Morbidity in Pregnant Women Associated with Unverified Penicillin Allergies, Antibiotic Use, and Group B Streptococcus Infections

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ABSTRACT

Context: The morbidity potentially associated with unverified penicillin *allergy* in pregnant women, with and without group B streptococcus (GBS) infections, is unknown. Penicillin allergy testing is safe during pregnancy but is done infrequently.

Objective: To determine morbidity associated with antibiotic use in a large cohort of pregnant women, with and without an unverified history of penicillin allergy, and with and without GBS.

Design: Retrospective. All pregnant women who delivered live infants in Kaiser Permanente Southern California between January 1, 2009, and December 31, 2014, were identified.

Main Outcome Measures: Penicillin allergy status at delivery, delivery method, maternal and infant hospital utilization, peripartum antibiotic exposures, new antibiotic-associated adverse drug reactions, and new *Clostridium difficile* infections.

Results: There were 170,379 unique women who had 201,316 pregnancies during the study period. There were 16,084 pregnancies in women with an active, but unverified, penicillin allergy at delivery. There were 42,524 pregnancies in GBS-positive women, and 3500 also had a penicillin allergy. Women with a penicillin allergy, with or without GBS, had significantly (about 10%) higher cesarean section rates and spent significantly more (about 0.1) days in the hospital after delivery. Among GBS-positive women, those with an unverified penicillin allergy were exposed to significantly more cefazolin, clindamycin, vancomycin, and gentamicin and had significantly higher rates of adverse drug reactions associated with all antibiotic use.

Conclusions: Unverified penicillin allergy is associated with more hospital utilization and additional morbidity. Penicillin allergy testing of pregnant women with a history of penicillin allergy may help reduce these unwanted outcomes.

INTRODUCTION

An unconfirmed history of penicillin allergy is a well-known, major public health problem.[1] The Choosing Wisely initiative of the American Board of Internal Medicine Foundation has recommended that physicians minimize the use of non-β-lactam antibiotics in patients with a history of penicillin allergy, without an appropriate evaluation.[2] Other than in hospitalized patients in general, there are minimal data on predicting which specific patients with a history of penicillin allergy would most benefit from having their allergy confirmed or removed from the chart if incorrectly placed there.[3] Penicillin allergy testing has been shown to be safely performed in pregnant women with Group B streptococcus (GBS) infections but is rarely performed.[4,5] A better understanding of the potential morbidity associated with an unverified history of penicillin allergy may support more widespread adoption of penicillin allergy testing in this population.

Our primary objective was to determine morbidity associated with antibiotic use in a large cohort of pregnant women, with and without an unverified history of penicillin allergy, and with and without GBS.

This article restricts the word "allergy" to mean a clinically significant immunoglobulin E-mediated reaction. The term "*allergy*" will refer to an adverse reaction or intolerance associated with the previous use of a specific medication or medication class as noted in the patient's medical record.

METHODS

This study was reviewed and approved by the Kaiser Permanente Southern California (KPSC) institutional review board. The Southern California Kaiser Foundation Health Plan has always maintained a single comprehensive medical record for each member, and the membership pool has been shown to reflect the socioeconomic diversity of the Southern California general population.[6] Since 2007, the medical record has been completely electronic.

All pregnant women who delivered between January 1, 2009, and December 31, 2014, were identified from the medical records. Those who had a positive culture for GBS before delivery were identified. Those with a history of an active penicillin *allergy* on the day of delivery were identified.

Maternal and infant hospital utilization within 6 months of delivery, method of delivery, antibiotic exposures within 3 days before or after delivery (a 7-day period), new antibiotic allergy reports within 30 days of peripartum antibiotic exposure, and new *Clostridium difficile* infections within 90 days of delivery were the primary outcome variables collected.

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A course of an antibiotic was defined as any systemic exposure, oral or parenteral, to a specific antibacterial antibiotic. "Oral" exposures included delivery by mouth as well as nasogastric tube or other direct route to the stomach. Parenteral exposures included intravenous, intramuscular, subcutaneous, intradermal, intraosseous, intraperitoneal, and intravesicular injections or infusions. Topical exposures were not considered for this analysis. Any exposure to the same antibiotic, by the same route, within 36 hours was considered part of the same course. Reports of new antibiotic *allergy* entered into the electronic health record within 30 days of the antibiotic exposure were identified.

