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# Variables associated with the hours worked by Iowa dentists

Adrienne Douglas Jennings  
*University of Iowa*

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VARIABLES ASSOCIATED WITH THE HOURS WORKED BY  
IOWA DENTISTS

by  
Adrienne Douglas Jennings

A thesis submitted in partial fulfillment  
of the requirements for the Master of  
Science degree in Dental Public Health  
in the Graduate College of  
The University of Iowa

December 2011

Thesis Supervisor: Professor Raymond Kuthy

Graduate College  
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CERTIFICATE OF APPROVAL

MASTER'S THESIS

This is to certify that the Master's thesis of

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has been approved by the Examining Committee  
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## CHAPTER I

### INTRODUCTION

Modern dental medicine, which originated at the turn of the 19<sup>th</sup> century, was once a male-dominated profession. During the 19<sup>th</sup> century, women's roles were confined to the home to oversee family and household responsibilities. In 1867, Lucy Hobbs Taylor became the first woman in United States history to earn a dental degree. Since then, women have continued to slowly matriculate into the workforce and specifically into the dental profession. A large influx of women into dentistry was seen in the early 1970's facilitated by the women's liberation and civil rights movements of the 1960's and early 1970's. Another major contributor to women entering the dental profession was the invention of birth control pills, which were first made available in 1960. Birth control pills provided women with the choice to have children if and when they desired. This allowed more freedom for women to matriculate into the workforce.

These developments provided an avenue for women to work outside the home. In 1950, only 33.9 percent of women participated in the employed workforce (representing 29.6% of the labor force), 43.3 percent were employed in 1970 (38.1% of labor force) and over half (51.5% of women) were working by 1980 (42.5% of the labor force) (Johnston and Packer 1988). In 1990, these numbers increased to 57.5 percent of women being in the employed workforce and 45.4 percent of the labor force being women (Johnston and Packer 1988). With the influx of women into the workforce, there was a similar influx of women into dentistry. Thirty years ago, there were only one or two graduates per dental school class. In the 1997-98 academic year, women comprised 37.3 percent of all dental school enrollees (Brown 1999). Women have persevered in their desires for professional careers and have subsequently made careers in the profession of



dentistry.

### Challenges

The importance of the woman's role in the home has not changed. Though women currently comprise nearly 40% of graduating dental students and more than 20% of active dental practitioners, the woman's role as wife and mother is still just as important now as it was in the 19<sup>th</sup> century (Weaver and Valachovic 2004). Today women are at the forefront of dentistry. While women have been fully accepted into the dental profession, this has not dramatically reduced barriers to dental care. Each year over 50 US dental schools graduate an average of 80 students, yet there are many people in the US who cannot access a dentist. Iowa is no different and faces the same challenges with access to care that is problematic throughout the country.

Access to dental care, especially in underserved areas of the population, continues to be a subject of considerable interest. One factor found to be critical in solving the problem with access to dental care is an adequate dental workforce who is able to respond to these needs. Numerous studies and publications have shown that barriers other than finances prevent patients with dental needs from receiving appropriate and timely care (Guay 2004).

With 40% of new graduates being women and a projected 30% of United States' dentists being women by 2020, it is important to ascertain the contributions of women to the dental workforce. There is a considerable amount of research on the impact that the influx of women into dentistry will have on the profession (Adams 2005). With family obligations factored into the equation, women generally work fewer hours annually than their male counterparts (Adams 2005). However, recent research has shown an increase

in the percentage of male dentists who also work part time hours (Adams 2005). Given this decrease in hours by male and female dentists, there is likely to be a further decrease in the public's access to dental care.

### Research

This research describes an intensive study of Iowa dentists to determine annual estimates of the number of hours worked and potential factors that affect the number of hours worked by these dentists. The research determines how extensively the feminization of the profession of dentistry, along with the decrease in hours worked by all dentists, has contributed to the problem concerning limited access to care. The research will take into account how factors outside of work can contribute to a reduction of hours worked by Iowa dentists. Through a survey of Iowa dentists, the research will compare differences in the number of hours worked weekly between and within both genders for those married and unmarried, concerning the following: family obligations, additional sources of income, household contributions and domestic responsibilities. Obtaining this specific information would help policy makers determine how to plan for the future of dentistry.

## CHAPTER II

### INTRODUCTION

While attempting to identify the personal obligations that affect the amount of time Iowa dentists spend in their practices, it is important to look at the background of men and women and their roles in society.

