

# Patients' Perceptions about Substitution of a Reference Drug while in Hospital: Focus on H<sub>2</sub>-Receptor Antagonists

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## ABSTRACT

**Objective:** To assess patients' perceptions about substitution of a reference drug (H<sub>2</sub>-receptor antagonist) with a formulary alternative while in the hospital.

**Methods:** This study consisted of standardized patient interviews conducted over a 6-week period. Eligible, consenting patients admitted to the Vancouver General Hospital site of the Vancouver Hospital and Health Sciences Centre who were given a prescription for an H<sub>2</sub>-receptor antagonist were interviewed to determine patient characteristics, history of H<sub>2</sub>-receptor antagonist use, and understanding and opinion of reference-based pricing.

**Results:** Forty-one (46%) of the 89 eligible patients consented to participate. Twenty-eight (68%) of the participants were receiving ranitidine at the time of admission to hospital, and 12 of the remaining 13 were converted to ranitidine from another H<sub>2</sub>-receptor antagonist (cimetidine) at the time of admission. Eighteen patients (44%) were aware of the reference-based pricing policy, but 4 (10%) were only familiar with the program's name. Of the 12 patients for whom therapy was converted from cimetidine to ranitidine, only 5 (42%) appeared to be aware that their H<sub>2</sub>-receptor antagonist had been changed, and 7 (58%) claimed to feel the same or better while taking ranitidine in hospital. After participants were notified of the conversion by the investigator, the median satisfaction rating of the conversion from one H<sub>2</sub>-receptor antagonist to another was 5 (range 1 to 5; maximum score 10). In addition, 7 (58%) stated no particular preference for either H<sub>2</sub>-receptor antagonist. On discharge, 36 (88%) of the patients resumed taking the H<sub>2</sub>-receptor antagonist that they had been using before admission.

**Conclusion:** Despite the influence of the reference-based pricing policy on use of H<sub>2</sub>-receptor antagonists in the community, more than half of interviewed patients were taking ranitidine before admission to this hospital. Of those converted from cimetidine to ranitidine during their hospital stay, none identified any problems associated with the change. Once discharged from the hospital, most patients resumed their previous H<sub>2</sub>-receptor antagonist therapy.

**Key words:** reference drug, H<sub>2</sub>-receptor antagonists, drug substitution

## RÉSUMÉ

**Objectif :** Évaluer la perception qu'a les patients hospitalisés de la substitution d'un médicament de référence (inhibiteur des récepteurs H<sub>2</sub>) par un médicament inscrit au formulaire.

**Méthodes :** Ménager des entrevues standards avec le patient sur une période de six semaines. Les patients consentants et admissibles à l'étude, qui étaient hospitalisés au Vancouver General Hospital, du Vancouver Hospital and Health Sciences Centre, et qui ont reçu une ordonnance d'inhibiteur des récepteurs H<sub>2</sub>, ont été interviewés pour déterminer leurs caractéristiques, leurs antécédents d'usage d'inhibiteurs des récepteurs H<sub>2</sub>, leur compréhension de la méthode du prix de référence et leur opinion sur cette méthode.

**Résultats :** Quarante et un (46 %) des 89 patients admissibles ont consenti à participer à l'étude. De ces participants, 28 (68 %) ont reçu de la ranitidine après avoir été hospitalisés et 12 des 13 autres patients ont reçu de la ranitidine comme substitut à leur inhibiteur des récepteurs H<sub>2</sub> (la cimétidine). Dix-huit patients (44 %) connaissaient la politique du prix de référence, alors que 4 (10 %) n'étaient que familiers avec le nom de ce programme. Des 12 patients dont le traitement a la cimétidine a été substitué par la ranitidine, seulement 5 (42 %) semblaient savoir qu'on leur avait substitué leur inhibiteur des récepteurs H<sub>2</sub>, et 7 (58 %) ont déclaré se sentir aussi bien sinon mieux avec la ranitidine qu'avec leur inhibiteur des récepteurs H<sub>2</sub>. Après que les chercheurs aient informé les patients de la substitution, le taux de satisfaction moyen était de 5 (variation de 1 à 5; cote maximale de 10). En outre, 7 (58 %) patients ont dit n'avoir aucune préférence particulière pour l'un ou l'autre inhibiteur des récepteurs H<sub>2</sub>. À leur sortie, 36 (88%) patients ont recommencé à prendre l'inhibiteur des récepteurs H<sub>2</sub> qu'ils utilisaient avant d'avoir été hospitalisés.