All cases of anaphylaxis coded (International Classification of Diseases, Ninth Revision [ICD-9] 995.0) within 3 days before or after delivery were identified. Chart reviews were then performed to verify that the clinical symptoms that occurred met the current working definition of anaphylaxis and were plausibly associated with use of a specific antibiotic.[7] All cases of serious cutaneous adverse drug reactions coded (ICD-9 Codes 695.14, 695.13, and 695.15) within 30 days of receiving a peripartum antibiotic were identified. Chart review was then performed to verify that the clinical symptoms were compatible with the coded diagnosis and to identify the specific agent most likely associated with the adverse reaction noted.[8]

New *C difficile* infections within 90 days of delivery were identified by either a new report of *C difficile* coded (ICD-9 Code 008.45) or a positive microbiology culture or polymerase chain reaction for *C difficile* within 90 days of delivery.

Hypothesis testing for continuous variables was by means of Student *t*-test and for categorical variables by χ^2. Nominal statistical significance was set at p = 0.05. All statistical analyses were performed using SAS statistical software (SAS Institute Inc, Cary, NC).

RESULTS

Study Cohort

There were 170,379 unique women who had 201,316 pregnancies during the study interval (January 1, 2009, to December 31, 2014) and delivered 204,885 live infants. Among the 14,233 women with an active, but unverified, penicillin *allergy* at delivery, there were 16,084 pregnancies (8.0%).

Group B Streptococcus Status and Penicillin Allergy

There were 39,398 women (23.1%) who had 42,524 pregnancies and whose cultures were positive for GBS. Of these GBS-positive women, 3247 (8.8%; resulting in 3500 pregnancies) also had a penicillin *allergy*. There were 10,988 women (9.0%; 12,584 pregnancies) without GBS with an active penicillin *allergy* at delivery.

Table 1 shows the demographics of all pregnant women, with and without GBS, who delivered live infants. Demographics of all pregnant women who delivered, with and without penicillin allergy, are displayed in Table 2. The demographics of pregnant women who delivered, with GBS, and with and without penicillin allergy, are displayed in Table 3.

Peripartum Antibiotic Exposure

The specific antibiotic exposures within 3 days of delivery and new antibiotic allergies noted within 30 days of the specific antibiotic exposures in pregnant women with GBS, and with and without penicillin allergy, are displayed in Table 4. Cephalosporins were the second most commonly used antibiotic class in women with a history of penicillin

Table 1. Demographics of all pregnant women with and without group B streptococcus (GBS) infection who delivered between 2009 and 2014

Demographic characteristic	GBS positive	GBS negative	p value
Age, years, mean (SD)	29.71 (5.78)	29.59 (5.85)	< 0.0001
Total deliveries[a]	42,524	158,792	
Number of unique women	39,398	138,335	
Active drug-class allergies before delivery, mean (SD)	0.72 (0.64)	0.69 (0.64)	< 0.0001
Number of live births	43,116	161,769	
Cesarean deliveries, no. (%)	11,825 (27.81)	49,452 (31.34)	< 0.0001
Total days in hospital from the date of initial admission for delivery to 6 months after delivery for all women, mean (SD)	3.459(1.88)	3.463 (2.06)	0.7715
Total days in hospital from the date of initial admission for delivery to 6 months after delivery for women with spontaneous vaginal delivery, mean (SD)	3.100 (1.50)[b]	3.152 (1.46)[c]	< 0.0001
Total days in hospital from the date of delivery to 6 months after delivery for the infants, mean (CI)	3.86 (3.79-3.93)	4.42 (4.38-4.47)	< 0.0001
Antibiotic exposure ± 3 days from delivery, no. (%)	41,149 (96.77)	70,294 (44.27)	< 0.0001
Total antibiotic courses	102,248	158,507	< 0.0001[d]
Total new antibiotic allergies within 30 days of peripartum antibiotic exposures, mean (CI)	0.0033 (0.0027-0.0038)	0.0015 (0.00129-0.0017)	< 0.0001
New *Clostridium difficile* infections within 90 days of delivery, no. (%)	20 (0.05)	73 (0.05)	0.9119

