Published in final edited form as:

Lupus. 2015 February ; 24(2): 203–209. doi:10.1177/0961203314552832.

Application and Feasibility of Systemic Lupus Erythematosus Reproductive Health Care Quality Indicators at a Public Urban Rheumatology Clinic

Itziar Quinzanos^{1,2,3}, Lisa Davis^{1,3}, Angela Keniston³, Alyssa Nash⁴, Jinoos Yazdany⁵, Rebecca Fransen⁶, Joel M. Hirsh^{1,3}, and JoAnn Zell^{1,3,7}

¹Division of Rheumatology, Department of Medicine, University of Colorado School of Medicine, Denver, Colorado

²Division of Rheumatology, Department of Medicine, Denver Veterans Affairs Medical Center, Denver, Colorado

³Division of Rheumatology, Department of Medicine, Denver Health Medical Center, Denver, Colorado

⁴Division of General Internal Medicine, Department of Medicine, University of Colorado School of Medicine, Denver, Colorado

⁵Division of Rheumatology, Department of Medicine, University of California, San Francisco, California

⁶Exempla Saint Joseph Hospital, Denver, Colorado

⁷Division of Rheumatology, Department of Medicine, National Jewish Health, Denver, Colorado

Abstract

Objective—Quality indicators (QIs) are evidence-based processes of care designed to represent the current standard of care. Reproductive health QIs for the care of patients with systemic lupus erythematosus (SLE) have recently been developed, and examine areas such as pregnancy screening for autoantibodies, treatment of pregnancy associated antiphospholipid syndrome, and contraceptive counseling. This study was designed to investigate our performance on these QIs

Corresponding Author and Requests for Reprints: Itziar Quinzanos, M.D., Denver Veterans Affairs Medical Center, Department of Medicine, 1055 Clermont St, Research (A151), Denver, Colorado 80220, Tel: (720) 857-5102, Fax: (720)857-5992, itziar.quinzanos@ucdenver.edu.

I Quinzanos MD, Research Fellow, Department of Internal Medicine, Rheumatology, Denver Health and University of Colorado School of Medicine, Denver, CO, Denver Veterans Affairs Medical Center, Denver, CO, Denver, Colorado

L Davis MD, MSCS, Assistant Professor of Medicine, Denver Health and University of Colorado School of Medicine, Denver, CO, Denver, Colorado

A Keniston, MSPH, Denver Health, Denver, CO, Denver, Colorado

A Nash, M.D., Intern, Department of Internal Medicine, General Medicine, Denver Health and University of Colorado School of Medicine, Denver, CO, Denver, Colorado

J Yazdany, M.D., Assistant Professor of Medicine, University of California, San Francisco, CA, San Francisco, California

R Fransen, Resident, Exempla Saint Joseph Hospital, Denver, CO, Denver Health and University of Colorado School of Medicine, Denver, CO, Denver, Colorado

JM Hirsh, M.D., Assistant Professor of Medicine, Denver Health and University of Colorado School of Medicine, Denver, CO, Denver, Colorado

J Zell, M.D., Assistant Professor of Medicine, Denver Health and University of Colorado School of Medicine, Denver, CO, National Jewish Health, Denver CO, Denver, Colorado

and to explore potential gaps in care and demographic predictors of adherence to the QIs in a safety net hospital.

METHODS—We performed a retrospective record review of patients with a diagnosis of SLE at Denver Health Medical Center (DH) through an electronic query of existing medical records and via chart review. Data was limited to female patients between the ages of 18–50 who were seen between July 2006 and August 2011.

RESULTS—One hundred and thirty-seven female patients between the ages of 18–50 were identified by ICD-9 code and confirmed by chart review to have SLE. Of these, 122 patients met the updated 1997 American College of Rheumatology SLE criteria and had an intact reproductive system. Only 15 pregnancies were documented during this 5-year period and adherence to autoantibody screening was 100 percent. We did not have any patients who were pregnant and met criteria for pregnancy associated antiphospholipid syndrome. Sixty-five patients (53%) received potentially teratogenic medications and 30 (46%) had documented discussions about these medications' potential risk upon their initiation. Predictors of whether patients received appropriate counseling included younger age (OR 0.93, CI 0.87-0.98) and those who did not describe English as their primary language (OR 0.29, CI 0.09-0.96). These remained statistically significant in multivariate analysis.