**Conclusion :** Malgré l'effet de la méthode du prix de référence sur l'usage des inhibiteurs des récepteurs H<sub>2</sub> dans la communauté, plus de la moitié des patients qui ont été interviewés prenaient de la ranitidine avant leur hospitalisation. Des patients qui sont passés de la cimétidine à la ranitidine durant leur séjour à l'hôpital, aucun n'a relevé de problèmes associés à la substitution. Après leur sortie, la plupart des patients ont recommencé à prendre les inhibiteurs des récepteurs H<sub>2</sub> qu'ils prenaient auparavant.

**Mots clés :** médicament de référence, inhibiteurs des récepteurs H<sub>2</sub>, substitution de médicament

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## INTRODUCTION

Pharmaceutical reference systems represent reimbursement limits set by payers to control drug expenditures. Under these systems, payers agree to reimburse the cost of listed drugs to a maximum of a preset reference price. Costs in excess of this price must be covered by the patient or a private payer. The reference drug is typically chosen from a cluster of drugs that have identical active ingredients (e.g., the Low Cost Alternative Program in British Columbia) or chemically different active ingredients from the same drug class that are considered to be therapeutically interchangeable (the Reference-Based Pricing Program in British Columbia) or that are agents from different drug classes considered to have equivalent pharmacological effects.

In 1995, the Reference-Based Pricing Program (now called the Reference Drug Program) was launched by the British Columbia Ministry of Health to reduce provincial drug expenditures.<sup>1</sup> Under this policy, drug therapies are funded according to the least costly drug within a category of agents with the same therapeutic value.<sup>2,3</sup> The first drug category affected by the Reference-Based Pricing Program in British Columbia was H<sub>2</sub>-receptor antagonists, followed by nitrates, nonsteroidal antiinflammatory drugs and select antihypertensive agents (the angiotensin-converting enzyme inhibitors and the calcium-channel blockers). For each category, exceptions to the policy can be made on the basis of individual patients' needs.

The Reference-Based Pricing Program is limited to prescriptions dispensed in community pharmacies. Thus, hospitals are not required to comply with the Ministry of Health guidelines when dispensing drugs for inpatients. However, many hospitals had similar programs in place for several years before the implementation of reference-based pricing. Drug formularies and therapeutic interchange programs have been used to control prescribing patterns and reduce drug and delivery costs within the institutional setting.<sup>4</sup> Because of different acquisition costs and prescribing patterns in the hospital setting, policies and procedures may conflict with those implemented by the Reference-Based Pricing Program. This difference might lead to a situation in which patients, at the time of admission, are receiving a reference-based agent not available in the hospital.

The Vancouver General Hospital site of the Vancouver Hospital and Health Sciences Centre is a 1000-bed teaching hospital affiliated with the University of British Columbia. Its institutional drug policies differ

in some respects from the provincial reference-based pricing policy. For example, at the time of this study, cimetidine was the reference drug within the H<sub>2</sub>-receptor antagonist category and was the only agent listed as a PharmaCare benefit drug within this category. However, this drug was not listed on the hospital formulary before the Reference-Based Pricing Program was implemented, as it was not often prescribed, was more expensive, and was considered inferior to ranitidine because of a higher potential for serious drug-drug interactions.<sup>5</sup> After a review of the reference-based pricing policy, the hospital's Drugs and Therapeutics Committee reevaluated the available H<sub>2</sub>-receptor antagonists and decided to retain ranitidine and continue to exclude cimetidine from the formulary. In January 1998, a therapeutic interchange policy was implemented to streamline the process of converting prescriptions for oral cimetidine to ranitidine. The objective was to avoid formulary duplication and to reduce unnecessary pharmacist-physician telephone interactions that could result in delays in administering medications.

To our knowledge, no reports have been published on the impact of switching reference-based drugs to formulary alternatives while a patient is in hospital. The specific objective of this study was to assess patients' perceptions about the substitution of their H<sub>2</sub>-receptor antagonist and about the Reference-Based Pricing Program.