[a] A woman may have multiple deliveries during the study interval, and each delivery is counted as an independent event. All descriptive statistics and statistical tests are at delivery level, not patient level.
[b] n = 30,699 women.
[c] n = 109,340 women.
[d] p value for testing whether the mean number of courses of antibiotic is different for those with GBS-positive cultures from those with GBS-negative cultures (among those exposed).
CI = confidence interval; SD = standard deviation.

allergy, after clindamycin, and virtually no penicillin allergy testing or graded cephalosporin challenges were performed before the cephalosporin exposures. The 6th through 10th most commonly used other antibiotics in women with an unverified history of penicillin allergy were metronidazole, nitrofurantoin, sulfamethoxazole, erythromycin, and doxycycline. In women without penicillin allergy, the 6th through 10th most commonly used other antibiotics were metronidazole, nitrofurantoin, erythromycin, sulfamethoxazole, and doxycycline.

Comorbidities

Of the 39,024 GBS-positive women without a history of penicillin allergy,

Table 2. Demographics of all pregnant women with and without a history of penicillin allergy who delivered between 2009 and 2014

Demographic characteristic	History of penicillin allergy	No history of penicillin allergy	p value
Age, years, mean (SD)	30.34 (5.78)	29.55 (5.83)	< 0.0001
Total deliveries[a]	16,084	185,232	
Number of unique women	14,233	163,500	
Active drug-class allergies before delivery, mean (SD)	1.48 (0.85)	0.63 (0.57)	< 0.0001
Number of live births	16,387	188,498	
Cesarean deliveries, no. (%)	5198 (32.32)	56,079 (30.28)	< 0.0001
Total days in hospital from the date of initial admission for delivery to 6 months after delivery for women, mean (SD)	3.55 (1.79)	3.45 (2.04)	< 0.0001
Total days in hospital from the date of initial admission for delivery to 6 months after delivery for women with spontaneous vaginal delivery, mean (SD)	3.17 (1.45)[b]	3.11 (1.50)[c]	< 0.0001
Total days in hospital from the date delivery to 6 months after delivery for the infants, mean (CI)	4.48 (4.33-4.62)	4.29 (4.25-4.33)	
Antibiotic exposure ± 3 days from delivery, no. (%)	9126 (56.74)	102,317 (55.24)	0.0002
Total antibiotic courses	18,755	242,000	< 0.0001[d]
Total new antibiotic allergies within 30 days of peripartum antibiotic exposures, mean (CI)	0.0106 (0.0089-0.0124)	0.0011 (0.0009-0.0013)	
New *Clostridium difficile* infections within 90 days of delivery, no. (%)	7 (0.04)	85 (0.05)	0.8928

[a] A woman may have multiple deliveries during the study interval, and each delivery is counted as an independent event. All descriptive statistics and statistical tests are at delivery level, not patient level.
[b] n = 10,886 women.
[c] n = 129,153 women.
[d] p value for testing whether the mean number of courses of antibiotic is different for those with penicillin allergy from those without penicillin allergy (among those exposed).
CI = confidence interval; SD = standard deviation.

Table 3. Demographics of pregnant women with group B streptococcus infection, with and without a history of penicillin allergy, who delivered between 2009 and 2014

Demographic characteristic	History of penicillin allergy	No history of penicillin allergy	p value
Age, years, mean (SD)	30.28 (5.64)	29.66 (5.79)	< 0.0001
Total deliveries[a]	3500	39,024	
Number of unique women	3245	36,153	
Active drug class allergies before delivery, mean (SD)	1.485 (0.832)	0.647 (0.570)	< 0.0001
Number of live births	3545	39,571	
Cesarean deliveries, no. (%)	1063 (30.37)	10,757 (27.57)	0.0004
Total days in hospital from the date of initial admission for delivery to 6 months after delivery for women, mean (SD)	3.55 (1.51)	3.46 (2.00)	0.002
Total days in hospital from the date of initial admission for delivery to 6 months after delivery for women with spontaneous vaginal delivery, mean (SD)	3.201 (1.14)[b]	3.147 (1.48)[c]	0.0304
Total days in hospital from the date delivery to 6 months after delivery for the infants, mean (CI)	4.05 (3.77-4.33)	3.85 (3.78-3.91)	
Antibiotic exposure ± 3 days from delivery, no. (%)	3392 (96.91)	37,757 (96.75)	0.606
Total antibiotic courses	6726	95,522	< 0.0001[d]
Total new drug-class allergies within 30 days of peripartum antibiotic exposures, mean (CI)	0.0269 (0.0211-0.0326)	0.0011 (0.0008-0.0015)	
New *Clostridium difficile* infections within 90 days of delivery, no. (%)	0 (0.00)	20 (0.05)	0.4037

[a] A woman may have multiple deliveries during the study interval, and each delivery is counted as an independent event. All descriptive statistics and statistical tests are at delivery level, not patient level.
[b] n = 2437 women.
[c] n = 28,267 women.
[d] p value for testing whether the mean number of courses of antibiotic is different for those with penicillin allergy from those without penicillin allergy (among those exposed).
CI = confidence interval; SD = standard deviation.