#### Historical Roles of Women

While women are currently a prominent fixture in today's workforce, that was not always the case. In the early twentieth century, the roles of women were largely confined to their responsibilities in the home while men served as the breadwinner. Until World War II, gainfully employed women were always outnumbered by men, primarily married, who worked only within their household (Brownlee 1979). Women were financially dependent upon their husbands for almost everything (Brownlee 1979). Brownlee reports that the "marketplace" interpretation for the low participation rates of married women in the workplace emphasized the decision of families to devote more time to childrearing, not the consumption and conspicuous displays of leisured women. This gave rise to the formation of 'human capital'. The 'human capital' interpretation suggests that fertility (i.e., larger families) declined because twentieth century families decided to raise the average level of investment of parents' time in their children (Brownlee 1979). Efforts were made to produce "higher quality" children, thus calling for an increased parental effort per child (Brownlee 1979). Technological revolution in the household (i.e.: washing machines, wringers, sewing machines, etc.) lightened the household chores thereby reducing the pressure on the housewives' time, easing her need

for the employment of servants and giving more available time for child rearing responsibilities, a task that was the sole responsibility of women (Brownlee 1979).

An additional factor that prevented women from pursuing careers outside the home during the early twentieth century was a relative increase in family income. Rising levels of family income tended to reduce the labor-force participation of married women of middle-class status (Brownlee 1979). These rising incomes allowed families to enhance social status by keeping wives at home to raise children while men continued working to provide for the family (Brownlee 1979). Additionally, discrimination in the workplace increased the attractiveness of domestic work as an alternative to marketplace employment (Brownlee 1979). Even as women sought jobs that would earn more money, they were still drawn to domestic work in lieu of marketplace employment. Despite the increase in wages earned by women, the labor force did nothing to provide optimal levels of employment for women (Brownlee 1979). Early twentieth century women were described as “helpless” and “dependent upon their husbands for almost everything” (Patterson-Black 1976). The lack of options found many women following their husbands because the women felt they had no alternative (Patterson-Black 1976).

Numerous roles for women have been addressed throughout the literature, including the woman as a wife. Duxbury surmised that a woman’s self-concept has traditionally been associated with her performance of parenting and spouse roles (1991). Whereas, England argued that the parental role is the more dominant role the woman pursues (1996). England determined that despite the rapid increase in women entering paid labor force, the traditional gender role of women as “natural” caretakers of the home and family has remained remarkably unaltered.

A woman's gender dueled with her career aspirations often forced the woman to make the choice between motherhood or staying single (Turner 2007). When motherhood was chosen, this implies a lack of commitment to the profession, but if the woman chose to stay single, this was perceived as abnormal (Turner 2007). Historically, the term "woman" was touted as being valued but they are devalued by the lifestyle they are forced to live (Turner 2007).

### Women Working

Women were in the workforce long before professional positions were the norm. For example, women worked as nurses for centuries prior to the influx of women into the workforce. However, the greatest influx of women into the workforce was seen with the Civil Rights Movement of the 1960's and 1970's. Concurrently, federal legislation was passed to fund grants that encouraged women to increase enrollment in professional health programs. This movement empowered women to realize there were more opportunities in various professional fields, including dentistry. Birth control pills, which were made available in 1960, coincided with the Women's Liberation movement (i.e.: abortion rights) and gave women control over child bearing. This was deemed one of the greatest biological and cultural changes in history.

In the early 1900's, it was believed that female-dominated professions (FDP) would be ideal for women since they would not have to contend with power struggles, pay inequality and a lack of compassion due to domestic issues (Turner 2007). Women are not equally represented in all segments of the labor force (Fagenson and Jackson 1993). They dominate in traditionally female occupations (e.g., secretarial, clerical, nursing) (Fagenson and Jackson 1993). Today, female-dominated professions still have

these problems along with low prestige associated with predominantly female professions (i.e.: librarians).

Historically, females were hired as cheap labor. For example, employing one male librarian would cost \$1,000 whereas one woman could be hired for \$500 (Turner 2007). A study conducted at the University of Texas at Austin assessed how men generally had career advancement in these traditionally female dominated professions (nursing, elementary school teaching, librarianship and social work) which allowed them to earn more than their female counterparts due to the “men’s underrepresentation in female-dominated professions” (Williams 1992). When 20 Fortune 500 companies examined career progressions of male and female managers, when all things were equal (similar education, similar levels of family power, and work in similar industries) wage discrepancies between males and females continued to exist (Stroh 1992). While women’s numbers in the management profession are increasing and approaching men’s, women managers have not achieved equity with their male counterparts in terms of their salaries (Fagenson and Jackson 1993). In 1992, women managers earned 66.2 percent of male managers’ compensation (Fagenson and Jackson 1993). In medicine and health, women’s pay progressed to as much as 86.8 percent of male managers’ earnings (Fagenson and Jackson 1993). In some managerial categories the gap in salaries is narrowing and in others it remains quite large (Fagenson and Jackson 1993).