## METHODS

The study consisted of standardized patient interviews conducted over a 6-week period. Approval to conduct the research was obtained from both the university's and the hospital's ethics and research boards before study initiation.

The interview was designed to focus on 3 main topics: the patient's use of medication at home and in the hospital; the patient's perceptions about H<sub>2</sub>-receptor antagonist use at home and in the hospital; and the patient's understanding of and opinion about the Reference-Based Pricing Program. Data collected included patient characteristics, duration of H<sub>2</sub>-receptor antagonist use, indication, concurrent medication use, risk factors for drug interaction, and adverse effects experienced.<sup>5</sup> A selection of questions from the interview form are presented in Table 1. Several pharmacists tested the standardized patient interview form before its implementation. A 10-point rating scale was used to measure patient satisfaction and opinion (1 = unhappy, 10 = happy).



**Table 1. Selected Questions from the Patient Interview**

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Is this trip into the hospital a result of a problem that you experienced while taking your ulcer or heartburn medication?

Did you find that the medication(s) worked well? Did it/they resolve your stomach problems?

Do you feel that you have experienced any adverse effects as a result of any of the H<sub>2</sub>-antagonist medications that you have taken at any time?

If you were switched from one H<sub>2</sub>-antagonist to another in the community, why was your medication changed?

How do you feel about your medication being changed?

Did your medication cause you to need extra appointments with your doctor?

Did you ever have to go to the emergency department because of any problems that you might have experienced that you think were due to the H<sub>2</sub>-antagonist? If yes, how many times?

Are you aware of the Reference-Based Pricing Program?

Do you know how the Reference-Based Pricing Program affects your medication?

What is your opinion of the Reference-Based Pricing Program?

Do you know that you are receiving a different H<sub>2</sub>-antagonist while you are in the hospital?

Knowing that both medications are in the same drug family, how do you feel about your medication being changed when you were admitted to the hospital?

With the medication that you are receiving in the hospital, do you feel any different?

Are you experiencing any adverse effects as a result of this medication?

Do you feel that the medication works as well as the medication you were taking at home?

Which medication would you prefer to take when you are discharged from the hospital?

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Patients were considered eligible to participate in the interview if they received regularly scheduled oral H<sub>2</sub>-receptor antagonist therapy before and during their stay in hospital, had been admitted to a noncritical care ward or a long-term care ward, and had provided informed consent.

On days when interviews were to be conducted, the drug distribution computer was used to generate a list of potential study candidates from all hospitalized recipients of any oral H<sub>2</sub>-receptor antagonist. Eligible patients were further screened to determine their use of oral H<sub>2</sub>-receptor antagonists at home through an assessment of their preadmission medication history. Patients who fulfilled the study criteria were approached by one of the investigators (N.J.G.), to obtain consent to conduct the interview and to view their PharmaNet medication profile. The PharmaNet is a centralized computer database coordinated by the Ministry of Health that records every prescription dispensed in a community pharmacy in the province. After completion of the interview, the investigator answered any

questions and a note was written in the health record detailing the interview.

## RESULTS

### Patient characteristics and preadmission use of H<sub>2</sub>-receptor antagonists

During the 6-week study period, 89 patients were considered eligible for the study. Of these, 41 (46%) patients consented to participate. Twenty-three (56%) of the patients were male, and the mean age was 66 years (range 18 to 89 years). Most patients (34 [83%]) had third-party financial coverage for the cost of their medications. This coverage included 66% by PharmaCare (excluding Plan E [for registered residents not covered by any other PharmaCare plan]) and 37% by third-party insurance; 15% of patients had overlapping coverage.

Thirteen (32%) of the 41 patients were receiving cimetidine before admission, whereas the balance were receiving ranitidine. Fourteen (34%) of the patients



stated that they had been taking an H<sub>2</sub>-receptor antagonist for 1 to 5 years, and 13 (32%) of the patients reported that they had been taking the drug for less than 6 months. Fourteen (34%) of the patients reported taking H<sub>2</sub>-receptor antagonists for prophylaxis of adverse effects from concurrent medications (nonsteroidal antiinflammatory drugs or corticosteroids), whereas the remainder were receiving them for gastrointestinal complaints.