10,757 (27.57%) underwent a cesarean delivery and spent an average of 3.46 days (standard deviation = 2.00 days) in the hospital within 6 months of their delivery. Within 3 days of their delivery, GBS-positive women without a history of penicillin allergy received the following antibiotics, listed from most common to least common: penicillin, cefazolin, gentamicin, clindamycin, azithromycin, and vancomycin. The GBS-positive women without a history of penicillin allergy reported 15 (0.04%) new penicillin allergies, 19 (0.05%) new cephalosporin allergies, 3 (0.01%) new clindamycin allergies, 3 (0.01%) new vancomycin allergies, 3 (0.01%) new azithromycin allergies, 0 (0%) new gentamicin allergies, and 6 (0.02%) new other antibiotic allergies within 30 days of a peripartum antibiotic exposure. The GBS-positive women without a history of penicillin allergy had 20 (0.05%) new episodes of *C difficile* within 90 days of delivery.

The GBS-positive women with an active, but unverified, penicillin allergy (N = 3500) had a significantly higher (p = 0.0004) rate of cesarean deliveries, 30.37% (n = 1063). They also spent significantly more (p = 0.002) total days—a mean of 3.55 days (standard deviation = 1.51 days) longer—in the hospital within 6 months of their delivery, independent of the method of delivery. Within 3 days of their delivery, GBS-positive women with penicillin allergy received the following antibiotics, listed from most common to least common: clindamycin, cefazolin, azithromycin, vancomycin, and gentamicin. Those GBS-positive women with a history of penicillin allergy within 30 days of a peripartum antibiotic exposure reported higher statistically significant rates of adverse drug reactions with all antibiotics used, including 12 (0.34%) new clindamycin allergies, 10 (0.29%) new cephalosporin allergies, 22 (0.63%) new vancomycin allergies, 1 (0.03%) new azithromycin allergies, 4 (0.11%) new gentamicin allergies, and 3 (0.09%) new other antibiotic allergies. The GBS-positive women with penicillin allergy had no new episodes of *C difficile* within 90 days of delivery, which was not significantly different from those without penicillin allergy.

Table 4. Antibiotics used within 3 days of delivery and new drug-class allergies reported within 30 days of peripartum antibiotic exposures in pregnant women with group B streptococcus infection who delivered between 2009 and 2014

Peripartum antibiotic exposure	History of penicillin allergy (n = 3500)[a]	No history of penicillin allergy (n = 39,024)[a]	p value
Penicillin pregnancies			
Number (%)	130 (3.77)	32,657 (83.68)	< 0.0001[b]
Total courses	262	71,739	< 0.0001[c]
New penicillin allergy, no. (%)	NA	15 (0.04)	—
Clindamycin pregnancies			
Number (%)	2031 (58.03)	1269 (3.25)	< 0.0001[b]
Total courses	2232	1365	0.0365[c]
New clindamycin allergy, no. (%)	12 (0.34)	3 (0.01)	< 0.0001
Cefazolin pregnancies			
Number (%)	1332 (38.06)	10,626 (27.23)	< 0.0001[b]
Total courses	2379	14,504	< 0.0001[c]
Other cephalosporin pregnancies			
Number (%)	27 (0.77)	274 (0.70)	0.6395[b]
Total courses	30	356	0.7661[c]
New cephalosporin allergy, no. (%)	10 (0.29)	19 (0.05)	< 0.0001
Vancomycin pregnancies			
Number (%)	481 (13.74)	61 (0.16)	< 0.0001[b]
Total courses	713	93	0.6879[c]
New vancomycin allergy, no. (%)	22 (0.63)	3 (0.01)	< 0.0001
Gentamicin pregnancies			
Number (%)	371 (10.60)	2339 (5.99)	< 0.0001[b]
Total courses	784	5664	< 0.0001[c]
New gentamicin allergy, no. (%)	4 (0.11)	0 (0)	< 0.0001
Azithromycin pregnancies			
Number (%)	89 (2.54)	665 (1.70)	0.0003[b]
Total courses	128	954	0.0045[c]
New azithromycin allergy, no. (%)	1 (0.03)	2 (0.01)	0.2272
Other pregnancies (no antibiotic exposure)			
Number (%)	51 (1.46)	315 (0.81)	0.0001[b]
Total courses	57	386	0.0095[c]