Numerous professions have not been feminized due to the lengthy hours required to be successful in a particular field. One such field is surgery, which is still considered a male-dominated profession. Due to the extensive amount of time spent training along with the extended work hours, family obligations typically see women shying away from this medical specialty. In fact, female surgeons are more likely to miss work for family

obligations, but male surgeons are more likely to miss family obligations for work (Sajatovic 2004).

Since the early 1980's, women have sought full-time employment more often than part-time and do not see their workforce participation as intermittent (England 1996). Sajatovic summarized that 34% of women were in the workforce in 1950 compared with 60% in 1997 (2004). With women comprising 50% of the global population and 51% of US population, it is important to realize what substantial contributions women make to the population and to the workforce (Sajatovic 2004).

### Roles of Men

Men were responsible for living up to the cultural standards of self-made manhood and prove to other men they were truly "manly" (Kimmel 2006). In addition, since the early 1800's, men have been given the burden of proving their manhood to women and earning the role of breadwinner (Kimmel 2006). Men are not only termed as breadwinners, providers and heads of the household, but they are traditionally husbands and fathers as well. Duxbury depicts the traditional family model of husband as breadwinner and wife as homemaker (1991). Men's self esteem and identity have traditionally been linked to their performances of their work role (Pleck 1985, Terborg 1985).

Although men traditionally worked as the sole provider of the home, as women entered the workforce and numerous households became dual income families, men have reduced the number of overall hours worked. Brown et al found that dentists worked an average of 37 to 38 hours per week, but only 31 to 33 hours were spent treating patients (2000). Some of the reasons noted for these decreased working hours were barriers the

patients may have with money or fear of treatment thus reducing the amount of work available to the dentist. In the same study, when confronted with relative issues facing dentistry in the United States, dentists were asked to rank family and personal issues (selected from a list on a Likert-scale). Dentists identified "balancing work and family obligations" as the top issue ("very important") in selection of a career in dentistry (Brown 2000).

Unlike traditional males who were stereotyped as successful based upon their career achievements, men today are viewed as the "ideal man" when they are not only successful as a financial provider but also involved as a father, husband/partner and son (Aumann 2008). The term "male mystique" is used to describe the pressure of the modern male to "do it all in order to have it all" (Aumann 2008). This male mystique is synonymous with what women experienced when they first entered the workforce in record numbers (Aumann 2008). Today, both men and women face the "work-family conflict" (Aumann 2008).

### Household Responsibilities

Male partners of working women do roughly the same amount of housework and parenting as men in "traditional" relationships. In fact, even in heterosexual couples where the woman is employed and the male is unemployed, most domestic responsibilities remain "woman's work" (Duxbury 1991). Jay Ginn surmised that society suggests women should be responsible for domestic responsibilities regardless of employment status. It has even been suggested that women decrease their work hours to allow time for household responsibilities (1997). Women's employment options are thus constrained by their domestic responsibilities.



A study conducted at Kent State University compared the attitudes toward certain domestic chores based upon gender (Kroska 2003). The study examined the factors related to the affective meanings that spouses and cohabitators attached to child care, baby care and 9 domestic/household chores (Kroska 2003). Performing domestic chores and caring for one's kids was deemed an expression of love and affection by women; however, women also described these tasks as unpleasant, burdensome and exuding powerlessness in the marital relationship (Kroska 2003). Men who performed these same chores associated these responsibilities with more positive and powerful adjectives (i.e. interesting, appreciated and sociable) (Kroska 2003). Most studies of housework/chores have assessed traditionally feminine chores, but Kroska's study also looked at chores that were traditionally male in nature (i.e. auto work and yard work) (Kroska 2003). Gender neutral chores (bookkeeping and driving family members) did not typically vary by gender concerning the meaning of the chores (Kroska 2003).