CONCLUSIONS—We were able to detect an important gap in care regarding teratogenic medication education to SLE patients of childbearing potential in our public health academic clinic as only 1 in 2 eligible patients had documented appropriate counseling at the initiation of a teratogenic medication.

Key Indexing Terms

Systemic Lupus Erythematosus; Quality Indicators Health Care; Reproductive Health; Teratogens; Contraception

Background

Quality indicators (QIs) are rigorously constructed, evidence- and experience-based measures thought to represent the current standard of care. In an effort to analyze and improve the quality of health care delivery, QIs have been developed in many areas of rheumatologic practice such as gout, osteoarthritis and rheumatoid arthritis.[1] Recently, QIs have been developed for systemic lupus erythematosus (SLE) and address such areas as drug monitoring, laboratory screening and reproductive health.[2] Even though SLE has a lower prevalence than other chronic rheumatologic conditions (i.e. rheumatoid arthritis) in the general population, its morbidity burden is significant.[3] Diagnosis of SLE is frequently made in young adults, predominantly women, during the reproductive years.[3] Due to the onset and frequency of SLE in women of reproductive age, it is paramount to analyze the issues surrounding reproductive health in clinical practice. As part of a larger project, three reproductive health QIs for SLE have been developed (see Table 1).[4] These three QIs explore critical areas that need to be monitored for successful reproductive outcomes. These QIs recommend testing for specific antibodies in women who are anticipating pregnancy (QI1), treatment of pregnancy associated antiphospholipid antibody syndrome (pregnancy-APS) with heparin and aspirin (QI2), and counseling of women with reproductive potential

who are prescribed a teratogenic medication (QI3). To date, no evaluation of these QIs' application to a real-life setting have been conducted.

In this study, we for the first time systematically applied the SLE reproductive health quality indicators to a safety-net health system, using a combined approach for data capture from electronic health records as well as chart review. Our primary goal was to examine adherence to SLE QIs, feasibility of performing these measures, and sociodemographic predictors of higher adherence to the QIs.

Methods

Study Population

Denver Health, and its associated 20 community clinics, is an urban academic safety-net hospital system with 400,000 annual outpatient visits and 26,000 annual inpatient visits. We first identified individuals with SLE who were seen in the DH system between July 2006 and August 2011 via International Classification of Diseases, Ninth revision, Clinical Modification (ICD-9-CM) code 710.0 as identified from the integrated electronic health record. This population was then limited to female patients between the ages of 18–50, and chart reviews were performed (by AN and RF) to confirm that individuals met the American College of Rheumatology (ACR) criteria for SLE[5] and to evaluate if the patient was able to conceive (not post-menopausal, not status post-tubal ligation, or not status post hysterectomy). 156 chart abstractions were performed, several subjects were excluded for failing to meet SLE classification criteria, and one was excluded due to incarceration.

Variables

Outcome Variables—QI1 (evaluation of pregnancy-linked SLE screenings) laboratory variables included antiphospholipid antibody testing (anticardiolipin antibody IgG and IgM, B2 glycoprotein antibody IgG and IgM, Dilute Russell's viper venom time and lupus anticoagulant confirmatory testing), and SSA and SSB antibodies. Charts of the 15 pregnant patients were reviewed for completion of this QI. For QI2 (evaluation of appropriate pregnancy-APS treatment), we performed a manual chart review to identify pregnant patients who met criteria for pregnancy APS and to evaluate for appropriate treatment algorithms (heparin and aspirin). Finally for QI3 (counseling women of childbearing ability regarding the teratogenic potential of medications), we performed a manual chart review and recorded whether providers documented counseling of the teratogenic potential in the rheumatology visit that the medication was initiated. Rheumatologic medications that we considered to require counseling regarding risk included: methotrexate; azathioprine; leflunomide; mycophenolate mofetil; cyclosporine; cyclophosphamide; and thalidomide. We did not include hydroxychloroquine as this medication is thought to be relatively safe in pregnancy.[6] As a measure of feasibility, we recorded the time spent extracting each of the QIs.

Socio-demographic variables—Socio-demographic data was collected from the Denver Health Data Warehouse, a repository of data compiled from Denver Health's electronic health record. The query included age, gender, race/ethnicity, primary language,

use of interpreter services, primary source of payment, income level (below the federal poverty level, yes/no), C3 and C4 complement levels and history of pregnancy discharge diagnoses after index encounter during study period. We included C3 and C4 complement levels (mg/dL) as surrogates for disease activity.