[a] A woman may have multiple deliveries during the study interval, and each delivery is counted as an independent event. All descriptive statistics and statistical tests are at delivery level, not patient level.
[b] p value for testing whether the percentage exposed to specific antibiotic is different for those with penicillin allergy from those without penicillin allergy.
[c] p value for testing whether the mean number of courses exposed to specific antibiotic is different for those with penicillin allergy from those without penicillin allergy (among those exposed).
NA = not applicable.

Penicillin Exposure in Women with Unverified Penicillin Allergy

During the study interval, 130 women with an active, but unverified, penicillin allergy received 262 courses of penicillin-class antibiotics at delivery without any allergy testing or graded challenge before the exposure. The specific penicillin-class antibiotics administered were as follows: amoxicillin, 2 (0.76%); ampicillin, 91 (34.74%); and penicillin, 169 (64.50%). There were 2 (0.76%) oral and 260 (99.24%) parenteral exposures to penicillin-class antibiotics.

The most commonly listed reasons for overriding the electronic health record warning not to use a penicillin-class antibiotic in a pregnant woman with a penicillin allergy history were "benefits outweigh risks" in 184 cases (47.92%), "not a true allergy" in 86 (22.4%), "previously or currently tolerated" in 47 (12.24%), "low

risk" in 30 (7.81%), "not clinically significant" in 29 (7.55%), "expected side effect" in 6 (1.56%), and "unverified" in 2 (0.52%). The penicillin-class antibiotics were prescribed by the obstetrician-gynecologist in 104 cases (39.69%) or other treating physicians (but not anesthesiologists) in 158 cases (60.31%).

Chart review of the discharge summaries, first postpartum obstetrics and gynecology notes, and any follow-up medical visits 30 days after receiving the antibiotic dose revealed no adverse reactions noted with these penicillin exposures. Only 7 (5.4%) of 130 patients who tolerated a peripartum penicillin exposure had the notation of penicillin allergy removed from their electronic health record during the follow-up period through June 30, 2015.

A total of 260,755 courses of antibiotics were administered to pregnant women during the study interval. There were 77,283 courses of penicillin-class antibiotics (35,895 women; 37,439 pregnancies) given to pregnant women without a history of penicillin allergy in the 3 days before delivery, and 55 (0.15%) resulted in a new penicillin allergy notation before delivery. Only 2 cases (0.0008%; 95% confidence interval = 0 to 1 in 54,644) of possible antibiotic-associated anaphylaxis occurred within 3 days before or after delivery for the entire 201,316 pregnancies. Neither case occurred in GBS-positive women. Both cases were associated with the use of cefazolin during anesthesia induction.

There were 83,953 total exposures to cefazolin, resulting in a possible anaphylaxis rate of 0.0024% (95% confidence interval = 0 to 1 in 17,593). Neither patient had an underlying history of penicillin allergy. One episode was associated with swelling, the sensation of shortness of breath, and a slight elevation in blood pressure, and was not treated with adrenaline. The second episode occurred during a surgical procedure for removal of a retained placenta the day after delivery and was associated with facial swelling and no rash or hypotension, but was treated with adrenaline.

There was only one possible, but unlikely, case of a serious cutaneous adverse drug reaction associated with peripartum antibiotic use, and it was coded as Stevens-Johnson syndrome by one consultant. This diagnosis was given after consultation in the Allergy Department about two weeks after onset of what may have been a contact dermatitis to benzoin on her abdomen, a delayed-onset reaction to cefazolin or cephalexin, or a combination of these events. Five days earlier the patient had been seen in the Obstetrics Department for routine postpartum follow-up and was given a diagnosis of erythema multiforme minor and contact dermatitis. She had been given cefazolin at the time of her cesarean delivery and then given cephalexin four days later, at hospital discharge, for a possible abdominal cellulitis. Contact dermatitis around the surgical site was noted in the hospital discharge summary. No treatment, other than antihistamines, was given for the rashes. No percentage of body surface area affected was noted in the record, and no skin biopsy specimen was obtained. She was seen in the Obstetrics Department again two days after the allergy consultation for management of her slow-to-resolve surgical site cellulitis and was treated with topical antibiotics.