According to our review of the PharmaNet and hospital drug profiles, 11 (27%) of the 41 patients had received medications that had a potential for a significant drug–drug interaction with cimetidine. The drugs identified were anticoagulants (5/11 [45%] of cases), theophylline (3/11 [27%]), tricyclic antidepressants (2/11 [18%]), and β-blockers (1/11 [9%]). Only 2 of these 11 patients were actually receiving cimetidine before admission; the remainder were taking ranitidine. To our knowledge, no patients were admitted as a result of a drug–drug interaction related to H<sub>2</sub>-receptor antagonist therapy.

None of the admissions were due to an adverse effect related to an H<sub>2</sub>-receptor antagonist. Only 6 preadmission self-reported adverse events could have been attributed to H<sub>2</sub>-receptor antagonists; these included rash, gastrointestinal upset, gynecomastia, and a life-threatening allergic reaction. Of these, one required an additional physician visit.

Eight (20%) of the 41 patients had received a prescription for at least one other H<sub>2</sub>-receptor antagonist (other than the agent they were currently using) immediately before admission. Only 4 (50%) of these patients could recall the name of the new drug. The stated reasons for changes in H<sub>2</sub>-receptor antagonist therapy were side effects (in 3 [38%]), lack of effect (in 2 [25%]), the reference-based pricing policy (in 2 [25%]), and potential drug interactions (in 1 [13%]). When all 41 patients were questioned about their current H<sub>2</sub>-receptor antagonist use, 17 (41%) reported a dosage regimen that matched their PharmaNet profile.

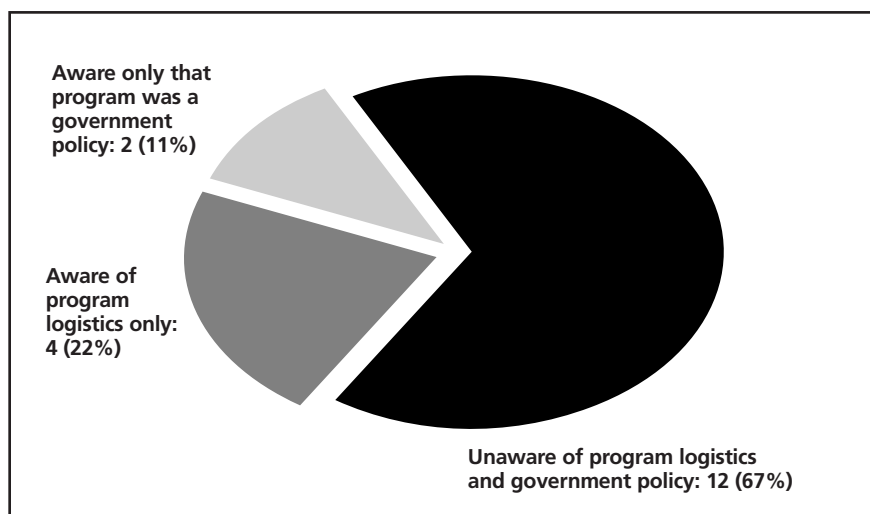
### H<sub>2</sub>-receptor antagonist conversion

Before admission, 13 (32%) of the 41 patients had been receiving cimetidine, whereas the remainder

(28 [68%]) were receiving ranitidine. Of the patients receiving cimetidine before admission, 12 (92%) were initially prescribed cimetidine in hospital, but these prescriptions were subsequently converted to ranitidine. Of these 12 patients, only 5 (42%) appeared to be aware that their H<sub>2</sub>-receptor antagonist had been changed, and 7 (58%) claimed to feel the same or better while taking ranitidine in hospital. After they had been notified of the conversion by the investigator, patients' median satisfaction rating of H<sub>2</sub>-receptor antagonist conversion was 5 (range 1 to 5; maximum score 10). In addition, 7 (58%) stated no preference for a particular H<sub>2</sub>-receptor antagonist. Once discharged, most patients (36/41 [88%]) resumed the H<sub>2</sub>-receptor antagonist used before hospital admission (as verified by PharmaNet).