Statistical Analyses—We calculated performance on each SLE QI measure, defined as the proportion of eligible patients receiving recommended care. For QI3, chi-square testing was used to seek unadjusted differences in the proportion of patients prescribed teratogenic medications who received teratogenic risk and/or contraceptive counseling and patient demographics and Student's t-test was used to evaluate unadjusted differences associated with patient age and the average C3 and C4 values during the study period. We then performed an unadjusted logistic regression to determine the contribution of each clinical characteristic to the likelihood of counseling for teratogenicity of a new DMARD prescription and secondly we performed a multivariate backward stepwise logistic regression to evaluate predictors of counseling for teratogenicity. Variables were retained that had a p-value ≤ 0.10 in the final model. Variables considered to be significant had a p-value of ≤ 0.05 . All analyses were using SAS Enterprise Guide 4.3 (SAS Institute, Inc., Cary, North Carolina) and STATA software, version 11 (StataCorp, College Station, TX).

Results

One hundred thirty seven female patients with SLE between 18–50 years of age were identified for evaluation of QI measures. Of this cohort, 15 patients were postmenopausal, status post tubal ligation or had received a hysterectomy, leaving 122 female patients who were eligible for analysis. Patient demographics and baseline characteristics appear in Table 2. The subjects were predominantly Hispanic (61/122 patients, 50%), endorsed English as their primary language (101/122, 83%), and were impoverished (defined as at or below 100% federal poverty level).

Fifteen pregnancies were documented during this 5-year period. Performance on the QI1 regarding antibody testing was 100%. We were unable to assess QI2, as no pregnant patients in our chart review met criteria for pregnancy-APS. For QI3 approximately one-half of the patients (65/122 patients, 53%) received potentially teratogenic medications. Of the 65 patients who received potentially teratogenic medications, only 30 patients (46%) had documented discussions at the time of the medication's initiation about the potential teratogenic risks. The only significant difference between those with and without documented counseling for teratogenic medications include age (average age 29 vs. 35 years, respectively, p-value 0.0073) (Table 2).

In our unadjusted logistic regression (Table 3) the only statistically significant variables that predicted the documentation of appropriate counseling were age and English as the patient's primary language. Both of these variables were inversely related to documentation of appropriate counseling. That is, increasing age had a lower odds ratio (OR) of receiving counseling (OR 0.93, 95% confidence interval [CI] 0.87-0.98) and English-speakers had a lower OR of appropriate counseling (OR 0.29, 95% CI 0.09-0.96). These relationships remained statistically significant in the multivariate analysis that controlled for the effect of

other demographic characteristics (p-value 0.009 95% CI 0.86-0.98 for age and p-value 0.030, 95% CI 0.07-0.87 for English).

The chart review time for extraction of all 3 measures was 46 hours.

Discussion

In our study, we systematically applied the reproductive SLE health quality indicators to an academic safety-net health system using electronic data capture as well as chart review and we were able to quantify the time burden required to extract this information using currently available data streams. As a result, we detected an important gap in care in our system regarding the documented education of childbearing lupus patients about the potential teratogenic risk of immunosuppressive medications.

Only half of the patients in our study received counseling. This has been documented in previous studies. In 2007 Schwartz et al., found that many women of childbearing potential who filled class D or X medications had no contraceptive method dispensed, had not been sterilized, and had no documentation of contraceptive counseling in the 2 years prior.[7] Similarly, Andrade et al studied eight health managed organization populations and found that 6% of pregnant women had received U.S. FDA category D or X drugs during the 270 days before delivery.[8] In other studies of European populations using the U.S. Food and Drug Administration and other medication risk classifications systems suggest an even higher use of potentially harmful drugs during pregnancy— approximately 20% to 60%.[9, 10]

Potential barriers to adherence to these QIs include poor documentation, lack of time, or perhaps a focus on lupus activity which can be organ threatening. Implementation of a checklist in the electronic medical record when a new medication with teratogenic potential is prescribed to a woman of childbearing age could be a potential solution. In fact, clinical decision support has been proposed recently as a way to alert clinicians to the need for teratogenic risk counseling. It has had modest but encouraging results, and further modification and evaluation of such support systems remain needed.[11] Involving pharmacists in efforts to alert women about medication risks may also be beneficial.

