representative number from multiple previous studies of adherence in gout[5]. In arm 2, patients started at a below-target state and had annual urate monitoring, which we modeled would increase their adherence to 50%. In arm 3, patients started at a below-SU-target state and had biannual SU monitoring, which we modeled would increase their adherence to 60%. A summary of the key model variables used is shown in Table 1. We assumed that rates of adherence, on average, did not change over the duration of the model. All participants had flares as per their group assignment, and inherited health-related quality of life (HRQOL) and costs associated with their flare rates. For example, in arm 1, 40% had a flare rate based on an at-target SU level, and 60% had a flare rate based on an above-target SU level. In arm 2, 50% would have a flare rate based on an at-target SU, and 50% would have a flare rate based on an above-target flare rate. Flare rates by SU level were modeled from the work of Halpern, *et al*, from a large study of health management organization claims[13]. To model the costs of each flare, the proportion of self-treated, general practitioner (GP)–treated, or hospital-treated flares was modeled from published Australian and New Zealand data. Jackson, *et al* completed a capture-recapture analysis of the population prevalence estimate in New Zealand (NZ), which has a similar sociodemographic population and health system functioning[14]. Their results suggested that of the New Zealanders with gout, 20% were not identified or treated through healthcare providers, and this gave an evidence-based estimate of 20% for those who self-treated their gout at home with over-the-counter medications. Detailed data are

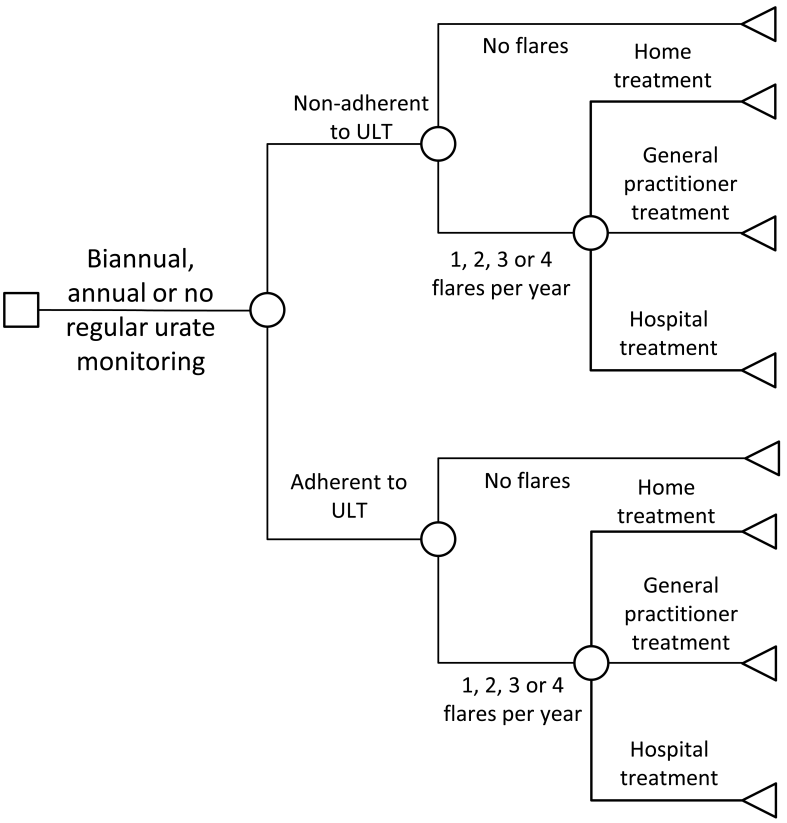

Figure 1. A diagrammatic representation of the model used for the study. ULT: urate-lowering therapy.

Table 1. Model assumptions.