The gender differences noted in housework meaning has been shown by several researchers. Kroska's research noted that women consider domestic work to be a form of family care and devote considerable energy to it (Kroska 2003). A woman's performance of housework is guided by an ethic of care which entails being sensitive to the particular needs of various family members and is often demonstrated through the activities of meal preparation, food shopping, cleaning, washing clothes and child tending (Kroska 2003). For women, feeding their family is a display of love and motherhood that involves considerable, although often unnoticed, time, effort, and energy, an approach much less common among men who do this work (Kroska 2003). The new parents' images of good parenting reflect "gender differentiated models of mothers as ever present nurturers and of fathers as providers and part-time playmates" (Kroska 2003).

A study conducted at the University of California – Riverside showed that between 1989 and 1999, women reduced the amount of housework performed weekly while men increased the amount of housework performed weekly (Coltrane 2000). Although men's housework increased, women still performed twice the housework, weekly, as men (Coltrane 2000). Consistent predictors for the division of household labor entailed the man and woman's employment, earnings, gender ideology and life-course issues (Coltrane 2000). More balanced divisions of housework are associated with women perceiving fairness, experiencing less depression, and enjoying higher marital satisfaction (Coltrane 2000).

Additional literature shows that the higher the time demands of paid and domestic work, the more often employees experience work family conflict, the lower their productivity is, and the more problems they have in the private sphere, such as depression, stress and marital difficulties (Ruijter 2007). Many of these couples who experience these types of stress have been outsourcing numerous tasks as there is not enough time to handle all of the set responsibilities. Examples of outsourcing alternatives include housekeepers, day care, handymen, takeout food, and restaurants (Ruijter 2007). Earlier outsourcing studies focused on the time availability explanation that households outsource their tasks if they have less time available to perform the tasks themselves (Ruijter 2007).

### Women with Professional Careers

As women began to seek professional careers, it became prudent for them to find a balance between work and family. As such, some things changed from the 1950's to the 1960's, but others have not. A study was conducted on male and female physicians by

Powers and compared to the findings of a study conducted a decade earlier (Powers et al 1969). Powers et al found that 29.3% of women physicians were married at the time of graduation from medical school (graduates of 1931, 1936, 1941, 1946, 1951 and 1956) compared with 15.1 percent of women in a study conducted by Dykman and Stalnaker in 1953 (graduates of 1925-1940) (1969). Dykman and Stalnaker reported that 3.6% of women students had children before or during medical school, compared with 11.8% in Powers' study (1969). Additionally, 95% of men reported full time employment following graduation from medical school versus 44.9% of women (Powers 1969). Family responsibility was the #1 reason listed by women for curtailing their medical activity, and having children reduced the amount of professional activity reported by women physicians (Powers 1969).

Powers et al attempted to assess if these same variations between genders existed within the medical field in 1969 as they did in a 1953 comparative study by Dykman and Stalnaker. By way of a mail questionnaire, Powers assessed the workforce contributions of men and women physicians who graduated between 1931 and 1956. The authors used longitudinal regression to compare trends of workforce contributions over time. Results were compared with a 1953 study by Dykman and Stalnaker to lend credibility to their findings. The questionnaire was sent to 3,837 physicians. Replies were received from 2,920 of the respondents (1,336 females and 1,584 males) yielding a 76% response rate (Powers 1969). Powers et al found that family size was a direct influence on number of hours worked by female physicians (Powers 1969). In addition, family obligations affected the variety of specialty options that women were likely to pursue (Powers 1969). Specialties that required more hours of practice were not traditionally chosen by women due to family obligations (Powers 1969).

Powers concluded that women, overall, contributed less to the profession than their male counterparts (1969). After marriage and children, the contribution in hours worked and patients seen by women physicians declined substantially. A decrease in the number of women physicians choosing specialty fields and reporting full-time practice hours was noted in both studies. Powers et al concluded that women physicians contributed more to the profession prior to having children (Powers 1969).

Insufficiencies in information in the study could be eliminated with more current data concerning hours worked between male and female physicians. Additional information could be included about number of patients seen and procedures performed during office hours. Specific hours worked by gender and differences of practice types would be good information to contribute to the importance of this study. While this study was done forty years ago, more recent literature has consistently shown that women continue to forego career advancement in lieu of family obligations.

### Female Influx into Professions

Pharmacy, medicine (specifically, general practice and obstetrics and gynecology) and law have experienced an influx of women into the professions over the past few decades and have been subsequently studied. Conversely, engineering and architecture are examples of two male dominated professions that have maintained their façade of maleness. While the male dominated professions are respected as high status occupations with higher wages, there is a decrease in the perception of the professional status with an increase in the percentage of females within a profession. When professions became “feminized”, the level of compensation often decreases (Adams 2005). Traditionally,

more female dominated professions such as nursing, pharmacy and law have been equated with lower salaries and decreased prestige (Adams 2005).