Interestingly, non-English as the patient's primary language predicted the documentation of counseling with the use of a new teratogenic medication. Perhaps providers may have assumed that primary English speakers possess greater familiarity with the teratogenic effects of DMARDs, or that the presence of an interpreter added either formality or additional time to the visit which encouraged counseling and or documentation of counseling. Further studies are needed to unravel the underlying reasons for this association.

Younger patients were also more likely to receive counseling, which is not surprising, and has been documented in other studies.[7] However this identifies a gap in quality, as older patients of childbearing potential need to take precautions as well, to prevent conception after teratogenic exposures.

Quality improvement measures have been shown to do what their name implies in other rheumatologic diseases[12]--they help healthcare providers to identify gaps in the care, and to study possible barriers to their completion. In some cases there is a need to modify the QI because its lack of utility or validity, but in many other scenarios we need to optimize its measurements.

Electronic specification of these measures may reduce the collection burden. Compilation of data using structured fields in the electronic health record will increase the likelihood of these data being useful. Manual chart review may not be feasible for practices with limited resources or for the purposes of rapid cycle quality improvement. Instead, future studies should focus on minimally burdensome electronic data capture with real-time clinical decision support and performance feedback. There has been some success in this area with the use of disease registries. Examples of this include the American College of Cardiology and the American Thoracic Society that have conducted research and implemented impressive quality improvement programs throughout their registries. The American College of Rheumatology has also created the Rheumatology Clinical Registry to facilitate quality reporting for practicing rheumatologists in areas like rheumatoid arthritis QI measures. These can certainly serve as a useful model for the field moving forward in SLE. [13]

Limitations of this study include its retrospective nature. Additionally, for QI1 and QI2, we documented only fifteen pregnancies during the five-year time period and thus it is difficult to generalize regarding adherence to QI1 and/or QI2. Extraction of the QIs from the medical record was technically feasible but tedious. For QI3, the lack of documentation does not necessarily indicate that counseling did not occur.

Strengths of this study include comparatively large sample size (SLE is an uncommon disease and the typical rheumatologist's practice has only has a handful of these patients); access to a disadvantaged socio-demographic population, and medical chart review which remains the gold standard for evaluating performance on QIs.

In summary, our study applied recently developed reproductive quality indicators to a large, culturally diverse, medical center to determine adherence and the feasibility of QI application. We found that over 1 in 2 patients did not receive documented contraceptive counseling when placed on teratogenic medications, and that older and English-speaking SLE patients were less likely to receive contraceptive counseling. The systematic application of QIs in our system has identified a gap in quality. Future studies should focus on interventions that improve quality in this area while minimizing data collection burden for the practice.

Acknowledgments

Sources of Support: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Reference List