Variables	Base Case	One-way SA, Range	PSA Distribution, Variables*	Sources
ULT				
Proportion of patients taking allopurinol	0.998	0.9–1.0	β (3.56, 0.186)	PBS statistics, estimate for SA
Proportion of patients taking febuxostat	0.05	0–0.1	Not included (reciprocal value of proportion taking allopurinol)	PBS statistics, estimate for SA
Flare treatment location				
Home	0.2	0–0.2	β (3, 12)	Jackson, *et al*[14]; Winnard, *et al*[15]; Robinson, *et al*[16]
GP	0.68	Dependent on proportions treated at home/hospital	Not included (value dependent on proportions treated at home/hospital)	Derived estimate
Hospital	0.12	0.01–0.12	β (13.96, 102.4)	Robinson, *et al*[16], estimate for SA
Effects of screening with ULT				
No urate monitoring	0.4	Threshold analysis ≥ 0.4 (i.e., no improvement compared to no monitoring)	β (2, 3)	Reach[5], estimate for PSA
Annual urate monitoring	0.5		β (2.63, 2.63)	Estimate for base case and PSA
Biannual urate monitoring	0.6		β (3, 2)	Estimate for base case and PSA
No. flares/yr				Derived from Halpern, *et al*[10], with estimates for SA
No longer taking ULT				
0	0.38	0.33–0.42	β (21.9, 35.8)	
1	0.25	0.2–0.3	β (26.8, 80.3)	
2	0.27	0.22–0.32	β (26.0, 70.3)	
3	0.09	0.06–0.12	β (32.7, 330)	
4	0.01	0–0.04	β (35.6, 3527)	
Remains adherent to ULT				
0	0.51	0.46–0.56	β (17.1, 16.5)	
1	0.28	0.23–0.33	β (25.6, 65.9)	
2	0.19	0.14–0.24	β (29.0, 124)	
3	0.02	0–0.05	β (35.3, 1728)	
4	0.00	0–0.03	Not estimated given base case value of 0.00	
GP performing laboratory testing for flare	0.5	Threshold analysis	β (2.62, 2.62)	Estimates for base case and SA
Costs	Threshold analysis			
SU, CRP, electrolytes/renal function	A$9.70 each		Not included	MBS, item number 66500
GP visit	A$37.05		Not included	MBS, item number 23
Hospital admission for gout	A$2361		γ (36, 0.0152)	AR-DRG, code I66B for base case, with estimates for PSA
Allopurinol, 100 tablets × 300 mg	A$12.74		Not included	PBS, item code 2604C
Ibuprofen	A$5.00		Not included	Estimates for base case and SA
Febuxostat, 28 × 80 mg tablets	A$50.27		Not included	PBS, item code 10445R
Full blood examination	A$16.95		Not included	MBS, item number 65070
Health-related utility estimates/1 yr				Khanna, *et al*[4]
No. flares/yr				
0	0.73	0.695–0.765	β (9.26, 3.43)	
1	0.72	0.685–0.755	β (6.69, 2.6)	
2	0.72	0.685–0.755	β (6.69, 2.6)	
3	0.67	0.633–0.707	β (5.91, 2.91)	
4	0.64	0.602–0.678	β (4.46, 2.51)	

*β distributions: (α, β); γ distribution: (α, λ). Costs are in Australian dollars. SA: sensitivity analysis; PSA: probabilistic SA; ULT: urate-lowering therapy; PBS: Pharmaceutical Benefits Schedule; GP: general practitioner; SU: serum urate; CRP: C-reactive protein; AR-DRG: Australian-refined diagnostic related group; MBS: Medical Benefits Schedule.

available on the NZ population prevalence of gout (2.69–2.89%)[15] and NZ gout flares causing admission to hospital[16]. According to the US data from Halpern, *et al*, the number of flares per year overall for gout patient groups under and over urate target level is 0.65 and 0.92, respectively[13]. Therefore, an NZ population of 4.3 million in 2009, and a 2009 prevalence of 2.79%, gives 119,970 people with gout, which means there were about 0.7 flares per person or 83,979 flares. There were 10,241 admissions for primary gout in 2009, so the proportion of gout flares admitted to hospital was about 10,241/83,979 (12%). The percentage subsequently treated by primary care services (68%) was derived from these estimates, after subtracting home treatment (20%) and hospital treatment (12%). The age-specific prevalence of gout is similar between the United States, United Kingdom, Australia,

and New Zealand, making this comparison generalizable[17,18]. We assumed that 99.8% of patients were treated with allopurinol as their ULT, with the remaining 0.2% treated with febuxostat; these are evidence-based figures from Australian prescribing data[19]. We modeled that a GP would order basic pathology testing (1 each of full blood examination, C-reactive protein, and electrolytes/renal function tests) at 50% of flare episodes only. The cost of medical visits for monitoring was included in the model and we assumed that patients continuing treatment, whether or not they had repeat SU, were seen every 6 months, to be provided with repeat prescriptions of their ULT.