In a Canadian study conducted by Akyeampong between 1987 and 1990, the amount of time lost from work due to illness and family obligations was assessed longitudinally. From 1987 until 1990, time lost per worker (both men and women) due to illness or disability increased by a third of a day to 6.7 days annually, while time lost on account of personal or family responsibilities rose by an extra half day to 2.7 days. Time lost for personal reasons averaged 7.3 days for men in 1990, hardly different from the 1987 rate of 7.2 days. Among women, however, the picture was different. Work absences for personal reasons rose to 12.4 days on average in 1990, a day and a half increase from 1987. Most of this increase was due to personal or family obligations (up almost a full workday to 5.2 days). It was hypothesized that the increased presence of women with preschool children in the workforce was largely responsible for the growth in work absences for personal reasons (Akyeampong 1992).

### Working Mothers

The presence of children appears to exert a strong and growing upward pressure on absence levels among mothers working full time in paid jobs, but has very little influence upon fathers. Working mothers missed 7.9 days of work on average in 1990 (6.5 days in 1987) to attend to personal or family demands. In families with at least one preschool child, workdays missed for personal or family demands were much higher, averaging 25.1 days (20.5 days in 1987). Conversely, working women with no children lost only 2.3 workdays in 1990. For full-time paid working men, time lost due to personal or family obligations hardly changed over the period, averaging around one day lost in

1990 among families with children, and only 0.8 days among those without children (Akyeampong 2000).

Gordon and Whelan reported that the workforce included more than 22.3 million working moms with kids less than 18 years of age in 1995 compared with 19.8 million working moms in 1987. It has been shown numerous times that women with children are required to adapt their work schedules around childcare and family responsibilities (Gordon and Whelan 1993). This amount of growth in women with careers and children is certain to affect the amount of time these women spend in corporate or professional settings.

### Family Obligations

When women attempt to excel in their professional lives and balance family obligations, this is often met with some difficulty. Sobecks et al compared the challenges of dual-physician families with single-physician families (1999). By conducting a cross sectional survey of randomly sampled physicians in the graduating classes of 1980 and 1990 at Case Western Reserve University and University of Cincinnati, Sobecks et al were able to ascertain feedback concerning sacrifices that were made in dual-physician families versus single physician families. In dual physician families, individual physicians earned less money, less often felt that their career took precedence over their spouse's career and more often played a major role in child-rearing (Sobecks 1999). Some of the benefits of a dual physician family were more frequent enjoyment of shared work interests and higher family incomes (Sobecks 1999).

Seventy percent of male physicians believed that their own career had taken precedence over their spouse's career (Sobecks 1999). Compared to male physicians, female physicians earned less money, worked fewer hours and were more likely to be married to physicians (Sobecks 1999). When children were factored into the equation, it was assessed that among male physicians, those with a non-physician spouse at home had more children and among female physicians, those married to another physician had the most children (Sobecks 1999). Female physicians reported arranging their work schedules to accommodate childcare responsibilities 87% of the time in dual doctor families. Additionally, female physicians reported being the primary (or shared) caregiver to the children 98% of the time in dual doctor families.

When compared to male physicians and with female physicians whose spouses were not physicians, female physicians with physician spouses worked fewer hours, earned less money, and made the greatest professional adjustments for child-rearing and most often reported limitations in their professional lives because of family (Sobecks 1999). In addition, female physicians married to physicians worked fewer hours than female physicians married to non-physicians (Sobecks 1999).

### Dual Earner Households

When comparing findings in dual physician families to earlier findings among dual professional couples, many of the results remain unchanged. Heckman et al found when the performances of husbands and wives in the same field were considered, it was the husband who appeared to be the primary beneficiary of the alliance (1977). There are often expectations by others, toward the husband and wife, to behave in traditional male/female roles (Heckman, Bryson, Bryson 1977). Whereas, Rapoport and Rapoport

reported a disparity existed between what dual career couples feel was right and proper behavior for themselves and what they perceive to be the norms held by people around them (1969). Husbands were perceived to be treated as professionals while the wives were not even recognized by other professionals even when they were of the same profession as their spouse (Heckman, Bryson, Bryson 1977).