1. MacLean CH, Saag KG, Solomon DH, Morton SC, Sampsel S, Klippel JH. Measuring quality in arthritis care: methods for developing the Arthritis Foundation's quality indicator set. *Arthritis Rheum.* 2004 Apr 15; 51(2):193–202. [PubMed: 15077259]
2. Yazdany J, Panopalis P, Gillis JZ, Schmajuk G, MacLean CH, Wofsy D, et al. A quality indicator set for systemic lupus erythematosus. *Arthritis Rheum.* 2009 Mar 15; 61(3):370–377. [PubMed: 19248127]
3. Fessel WJ. Epidemiology of systemic lupus erythematosus. *Rheum Dis Clin North Am.* 1988 Apr; 14(1):15–23. [PubMed: 3041487]
4. Gillis JZ, Panopalis P, Schmajuk G, Ramsey-Goldman R, Yazdany J. Systematic review of the literature informing the systemic lupus erythematosus indicators project: reproductive health care quality indicators. *Arthritis Care Res (Hoboken).* 2011 Jan; 63(1):17–30. [PubMed: 20734353]
5. Hochberg MC. Updating the American College of Rheumatology revised criteria for the classification of systemic lupus erythematosus. *Arthritis Rheum.* 1997 Sep; 40(9):1725. [PubMed: 9324032]
6. Gleicher N, Elkayam U. Preventing congenital neonatal heart block in offspring of mothers with anti-SSA/Ro and SSB/La antibodies: a review of published literature and registered clinical trials. *Autoimmun Rev.* 2013 Sep; 12(11):1039–1045. [PubMed: 23684701]
7. Schwarz EB, Longo LS, Zhao X, Stone RA, Cunningham F, Good CB. Provision of potentially teratogenic medications to female veterans of childbearing age. *Med Care.* 2010 Sep; 48(9):834–842. [PubMed: 20706159]
8. Andrade SE, Raebel MA, Morse AN, Davis RL, Chan KA, Finkelstein JA, et al. Use of prescription medications with a potential for fetal harm among pregnant women. *Pharmacoepidemiol Drug Saf.* 2006 Aug; 15(8):546–554. [PubMed: 16586470]
9. Lacroix I, Damase-Michel C, Lapeyre-Mestre M, Montastruc JL. Prescription of drugs during pregnancy in France. *Lancet.* 2000 Nov 18; 356(9243):1735–1736. [PubMed: 11095263]
10. Schirm E, Meijer WM, Tobi H, de Jong-van den Berg LT. Drug use by pregnant women and comparable non-pregnant women in The Netherlands with reference to the Australian classification system. *Eur J Obstet Gynecol Reprod Biol.* 2004 Jun 15; 114(2):182–188. [PubMed: 15140513]
11. Schwarz EB, Parisi SM, Handler SM, Koren G, Cohen ED, Shevchik GJ, et al. Clinical decision support to promote safe prescribing to women of reproductive age: a cluster-randomized trial. *J Gen Intern Med.* 2012 Jul; 27(7):831–838. [PubMed: 22297687]
12. Ferucci ED, Donnithorne KJ, Koller KR, Swango-Wilson A, Pflaum J, Lanier AP. Performance on rheumatoid arthritis quality indicators in an Alaska Native healthcare system. *Qual Saf Health Care.* 2010 Oct; 19(5):387–391. [PubMed: 20657010]
13. Desai SP, Yazdany J. Quality measurement and improvement in rheumatology: rheumatoid arthritis as a case study. *Arthritis Rheum.* 2011 Dec; 63(12):3649–3660. [PubMed: 22127687]
14. Cimaz R, Spence DL, Hornberger L, Silverman ED. Incidence and spectrum of neonatal lupus erythematosus: a prospective study of infants born to mothers with anti-Ro autoantibodies. *J Pediatr.* 2003 Jun; 142(6):678–683. [PubMed: 12838197]
15. Empson M, Lassere M, Craig J, Scott J. Prevention of recurrent miscarriage for women with antiphospholipid antibody or lupus anticoagulant. *Cochrane Database Syst Rev.* 2005 Apr 18. (2):CD002859. [PubMed: 15846641]

Table 1

Summary of the Reproductive Health Care Quality Indicators.

	Description
QI1	<p>Two part screening task for pregnant women or women contemplating pregnancy:</p> <p>1 Testing for SSA and SSB antibodies prior to pregnancy, and documenting in the chart within the first trimester.</p> <p>Reasoning: Obstetric guidelines^a identify seropositive patients to have increased risk of giving birth to children with congenital heart block and/or neonatal lupus syndrome.[6,14]</p> <p>Evidence: There is no documented evidence that these tests improve outcomes, but experts have underlined their importance in determining appropriate steps to monitor the pregnancy.</p> <p>2 Documentation of antiphospholipid antibodies (aPL) within 4 weeks of pregnancy, to reflect tests conducted in the 6 months prior.</p> <p>Reasoning and evidence: Several guidelines^b describe pregnancies with aPL as being linked to poorer outcomes, although it is difficult to discern whether these are due to SLE or aPL positivity.</p>
QI2	<p>Focuses on the appropriate treatment of pregnancy associated primary anti-phospholipid antibody syndrome (PAPS).</p> <p>Reasoning: For patients with a history of confirmed PAPS, the risk of poor obstetric results is significant.</p> <p>Evidence: A recent Cochrane review found that unfractionated heparin plus aspirin (ASA) was superior to ASA alone (relative risk [RR] 0.46, 95% confidence interval [95% CI] 0.29-0.71).[15] And current obstetric guidelines suggest that prophylaxis with either low molecular weight heparin or unfractionated heparin and low-dose ASA, increased the live birth rate.^c</p>
QI3	<p>Highlights the need for counseling regarding risk and contraception in women taking potentially teratogenic disease modifying antirheumatic drugs. Documentation of counseling should be in the medical chart.</p> <p>Reasoning and evidence: Data regarding counseling of SLE patients on the teratogenic potential of medications is lacking. However, in the general population fewer than 20% of women receiving teratogenic drugs are given appropriate counseling and approximately 6% of pregnancies in the US are exposed to potentially teratogenic class D or X medications[7], suggesting deficits in the quality of care.</p>