For the cost data, we took the perspective of the healthcare costs borne by the Australian government (both Commonwealth, which largely funds medicines, pathology, GP, and private outpatient specialist care, and States, which largely fund public hospital care). The data came from well-recognized sources (e.g., Pharmaceutical Benefits Schedule for pharmaceuticals, Medical Benefits Schedule for physician visits and pathology, Australian-Refined Diagnostic Related Groups for hospital inpatient care)[20,21]. Cost variables and their sources are outlined in Table 1 and are in 2016 Australian dollars (A$)[22]. For readers from outside Australia to better understand the costs, despite potential differences in health systems that make direct comparisons difficult, we have also presented costs in US dollars and euros, with conversion at a rate of 0.78 and 0.70, respectively, being average rates for conversion to Australian dollars in 2016[23].

Quality-of-life data were obtained from Khanna, *et al*[24] and are shown in Table 1. These data are based on 620 self-reported gout patients from the United States, United Kingdom, France, and Germany. Participants were categorized according to the number of gout flares, tophi, and SU level awareness. Their HRQOL was assessed with the Medical Outcomes Short Form (SF)-12 version 2 to estimate SF-6D preference-based utility values. We used a cost-effectiveness threshold of A$50,000 (US$39,000/€35,000) per quality-adjusted life-years (QALY) gained.

Univariate sensitivity analysis was performed by varying the individual components of the model (e.g., costs, frequency of flares, HRQOL estimates) to see what effect it had on the overall outcome of the different arms of the model. In addition, to answer the question of the strength of our assumptions about adherence based on monitoring frequency, we undertook sensitivity analysis and asked what change in adherence would justify the cost of monitoring (i.e., threshold analysis). The CI for the HRQOL estimates were relatively wide and overlapping between, for example, 0 and 1 flare per year. For pragmatic reasons, in both univariate and probabilistic sensitivity analysis (PSA), when HRQOL estimates were changed, we specifically stipulated that having a greater number of gout flares per year could not be associated with a better HRQOL estimate (e.g., having 0 flares/yr needed to be associated with no worse or better HRQOL than having ≥ 1 flares/yr).

PSA is a more sophisticated way of performing sensitivity analysis. Instead of adjusting 1 variable at a time to assess its effect on the results, it incorporates potential changes in multiple variables simultaneously, with each fitted to a particular distribution (e.g., probabilities to β distribution and costs to γ distributions, as is standard). A Monte Carlo simulation is then performed, where 1000 individual "trials" are run, and for each variable (using random number generation), a value is drawn from the distribution and the model is rerun. Variable estimates used in PSA and their sources are also outlined in Table 1. We included only variables in PSA for which distribution could be obtained or estimated (e.g., the cost variables for pathology tests and pharmaceuticals are the fixed costs borne by the government and thus cannot be fitted to a distribution). In both 1-way and PSA, where variable values needed to be estimated, we chose broad ranges or in the case of 1-way sensitivity testing, we undertook threshold analysis.

The value of costs and benefits was discounted at 5% beyond the first year, according to Australian guidelines for cost-effectiveness analysis[25]. Because this is a theoretical piece of work, no ethical approval was sought.

The assumptions used in our study were derived from previous published literature, as referenced. The primary literature was sourced from a PubMed search (www.ncbi.nlm.nih.gov/pubmed), using the term "gout" combined with "economic," "health economic," "flare," "health-related quality of life" and "QALY." The literature libraries of the authors were also searched for articles that were relevant to the modeling or its assumptions.

RESULTS

The cost-effectiveness analysis demonstrated that no monitoring was least costly but least effective, with annual monitoring and biannual monitoring being incrementally costlier and more effective, as shown in Table 2. Both annual monitoring and biannual monitoring were cost-effective compared to no monitoring.

A detailed sensitivity analysis is shown in Table 3. Comparing no monitoring versus biannual monitoring, sensitivity analysis showed it would take only an increase in adherence of < 3.5% for monitoring to become cost-effective. Both annual and biannual monitoring remained cost-effective options across all sensitivity analyses, including when the rates of hospital admissions for treating gout flare were lowered to 1% (from base case of 12%). A cost-sensitivity analysis showed that changes of at least 1 order of magnitude were required before the outcome was altered (Table 4).

The PSA results are shown in Figure 2, the cost-effectiveness acceptability curve. In 94% of iterations, no monitoring was the least costly, while biannual and annual monitoring were the least costly in only 3% of iterations each. At a willingness-to-pay threshold of A$50,000 (US$39,000/€35,000) per QALY gained, the probability that biannual monitoring was the most cost-effective option was 78% (i.e., in 78% of the iterations, biannual monitoring was the most cost-effective), while no monitoring and annual monitoring had a probability of 20% and 2%, respectively.