Perinatal Comorbidity

The 39,571 children born to GBS-positive women without a history of penicillin allergy spent a total of 139,738 days in the hospital within 6 months of delivery. The 3545 children born to GBS-positive women with a history of penicillin allergy spent a total of 13,109 days in the hospital within 6 months of delivery. The difference of +0.2 hospital days per infant born to a mother with penicillin allergy did not reach statistical significance (p = 0.1028).

Only 7 pregnant women with GBS had penicillin allergy testing before delivery in the KPSC Health Plan between January 1, 2009, and December 31, 2014, and 3 (42.86%) of the women were in the San Diego Service Area. Results for all 7 women were negative.

DISCUSSION

True penicillin allergy occurs much less frequently than the rate at which this allergy is placed in the patient chart.[3,9,10] Patients who are labeled as penicillin-allergic receive alternate, often broad-spectrum, antibiotics, which may lead to substantial morbidity and increased health care utilization. It is notable in the current study that none of the 130 women listed with active unverified penicillin allergy who received penicillin had an adverse reaction. We found that an unverified history of penicillin allergy was associated with a higher cesarean delivery rate in all pregnant women, even those without GBS. The antibiotic utilization seen in our cohort closely matches that reported in a recent survey of American obstetricians,[11] and 13.7% of our penicillin-allergic group received vancomycin, which has the potential for several adverse effects. This type of poor adherence to national guidelines was found in another recent study as well; more than 50% of women with a penicillin allergy without anaphylaxis received an antibiotic other than penicillin or cefazolin.[12,13] We found that significantly more new adverse drug reactions occur with all alternative antibiotics used in GBS-positive women with an unverified penicillin allergy (see Table 3). Fortunately, there was no significant difference in the *C difficile* incidence in any of the subgroups. This is probably related to the very low overall use of third-generation and higher-generation cephalosporins in this population. Currently, cephalosporins are widely, safely, and appropriately used in pregnant women with an active, but unverified, penicillin allergy without any specific testing or challenge procedures.[14,15]

A recent study showed no increased risk of penicillin allergy in fetuses exposed during the intrapartum period.[16] However, penicillin allergy testing is rarely performed in pregnant women, even in a health care system with no specific financial barrier to its performance. The cost of this test is approximately $145 per test. There have been several previous suggestions commenting on the economic utility of performing wide-scale allergy testing in patients with unverified penicillin allergy.[3,17,18]

Given the increase in morbidities and health care costs associated with unverified penicillin allergy, it seems quite reasonable to propose that any hospitalized patient with a clinical history of penicillin allergy should undergo allergy testing. In our case, penicillin allergy testing of all pregnant women with an unverified penicillin allergy and GBS would cost less than the 0.09 additional hospital days that these women, on average, currently utilize, which translates to a cost of at least $200

per occurrence. Although the cesarean delivery rate is increased in pregnant women with an active history of penicillin allergy, the increase in hospital days is independent of cesarean delivery compared with vaginal delivery (see Tables 2 and 3). This information, along with the known fact that penicillin allergy testing performed in pregnancy is safe and effective,[4,5] argues for a systemwide adaptation of penicillin testing for unverified allergy in this population. It is quite clear that any woman who would be eligible to receive a safer, equally effective medication in the penicillin class should be receiving this drug.

CONCLUSIONS

An unverified penicillin allergy is associated with greater hospital utilization and additional morbidity. Penicillin allergy testing of pregnant women with a history of penicillin allergy may help reduce these unwanted outcomes. Any patient who does not have a true drug allergy should have the allergy listing removed from her chart. ❖

Disclosure Statement

The author(s) have no conflicts of interest to disclose.

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Health

The art of medicine is valuable to us because it is conducive to health, not because of its scientific interest.

— Marcus Tillius Cicero, 106 BC – 43 BC, Roman philosopher, politician, lawyer, orator, political theorist, consul, and constitutionalist