^a ACR Guidelines for referral and management of systemic lupus erythematosus in adults. Arthritis Rheum 1999

^b Royal College of Obstetricians and Gynaecologists (RCOG). The investigation and treatment of couples with recurrent miscarriage. London (UK): Royal College of Obstetricians and Gynaecologists; 2003; American College of Obstetricians and Gynecologists. Antiphospholipid syndrome guidelines. 2005; EULAR recommendations for the management of systemic lupus erythematosus: report of a Task Force of the EULAR Standing Committee for International Clinical Studies Including Therapeutics. Ann Rheum Dis 2008; Finnish Medical Society. Evidence based guidelines for systemic disease in pregnancy. 2006.

^c Royal College of Obstetricians and Gynaecologists (RCOG). The investigation and treatment of couples with recurrent miscarriage. London (UK): Royal College of Obstetricians and Gynaecologists; 2003; American College of Obstetricians and Gynecologists. Antiphospholipid syndrome guidelines. 2005.

Demographic characteristics of 122 women with SLE of reproductive capacity ^a receiving care in a safety net hospital.

Table 2

	Premenopausal patients N = 122 (%)	Patients with Teratogenic Medications Prescribed (N = 65)		P
		Counseling not given	Counseling given	Total
Age, years (mean ± SD)	34 ± 10	35 ± 10	29 ± 8	33 ± 9
				0.007
	<i>White</i>	24(20)	4(50)	8(33)
	<i>Black</i>	28 (23)	8 (67)	12 (43)
	<i>Hispanic</i>	61 (50)	21 (55)	38 (62)
	<i>Other</i>	9 (7)	2 (29)	7 (78)
				0.473
	<i>English</i>	101 (83)	30 (61)	19 (39)
	<i>Spanish</i>	18 (15)	5 (36)	9 (64)
	<i>Other</i>	3 (2)	0 (0)	2 (100)
				2 (67)
				0.065
	<i>Interpreter</i>	14 (11)	2 (20)	8 (80)
	<i>Language Line</i>	1 (1)	0 (0)	1 (100)
	<i>Other (family member, clinic staff etc.)</i>	3 (2)	1 (50)	1 (50)
	<i>Not Documented</i>	3(2)	2(67)	1(33)
				3(100)
	<i>0–100%</i>	65 (53)	19 (59)	13 (41)
	<i>101–150%</i>	12 (10)	4 (80)	1 (20)
	<i>151–200%</i>	7 (6)	1 (33)	2 (67)
	<i>>200%</i>	4 (3)	2 (100)	0 (0)
	<i>Unknown</i>	34(28)	9 (39)	14(61)
				23 (68)
	<i>100–240mg/dL</i>	99.7±31.7	103.3±34.6	88.8±30.3
	<i>15–70 mg/dL</i>	15.9 ± 7.2	14.3 ± 7.3	15.7 ± 8.2
				14.9 ± 7.7
				0.560
Average C3 (mean±SD)				96.8±33.2
Average C4 (mean ± SD)				0.132

^a Premenopausal patients with an intact uterus/ovaries and without history of bilateral tubal ligation or patients for whom reproductive status was not documented

Table 3

Odds of receiving counseling regarding the potentially teratogenic effect of disease modifying antirheumatic drugs

	Univariate Analysis			Final Multivariate Analysis			
	Odds Ratio	[95% Conf. Interval]	P	Odds Ratio	[95% Conf. Interval]	P	P
Age	0.926	0.873	0.983	0.011	0.919	0.863	0.009
English	0.287	0.086	0.958	0.043	0.241	0.066	0.030
Lowest C3	1.026	0.948	1.110	0.514			
Lowest C4	0.987	0.970	1.005	0.182			
Caucasian	1.192	0.271	5.241	0.816			
Impoverished ^a	1.140	0.231	5.624	0.872			

C3 = complement C3

C3 = complement C3

^aImpoverished is defined as "at or below the 100% federal poverty level"