Culture Matters: The Pivotal Role of Culture for Women's Careers in Academic Medicine

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Abstract

Purpose

Women in academic medicine are not achieving the same career advancement as men, and face unique challenges in managing work and family alongside intense work demands. The purpose of this study was to investigate how a supportive department/division culture buffered women from the impact of work demands on work-to-family conflict.

Method

As part of a larger intervention trial, the authors collected baseline survey data from 133 women assistant professors at the University of Pennsylvania Perelman School of Medicine in 2010. Validated measures of work demands, work-to-family conflict, and a department/division culture were employed. Pearson correlations and general linear mixed modeling were used to analyze the data. Authors investigated whether work culture moderated the association between work demands and work-to-family conflict.

Results

Heavy work demands were associated with increased levels of work-to-family conflict. There were significant interactions between work demands, work-to-family conflict, and department/division culture. A culture conducive to women's academic success significantly moderated the effect of work hours on time-based work-to-family conflict and significantly moderated the effect of work overload on strain-based work-to-family conflict. At equivalent levels of work demands, women in more supportive cultures experienced lower levels of work-to-family conflict.

Conclusions

The culture of the department/division plays a crucial role in women's work-to-family conflict and can exacerbate or alleviate the impact of extremely high work demands. This finding leads to important insights about strategies for more effectively supporting the careers of women assistant professors.

Despite many advances, women in academic medicine are not reaching the same levels of career advancement, compensation, and leadership as their male counterparts.[1,2] The problem is not a leaky "pipeline" remedied by increasing the number of women entering medicine.[3] Instead, there are multiple factors in the institutional and broader societal environment that impede the success of women in academic medicine.[3] Scholarship points to the culture of the work environment as one of the critical factors impacting women faculty's experiences both in and out of work.[3–9]

Academic medicine is characterized by intense pressures for clinical and research productivity with the expectation of a major commitment to one's work role, particularly during the first decade of being a faculty member.[3,4] However, compared with their male colleagues, women faculty tend to have greater caregiving responsibilities and perceive their work environment as less supportive for managing the demands of work, family, and personal responsibilities.[10–12] Thus, differential career outcomes for women and men may result (at least in part) from women faculty facing greater challenges in integrating work and nonwork roles.[3] It follows that a very important direction for research and practice is to characterize the role of culture in the work environment and its impact on women faculty's levels of work-to-family conflict.

The purpose of this study is to evaluate the interactive nature of work demands and departmental culture in order to develop a deeper understanding of the critical role of the work environment for women's experiences of work-to-family conflict in academic medicine. This research was conducted as part of a larger study of women assistant professors in an academic school of medicine in which validated measures were assessed of departmental culture (e.g., "culture conducive to women's academic success" [CCWAS]), work demands, and perceived levels of work-to-family conflict.[13] We hypothesized that a supportive departmental culture could buffer the adverse effects of high work demands on women faculty's experiences of work–family conflict.

Method

Context

This analysis was conducted between August 2011 and May 2012 as part of an ongoing cluster-randomized controlled trial funded by the National Institutes of Health. The purpose of the trial is to determine whether a multileveled intervention in a school of medicine improves the career success and job satisfaction of women assistant professors in intervention departments (in comparison with control departments). The data described herein were drawn from the baseline data collection that was administered in 2010 prior to randomization and intervention implementation. Ethical approval for this

project was granted by the University of Pennsylvania institutional review board.

Sample

All units (departments/divisions) from the University of Pennsylvania Perelman School of Medicine with three or more women assistant professors were selected to participate in the trial; 27 units fit this inclusion criterion. Of the 178 eligible women assistant professors from these 27 units, 134 consented to participate in the multiyear intervention trial. These 134 participants received an e-mail with a link to the baseline Web-based survey.

Measures

Work-to-family conflict. Work-to-family conflict is defined as a form of inter-role conflict in which the demands of work and family are "at odds."[14] Meta-analytic evidence indicates that work-to-family conflict is linked to important career and personal outcomes such as turnover, burnout, well-being, and job and family satisfaction.[15,16] We used two subscales from a multidimensional measure of conflict between work and family: time-based work-to-family conflict (WFC) and strain-based WFC scale.[13] Time-based WFC is when the time demands of work (e.g., long hours) interfere with effective participation in the family role, whereas strain-based WFC is when the stress or strain from work has a negative effect on family life. Each subscale was assessed with three items and scored on a five-point scale from 1 (strongly disagree) to 5 (strongly agree). Prior research has indicated that subscales are reliable and valid measures of facets of work-to-family conflict. For this study, the Cronbach alpha reliability of the two subscales were $\alpha = 0.87$ for strain-based WFC and $\alpha = 0.69$ for time-based WFC.