DISCUSSION

Our study demonstrates that based on the assumptions used, regular monitoring of SU levels once the appropriate target has been reached is likely to be cost-effective. Our analysis shows that biannual monitoring is likely to be the most cost-effective monitoring strategy. This result is largely driven by small improvements in HRQOL owing to fewer gout flares, associated better adherence from regular monitoring, and the high cost of a hospital admission for treatment of gout flares compared to the small cost of SU monitoring by a GP. These results were consistent when assessment of variable uncertainty was tested in 1-way sensitivity analysis and PSA.

Table 2. QALY and ICER for the 3 arms of the model.

Arms	Cost A$	Cost US$	Cost €	QALY	ICER, A$/QALY gained
No urate monitoring	6974	5440	4882	13.51	–
Annual urate monitoring	7117	5551	4982	13.53	13,678
Biannual urate monitoring	7298	5692	5109	13.54	15,420

QALY: quality-adjusted life-years; ICER: incremental cost-effectiveness ratio (compared to no urate monitoring).

Table 3. Univariate sensitivity analysis.

Variables	Sensitivity Analysis, Range	ICER, Range	
		Annual	Biannual
HRQOL weights			
0	0.695–0.765	7546–17,813	9469–22,350
1	0.685–0.755	7737–13,678	9708–17,162
2	0.685–0.755	9118–16,678	11,441–17,162
3	0.633–0.707	9947–25,449	12,481–31,928
4	0.602–0.678	12,809–16,437	16,071–20,624
Probabilities of gout flares/yr			
Nonadherent to therapy			
0	0.33–0.42	9283–17,541	12,428–21,324
1	0.2–0.3	13,184–14,137	16,619–17,666
2	0.22–0.32	11,312–16,223	14,841–19,659
3	0.06–0.12	8334–23,383	11,116–28,141
4	0–0.04	6199–17,933	8673–21,991
Adherent to therapy			
0	0.46–0.56	11,112–16,830	14,430–20,519
1	0.23–0.33	12,339–14,981	15,694–18,591
2	0.14–0.24	9371–17,871	12,726–21,481
3	0–0.07	9149–24,446	12,059–29,294
4	0–0.04	13,678–34,258	17,162–40,451
Effectiveness of urate monitoring in improving adherence, %	≥ 40 (equivalent to no monitoring)	Annual monitoring cost effective at adherence rate > 41.6	Biannual monitoring cost effective > adherence rate of 43.4
Rates of flare treatment, %			
Hospital	1–12	13,678–30,728	14,162–34,212
Home	0–20	11,024 to dominant	14,508 to dominant
Patients taking febuxostat vs allopurinol, %	0–10	13,461–24,295	16,945–27,778

ICER: incremental cost-effectiveness ratio; HRQOL: health-related quality of life.

Table 4. Cost-sensitivity threshold analysis (willingness to pay A$50,000 per QALY).

Costs	Base Case			Failure of Monitoring Cost-effectiveness	
	A$	US$	€	Annual	Biannual
SU	9.70	7.18	6.40	A$50.10	A$41.79
CRP	9.70	7.18	6.40	Never	Never
Electrolytes and renal function	9.70	7.18	6.40	Never	Never
Full blood examination	16.95	13.22	11.87	Never	Never
GP visit	37.05	27.42	24.45	A$153	A$148
Hospital admission for gout	2361	1714.14	1558	Never	Never
Allopurinol (100 tablets × 300 mg)	12.74	9.43	8.40	A$46.52	A$44.90
Ibuprofen	5.00	3.70	3.30	Never	Never
Febuxostat	50.27	37.20	33.18	> A$1000	> A$1000

QALY: quality-adjusted life-years; SU: serum urate; CRP: C-reactive protein; GP: general practitioner.

The modeling was based on the assumption that increased SU monitoring would lead to an increase in ULT adherence; this relationship between monitoring/healthcare provider attention and adherence has been shown previously in studies of monitoring interventions in gout[26], osteoporosis[27], hypertension[28], hypercholesterolemia[29], and diabetes mellitus[30].