### Reference-Based Pricing Program

Of the 41 patients who were interviewed, 18 (44%) stated that they were aware of the Reference-Based Pricing Program. Of these, 4 had been receiving cimetidine (31% of all cimetidine recipients) and 14 had been receiving ranitidine (50% of all ranitidine recipients) before admission. Figure 1 illustrates the depth of understanding of the program for these 18 patients. Upon questioning, more than half of the patients were actually unaware of any details regarding the program logistics and were unaware that the program was a government policy. On a 10-point rating scale measuring satisfaction with the Reference-Based Pricing Program (1 = unhappy, 10 = happy), the median score was 5 (range 1 to 10). Of the 4 patients



**Figure 1.** Patients' level of knowledge about the Reference-Based Pricing Program (for a group of 18 patients admitted to the Vancouver General Hospital over a 6-week period who claimed to be aware of the program).



who had been receiving cimetidine before admission and who were aware of the Reference-Based Pricing Program, 3 provided a satisfaction rating (median 4, range 1 to 5). Of the 14 patients who had been receiving ranitidine before admission and who were aware of the program, 11 provided a satisfaction rating (median 5, range 1 to 10).

## DISCUSSION

This study provided us with information regarding patients' problems and perceptions when H<sub>2</sub>-receptor antagonists were converted to hospital formulary alternatives. These data were used to determine the impact of substituting a formulary alternative for an H<sub>2</sub>-receptor antagonist sanctioned by the Reference-Based Pricing Program on patients' self-reported outcomes during their stay in hospital.

To determine if patients had difficulties with their medications being switched from reference agents to formulary alternatives, we conducted patient interviews for those who were receiving an H<sub>2</sub>-receptor antagonist at the time of admission. In our sample, we did not identify any problems with interchanging ranitidine for cimetidine. Generally, patients were not concerned with having their medication converted to a formulary alternative within the same drug category while in hospital. In addition, most of the patients resumed their original H<sub>2</sub>-receptor antagonist after discharge.

Despite the fact that many of the interviewed patients were receiving the reference product at the time of admission, there was a low level of knowledge about reference-based pricing policies. Fewer than half of the patients had any familiarity with reference-based pricing. Furthermore, 15% of the patients confused the Reference-Based Pricing Program with the Low Cost Alternative Program. The latter involves the substitution of lower-cost generic products for higher-cost brand name products.<sup>6</sup> It appears that promotion of this initiative to the public through pamphlets and television commercials has not resulted in a better understanding of the program. Consequently, we believe that health-care professionals should attempt to educate their patients about such programs to ensure optimal medication use.

Some of our findings from the patient interview concur with those reported in the *Seniors Medication Report*.<sup>7</sup> Only 19% of patients interviewed for the *Seniors Medication Report* were familiar with the Reference-Based Pricing Program before the phone interview, but

most of these confused the program with the Low Cost Alternative Program. Even with a description of the policy, only a further 31% claimed any knowledge of the Reference-Based Pricing Program. Interestingly, only 33% of H<sub>2</sub>-receptor antagonist recipients in the *Seniors Medication Report* were receiving the reference-based H<sub>2</sub>-receptor antagonist, which agrees with our findings. In that project, most patients had a positive opinion about the Reference-Based Pricing Program, whereas participants in our study expressed neutrality.

The limitations of our survey include the small sample size. In addition, our sample may not have been a true representation of outpatients receiving H<sub>2</sub>-receptor antagonists, in that most of the interviewed patients had been receiving ranitidine before admission, contrary to the reference-based pricing policy. Because our survey was specific to H<sub>2</sub>-receptor antagonists, we cannot extrapolate our results to all drugs covered by the reference-based pricing policy. Finally, we were unable to locate any previously validated surveys assessing patients' self-reported outcomes after a therapeutic substitution; therefore, we had to design a survey for this purpose. No attempt was made to validate the survey.

In conclusion, over two-thirds of those interviewed were receiving ranitidine at the time of admission to hospital despite the reference-based pricing policy. Of those converted from cimetidine to ranitidine while in hospital, none identified any problems related to the conversion. Once discharged from the hospital, most patients resumed their prior H<sub>2</sub>-receptor antagonist therapy.

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