Work hours. Work hours were indicated by an open-ended response to the question "How many hours, per week, do you spend on work-related activities?" If participants provided a range of hours, we used the midpoint of the range. The average number of work hours reported was 59.33 (SD = 9.53; range from 40 to 85).

Work role overload. Three work role overload items were selected from Peterson and colleagues'[17] role overload scale. Each item was rated on a five-point scale from 1 (strongly disagree) to 5 (strongly agree). The Cronbach alpha

reliability for the scale is $\alpha = 0.90$. A sample item is "I feel overburdened by my work responsibilities."

Culture conducive to women's academic success (CCWAS). The CCWAS measure was developed as part of this larger research study. CCWAS is defined as the shared perceptions regarding the extent to which the unit culture is supportive of women's careers. (See Westring and colleagues[18] for an in-depth description of the measure development, reliability, and validity.) Briefly, CCWAS is a higher-order culture factor indicated by four dimensions of culture for women's careers: support for work–life balance, equal access to opportunities, freedom from gender bias, and chair/chief support. The measure consists of 45 items rated on a scale from 1 (strongly disagree) to 5 (strongly agree), with higher scores indicating a more supportive department/division culture. The overall scale had a reliability of $\alpha = 0.95$. Culture scores are aggregated to the department/division level, based on evidence for within-unit agreement and between-unit differences in culture (see Westring and colleagues).[18]

The CCWAS measure focused on the culture of the department except in two cases. For the Departments of Medicine and Pediatrics, the division-level was considered the unit of analysis because the departments were so large (over 300 faculty each compared with an average of 46 faculty in the other departments), and the main governance, rewards, incentives, and expectations of the faculty in those departments are determined at the division level. Our analyses provide empirical support for the equivalence of the measure for both department and division units, and they are therefore treated interchangeably.[18]

Additional outcome measures. Mental health and physical health were each reported with a single item describing health over the past six months from 1 (very poor) to 5 (very good). Intentions to leave the current job were assessed as the average of two items adapted from Jaros[19]: "I frequently think of quitting my job" and "I am planning to search for a new job during the next 12 months." Both items were rated on a five-point scale from 1 (strongly disagree) to 5 (strongly agree). The reliability of the turnover scale was $\alpha = 0.79$.

Statistical analysis

We examined the correlations between key study variables using Pearson correlation coefficients. Because CCWAS was assessed at the unit (department/division) level, we used a general linear mixed model to test significance of associations while adjusting for the clustering within unit using generalized estimating equation methods.[20] This method adjusts for correlation among responses within units, and statistical tests of interest are robust when the choice of correlation is misspecified. We tested whether CCWAS was a significant effect modifier of the association between the main effects of work demands on work-to-family conflict by including interaction terms within regression models. To further examine the patterns of effects of culture on the associations between work demands and work-to-family conflict, we divided the department/division CCWAS scores into triads. Additional tests were conducted to examine significant differences in time-based WFC across triads at 40, 50, 60, and 70 hours of work per week. The results described below were replicated when controlling for number of children and academic track with no significant differences in the findings. Data were analyzed using STATA version 12.1 (STATACorp LP, College Station, Texas).

Results

The sample consisted of 133 out of 134 consenting women assistant professors (99.25%; 74.72% of 178 eligible participants) in 27 departments/divisions at the University of Pennsylvania Perelman School of Medicine. The characteristics of the participants are described in Table 1. Both time-based and strain-based WFC were strongly associated with personal and professional outcomes of interest for women's careers. Women reporting greater levels of time-based WFC had higher intentions of quitting their job ($r = 0.34$, $P < .001$) and reported poorer physical and mental health ($r = -0.34$, $P < .001$; $r = -0.22$, $P < .05$, respectively). Similarly, higher strain-based WFC was also associated with greater turnover intentions ($r = 0.38$, $P < .001$), poorer physical health ($r = -0.38$, $P < .001$), and worse mental health ($r = -0.32$, $P < .001$). These data confirmed the negative effects of work-to-family conflict on personal and professional outcomes.