The strengths of our study include the modeling of costs and benefits (HRQOL) over a longterm time horizon, and the modeling of most base case variable inputs on evidence from published studies or other recognized sources. Where variable inputs from high-quality sources were not available and needed to be estimated (including for the sensitivity analysis ranges and variable distributions), we undertook extensive sensitivity analysis (1-way and PSA) to assess the effect of these estimated values on the results of the model. These analyses demonstrated that biannual SU monitoring remained, at worst, cost-effective compared to no monitoring, and that changes in input variables, often 1 order of magnitude, were required before the result would be significantly different.

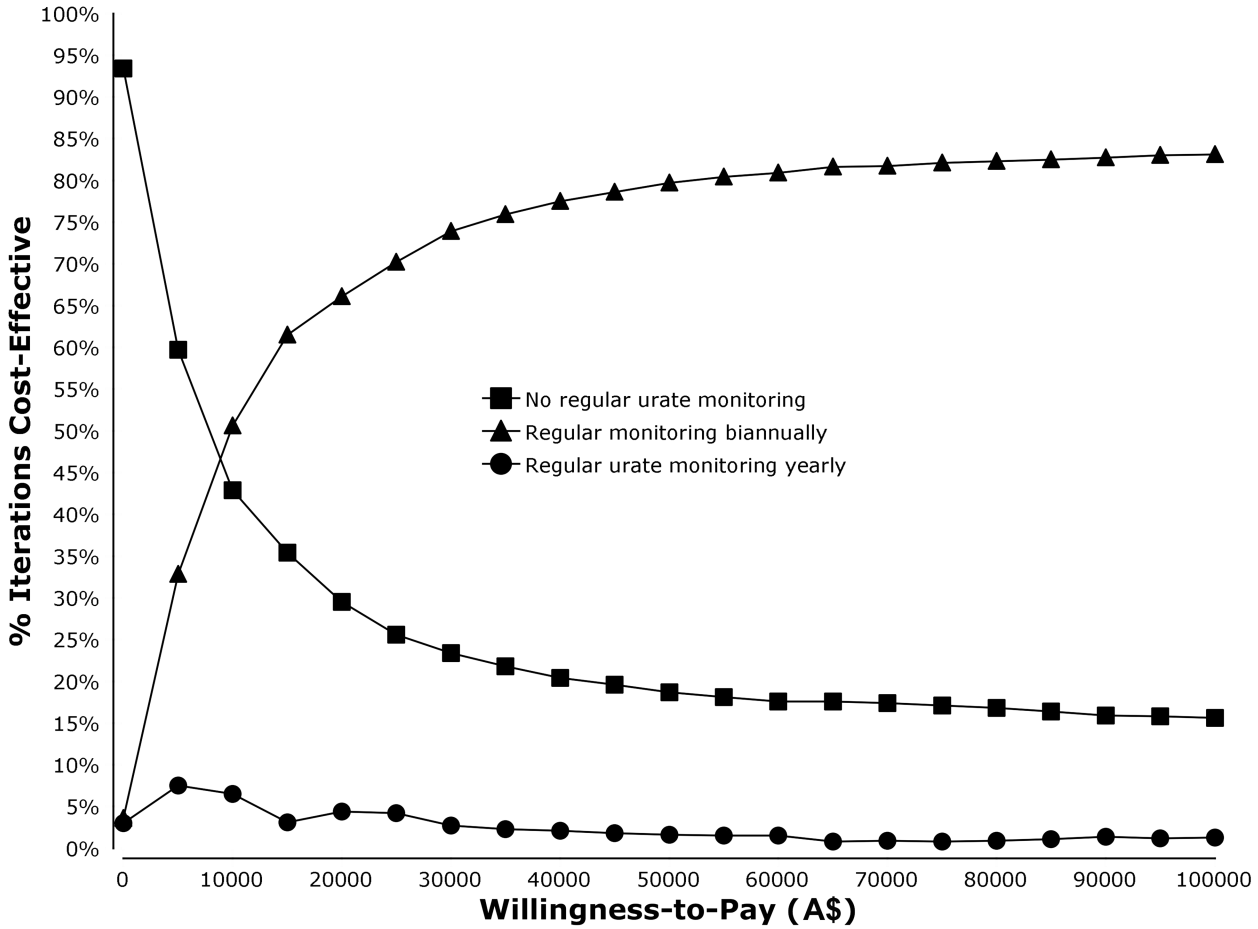

Figure 2. PSA cost-effectiveness acceptability curve (in Australian dollars). PSA: probabilistic sensitivity analysis.