Table 1

Characteristics of 133 Women Assistant Professors and Effects of Culture on Careers, University of Pennsylvania Perelman School of Medicine, 2010

Characteristic[a]	Measure
Age in years, mean (SD)	40.92 (5.12)
Number of children, no. (%)	
0	19 (14.3)
1	24 (18.0)
2	59 (44.4)
3 or more	18 (13.5)
Marital status, no. (%)	
Single	12 (9.0)
Married or domestic partnership	112 (84.2)
Divorced	4 (3.0)
Race, no. (%)	
White/Caucasian	79 (59.4)
Asian	37 (27.8)
Black/African American	10 (7.5)
Appointment, no. (%)	
Full-time	123 (92.5)
Part-time	6 (4.5)
Track, no. (%)	
Academic clinician	2 (1.5)
Clinician educator	91 (68.4)
Research	21 (15.8)
Tenure	18 (13.5)

[a]Due to missing data, we were not able to report the characteristics of all 133 participants. Percentages were still calculated from the total of 133 participants.

As expected, greater work demands were associated with greater work-to-family conflict. Longer work hours were associated with both more time-based WFC ($r = 0.45$, $P < .01$) and strain-based WFC ($r = 0.19$, $P < .05$). Greater work role overload was also associated with greater time-based and strain-based WFC ($r = 0.50$ and $r = 0.34$, respectively, $P < .01$ for both). Note that time-based and strain-based WFC were correlated ($r = 0.44$) with one another, indicating that the two forms of work-to-family conflict are not independent ($P < .01$). Individual CCWAS scores were correlated with both time-based and strain-based WFC ($r = -0.38$ and $r = -0.27$, respectively; $P < .01$ for both).

We next evaluated whether a supportive culture could buffer women faculty from the negative effects of work demands on experiences of work-to-family conflict. We posited a moderated relationship from *time-based* work demands (i.e., work hours) to *time-based* WFC and from *strain-based* work demands (i.e., work role overload) to *strain-based* WFC. In the first regression model, we found a statistically significant interaction between work hours and CCWAS on the outcome of time-based WFC ($P = .032$; see Table 2). To further illustrate the nature of the interaction, the sample was divided into triads based on department/division CCWAS scores, and the relationship between work hours and time-based WFC was plotted for each triad (see Figure 1).

Triad 1 represents units with the lowest third of CCWAS scores (i.e., the least supportive cultures). Triads 2 and 3 represent the middle and highest third of CCWAS scores, respectively. Women faculty in departments with the most supportive culture scores (CCWAS triad 3) experienced the lowest levels of time-based WFC, and women faculty in the departments with the least supportive cultures (CCWAS triad 1) reported the highest levels of time-based WFC (Figure 2) at each level of hours worked. This pattern was consistent for women faculty working up to 70 hours per week, as seen in Table 3.

Similar analyses were conducted to explore whether there was an interaction between CCWAS and work role overload in the prediction of strain-based WFC (Table 2). Although the initial interaction term in the regression model did not reach statistical significance ($P < .07$), when CCWAS was divided into triads, the interaction term between work role overload and CCWAS scores was significant ($P < .05$). As illustrated in Figure 2, in less supportive work cultures (CCWAS triads 1 and 2), women faculty reported higher levels of strain-based WFC regardless of the level of work role overload. In units with the most supportive cultures (CCWAS triad 3), women faculty experienced lower levels of strain-based WFC for most levels of work overload.

Table 2

Regression Coefficients for Moderator Analyses of Time-Based and Strain-Based Work-to-Family Conflict (WFC), From a Study of 133 Women Assistant Professors and Effects of Culture on Careers, University of Pennsylvania Perelman School of Medicine, 2010

Factor	Unadjusted		Adjusted[a]	
	Regression coefficient (95% CI)	*P* value	Regression coefficient (95% CI)	*P* value
Risk factors associated with time-based WFC				
Culture conducive to women's academic success (CCWAS)	−0.394 (−0.560 to −0.194)	<.001	−0.402 (−0.606 to −0.198)	<.001
Work hours per week (minus 59 hours)	−0.397 (−0.094 to 0.014)	.150	−0.032 (−0.091 to 0.028)	.302
CCWAS × work hours	−0.024 (0.006 to 0.042)	.008	0.021 (0.002 to 0.040)	.032
Constant	4.633 (4.002 to 5.264)	<.001	4.807 (4.170 to 5.443)	<.001
Risk factors associated with strain-based WFC				
CCWAS	−1.341 (−2.432 to −0.249)	.016	−1.347 (−2.462 to 0.232)	.018
Work overload	−0.594 (−1.676 to 0.489)	.288	−0.603 (−1.693 to 0.487)	.278
CCWAS × work overload	0.291 (−0.0248 to 0.606)	.071	0.295 (−0.020 to 0.610)	.066
Constant	6.284 (2.469 to 1.099)	.001	6.26 (2.372 to 1.348)	.002

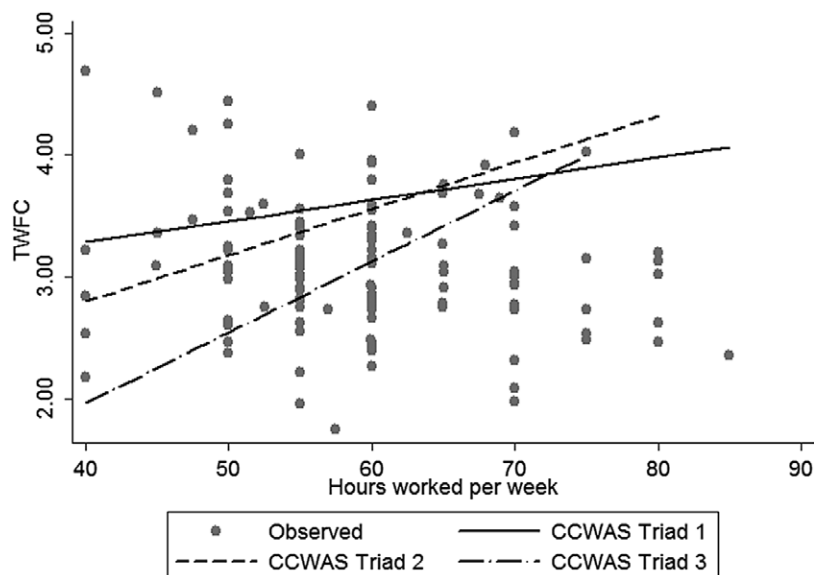[a]Adjusted for track and number of children at home.

Figure 1 Relationship between work hours and time-based work-to-family conflict (TWFC) by culture (in triads). From a study of 133 women assistant professors, University of Pennsylvania Perelman School of Medicine, 2010. CCWAS indicates culture conducive to women's academic success.

Discussion

Our findings provide consistent and strong support for the critical role of the culture of the department/division on women's careers. A supportive work culture appears to buffer women from the negative impact of both work overload and long work hours on levels of work-to-family conflict. Of note, we observed the benefit of a supportive work culture at nearly every level of work overload and work hours. For women working greater than 70 hours per week, there seemed to be a ceiling effect, suggesting that there is a limit

to the beneficial effects of a supportive culture for women who work such long hours. A similar pattern was observed for work overload; the protective effect of a supportive work culture was not observed beyond work overload levels of 4 or greater (on a 5-point scale). The beneficial effects of a supportive culture on work-to-family conflict are particularly important given our findings that increased levels of work-to-family conflict are strongly associated with reports of diminished health and increased intention to quit one's job.

An interesting pattern emerged in the subgroup of departments with the lowest culture scores (CCWAS triad 1). As shown in both Figures 1 and 2, the association between work demands and work-to-family conflict was relatively flat for this triad (i.e., work-to-family conflict was relatively high across all levels of work hours and work role overload). This may indicate that in unsupportive cultures, reducing work demands (e.g., hours worked or the level of work role overload) may not be an effective strategy for reducing work-to-family conflict. In these departments, efforts to more effectively support women must first be directed towards culture change.

There are limitations to this study that deserve mention. As these data were obtained from women assistant professors within a single research-oriented school of medicine, the findings may not be generalizable to other contexts or populations. Another potential limitation is that respondents provided self-report data for study variables at a single point in time. However, CCWAS scores were aggregated to the unit level which reduces concerns about single-source bias.