The limitation of our work relates to the assumptions made, primarily the expected changes in adherence from monitoring intervention. This assumption relies heavily on a further assumption that the finding of an above-target SU value will prompt the pathology test interpreter to recognize that an above-target value is a problem (understand the treat-to-target model), precipitate the provider to act, and effectively raise the level of adherence in at least some of the patients, based on the action taken. This therefore assumes that doctor intervention can increase adherence levels. Poor adherence is presumed to be multifactorial, with education, motivation, skills, and knowledge all likely to play a role. The relative importance of each of these factors is currently unknown. Assumptions that education is a key component may well be incorrect. For example, in young people counseled about human immunodeficiency virus prevention, education had no direct role in adherence; behavioral skills and motivation initiated behavior change[31]. However, prior studies have demonstrated that patients with gout do adhere to ULT when informed appropriately, using a treat-to-SU-target approach[26]. Further, our model demonstrates that only a small improvement in adherence rates (3.5%) is required before monitoring becomes cost-effective compared to no monitoring. There is the potential for bias to be introduced to our study based on the literature used to form the assumptions (e.g., if assumptions are not readily generalizable across groups of patients with gout or across different health environments). Every effort has been made in selecting the assumptions to make them as representative as possible, and to use sensitivity analysis to mitigate against this limitation.

The assumptions of the number hospitalized for their gout flares may also vary substantially between countries and health systems, or within countries or areas, and because of the comparatively higher costs of hospital admissions, this may affect the model. However, reducing the rates of hospital admissions 12-fold from the base case did not result in monitoring strategies from being, at the very least, a cost-effective alternative to no monitoring.

Further, the model has based disutilities on flare rates, and on whether a patient was adherent and therefore at SU target. Other studies have used absolute SU levels to model disutilities[32]. The relationship between SU levels and disutility is presumably through flare frequency. However, this relationship is confounded by total body urate stores. For

example, a person under target for 10 years will (likely) have no clinically relevant stores of urate and no flares, whereas a person who has very recently come down to target with treatment may have substantial stores of urate and will probably flare more frequently. If SU levels only were used, both of these patients would have the same disutility but vastly different flare rates. Therefore, in our view, the relationship between SU level and disutilities is not strong enough to base disutilities on.

The financial costs are modeled in Australian dollars using assumptions based on the Australian healthcare system. This makes the modeling broadly comparable to health systems with a similar structure and payment system such as those of New Zealand and the United Kingdom, but potentially less comparable to health systems such as the US one. Therefore, although we have provided cost data in this analysis in US dollars and euros, at best these values can be considered imprecise estimates only. Further, we have performed this analysis from the perspective of the healthcare costs borne by the government. Thus, we have not taken into account direct (e.g., out-of-pocket medication) or indirect costs (e.g., absences from work to attend appointments) borne by patients.

Our work suggests that regular monitoring could have an important role to play in gout management. If small improvements in adherence result from monitoring, it is likely to be a very cost-effective intervention. Further prospective studies to properly assess the efficacy of regular monitoring on adherence would improve the quality of future economic analysis in this area.

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Correction

The Cost-effectiveness of Biannual Serum Urate (SU) Monitoring after Reaching Target in Gout: A Health Economic Analysis Comparing SU Monitoring

Robinson PC, Dalbeth N, Donovan P. The cost-effectiveness of biannual serum urate (SU) monitoring after reaching target in gout: a health economic analysis comparing SU monitoring. J Rheumatol 2018; doi:10.3899/jrheum.170199. Because of an error in previous research in the denominator used for calculating the percentage of patients admitted to hospital with gout, some calculations reported in this article were incorrect. The correct figure is 1.3% of gout flares admitted to hospital. Therefore, the values used for primary care treatment of gout flare and self-management of gout flare are 78.7% and 20%, respectively. The overall conclusion of the study is unchanged: that biannual SU monitoring after attaining target SU is the most cost-effective approach, compared with no testing and annual testing. The corrected Table 2 is shown below.

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Table 2. QALY and ICER for the 3 arms of the model.

Arms	Cost			QALY	ICER, A$/QALY gained
	A$	US$	€		
No urate monitoring	2605	2032	1824	13.51	—
Annual urate monitoring	2912	2271	2038	13.53	30,137
Biannual urate monitoring	3279	2558	2295	13.54	32,096

QALY: quality-adjusted life-years; ICER: incremental cost-effectiveness ratio (compared to no urate monitoring); A$: Australian dollars.