This research is the first, to our knowledge, to analyze the mitigating effects of a supportive work culture on women's experiences of work-to-family conflict in academic medicine. We also have moved beyond a simplistic understanding of the impact of the work environment on family life and demonstrate that this validated culture measure modifies the deleterious effects of intense work demands. Further, by employing a validated culture measure at the unit level, we were able to determine the effects of the department/division work *environment* on women's experiences, rather than their individual perceptions of their work culture.

Table 3

Significant Differences in Time-Based Work-to-Family Conflict Scores by Culture Triad at Differing Levels of Work Hours, From a Study of 133 Women Assistant Professors and Effects of Culture on Careers, University of Pennsylvania Perelman School of Medicine, 2010

Hours per week	CCWAS triad 1 versus triad 2[a]	CCWAS triad 1 versus triad 3[a]	CCWAS triad 2 versus triad 3[a]
40			
Regression coefficient (95% CI)	0.52 (0.80 to 0.97)	1.34 (0.62 to 2.04)	0.81 (0.04 to 1.58)
P value	.02	<.001	.04
50			
Regression coefficient (95% CI)	0.29 (−0.03 to 0.62)	0.91 (0.46 to 1.36)	0.69 (0.12 to 1.11)
P value	.08	<.001	.001
60			
Regression coefficient (95% CI)	0.083 (−0.20 to 0.36)	0.52 (0.24 to 0.79)	0.44 (0.16 to 0.72)
P value	.58	.001	.002
70			
Regression coefficient (95% CI)	−0.17 (−0.52 to 0.17)	0.04 (−0.27 to 0.36)	0.22 (−0.06 to 0.49)
P value	.33	0.78	.13

Note: CCWAS indicates culture conducive to women's academic success.
[a]Triad 1 represents the least supportive cultures, and triad 3 represents the most supportive cultures (see text for full details).
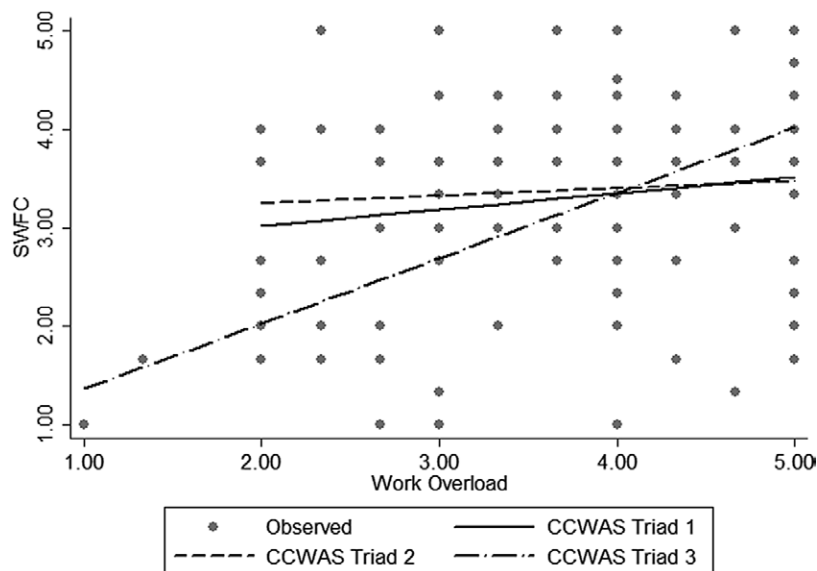
Figure 2 Relationship between work role overload and strain-based work-to-family conflict (SWFC) by culture (in triads). From a study of 133 women assistant professors, University of Pennsylvania Perelman School of Medicine, 2010. CCWAS indicates culture conducive to women's academic success.

As such, our findings present a nuanced approach to understanding the determinants of work-to-family conflict. Both work demands (e.g., total hours worked per week and work overload) and CCWAS had strong associations with work-to-family conflict. However, a supportive work culture buffered women from the negative effects of work demands on their experiences of work-to-family conflict. Indeed, the benefits of a supportive culture were documented for nearly every level of work overload and duration of hours worked. This finding not only highlights the importance of work culture on women's experiences but also may have significant practical implications. Interventions to improve the supportiveness of departmental culture for women faculty may result in major improvements in women's experiences and their careers. The findings reported herein also highlight the importance of, and lay the groundwork for, future research on the role of culture in the experiences of other minority (e.g., ethnic or sexual orientation) faculty members and interventions to support these populations.

Our larger, cluster-randomized controlled trial is currently exploring the impact of a multilevel intervention on the culture for women's career success and academic outcomes (e.g., publications, grants, intention to quit). We look forward to sharing our findings and to offering evidence-based tools and insights concerning effective culture change.

Additional research is necessary to both replicate the findings of this study in other academic medicine settings and explore the comparative effectiveness of interventions that modify work hours, reduce work overload, and/or improve the work culture.

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References

1 Ash AS, Carr PL, Goldstein R, Friedman RH. Compensation and advancement of women in academic medicine: Is there equity? Ann Intern Med. 2004;141:205–212.

2 Nonnemaker L. Women physicians in academic medicine: New insights from cohort studies. N Engl J Med. 2000;342:399–405.

3 Committee on Maximizing the Potential of Women in Academic Science and Engineering; Committee on Science, Engineering, and Public Policy; National Academy of Sciences; National Academy of Engineering; Institute of Medicine. Beyond Biases and Barriers: Fulfilling the Potential of Women in Academic Science and Engineering. Washington, DC: National Academies Press; 2007.

4 Brown AJ, Swinyard W, Ogle J. Women in academic medicine: A report of focus groups and questionnaires, with conjoint analysis. J Womens Health (Larchmt). 2003;12:999–1008.

5 Carr PL, Ash AS, Friedman RH, et al. Faculty perceptions of gender discrimination and sexual harassment in academic medicine. Ann Intern Med. 2000;132:889–896.

6 Levinson W, Tolle SW, Lewis C. Women in academic medicine. Combining career and family. N Engl J Med. 1989;321:1511–1517.

7 McGuire LK, Bergen MR, Polan ML. Career advancement for women faculty in a U.S. school of medicine: Perceived needs. Acad Med. 2004;79:319–325.

8 Shollen SL, Bland CJ, Finstad DA, Taylor AL. Organizational climate and family life: How these factors affect the status of women faculty at one medical school. Acad Med. 2009;84:87–94.

9 Foster SW, McMurray JE, Linzer M, Leavitt JW, Rosenberg M, Carnes M. Results of a gender-climate and work-environment survey at a midwestern academic health center. Acad Med. 2000;75:653–660.

10 Carr PL, Ash AS, Friedman RH, et al. Relation of family responsibilities and gender to the productivity and career satisfaction of medical faculty. Ann Intern Med. 1998;129:532–538.

11 Reed V, Buddeberg-Fischer B. Career obstacles for women in medicine: An overview. Med Educ. 2001;35:139–147.

12 Pololi LH, Civian JT, Brennan RT, Dottolo AL, Krupat E. Experiencing the culture of academic medicine: Gender matters, a national study. J Gen Intern Med. 2013;28:201–207.

13 Carlson DS, Kacmar KM, Williams LJ. Construction and initial validation of a multidimensional measure of work–family conflict. J Vocat Behav. 2000;56:249–276.

14 Greenhaus JH, Beutell NJ. Sources of conflict between work and family roles. Acad Manage Rev. 1985;10:76–88.

15 Amstad FT, Meier LL, Fasel U, Elfering A, Semmer NK. A meta-analysis of work–family conflict and various outcomes with a special emphasis on cross-domain versus matching-domain relations. J Occup Health Psychol. 2011;16:151–169.

16 Ford MT, Heinen BA, Langkamer KL. Work and family satisfaction and conflict: A meta-analysis of cross-domain relations. J Appl Psychol. 2007;92:57–80.

17 Peterson MF, Smith PB, Akande A, et al. Role conflict, ambiguity, and overload: A 21-nation study. Acad Manage J. 1995;38:429–452.

18 Westring AF, Speck RM, Sammel MD, et al. A culture conducive to women's academic success: Development of a measure. Acad Med. 2012;87:1622–1631.

19 Jaros SJ. An assessment of Meyer and Allen's (1991) three-component model of organizational commitment and turnover intentions. J Vocat Behav. 1997;51:319–337.

20 Zeger SL, Liang KY, Albert PS. Models for longitudinal data: A generalized estimating equation approach. Biometrics. 1988;44:1049–1060.