Earlier literature also gave information about expectations concerning which spouse's career was more dominant in the marriage. Linn found that women, in general, were expected to move if their husband's work required a change, but not for their own opportunities if that would inconvenience the husband's work (1971). In addition, many women reported "their drop out periods" coincided with their husband's job relocations as well as with pregnancies (Heckman, Bryson, Bryson 1977). The literature defines the cultural definition of 'man' and 'woman' as "being a good or real man is still centered on work and competing successfully at the breadwinner role, and being a good or real woman is still centered on the domestic scene" (Heckman, Bryson, Bryson 1977). When evaluating these findings against more current literature on the effects of dual earner households, Gjerberg found that there was consistency from earlier studies in the fact that women were still more likely to work part time, have spouses with higher levels of education, delay the birth of their first child and take the primary role in child rearing responsibilities (2007).

Skinner reported the influence of contemporary family living in increasing the rate of females in the labor force (1980). The U.S. Department of Labor and Statistics reported that married women were the key source of this growth even though it was difficult to assess the number of married career women in the workforce. It seemed reasonable to assume that the percentage for this group was positively related to the general increase in labor force participation rates of females (Hopkins and White 1978).



As more women sought increased education and training, along with the increased demand for skilled labor and the greater awareness of sex-role equality, dual-career lifestyle increased in prevalence and acceptability (Rapoport and Rapoport, 1976). The authors suggested that dual career lifestyles are a stress and strain due to competing demands of two careers. The term “dual career family” was coined in 1969 by Rapoport and Rapoport.

Survey results from a national sample of CEOs and HR managers suggest that more than 50% of organizations have moderate to great difficulty attracting and retaining women managers and professionals. Respondents said the most serious problems encountered by women were 1) organizational politics 2) career development opportunities and 3) family conflict (Schneier et al 1994). The survey results suggest a bail out by some of the best managerial and professional women from corporate life at the peaks of their careers. Fortune magazine reported that equal numbers of men and women MBAs started careers but a significantly greater number of women dropped off the managerial track 10 years later. Business Week attempted to follow up on top career women in the workplace to track the progression of their professional careers. The 1986 efforts of Business Week to trace the top 100 corporate women of 1976 resulted in locating 46 of the women more than 10 years later. Nearly one-third of women who were located had left their corporate position. One of the open-ended survey responses for the turnover among professional women involved relocation in conjunction with their spouse’s career (Schneier et al 1994).

Female professionals and managers also encounter other difficulties. Two-thirds of dual career families reported conflict between work and family. Almost 60 percent reported difficulty with childcare arrangements in dual career families (Schneier et al 1994). Duxbury conducted a survey of 131 men and 109 women with managerial and

professional jobs. These employees each had children and spouses with managerial and professional jobs. Significant differences in 11 of 17 gender comparisons were noted. Several of these differences were due to societal expectations and behavioral norms. The survey resulted in the conclusion, “It appears that redistribution of roles within the family to match increased role responsibilities outside of the home has not yet occurred (Duxbury 1991).” She further summarized, “The traditional family model of the husband as the breadwinner and the wife as the homemaker is becoming a vestige of a past society” (Duxbury 1991).

Three traditionally female-dominated employers are health (i.e.: nursing), education and banking. In an attempt to balance career and family, many of these employers have implemented policies such as part time employment, job sharing, personal leave to assist sick kids and onsite daycare provisions (Schneier et al 1994).

Further statistics indicate that the traditional “typical American family” with a working husband, homemaker wife and two or more children only comprises 7% of nation’s families (Duxbury 1991). Women are increasingly being forced to deal with job-related demands that limit performance of family roles. Men are becoming more involved with their families and their priorities are shifting away from work, as more than 50% of the North American workforce is married with children (Hessing 1988, Nieva 1988).

Societal expectations play a large role in the family structure and the employee roles in the workplace. Men perceive higher levels of work conflict because societal expectations make men more sensitive to problems within the work role that, in turn, could hinder their work role success. Women have a similar argument for the link between family involvement and family conflict. This sensitization between genders is often exacerbated by societal expectations.

Hall & Richter (1988) suggested individuals who are highly involved with work or family or both have “high home-work boundary permeability”. High boundary permeability occurs when an individual allows the demands of one domain to intrude into the other domain. Women experience stronger relationships between work-involvement and work-family conflict than men because high work involvement leads to more work-family conflict for women because they are adding nontraditional role whereas men are performing in a manner congruent with society’s expectations (Holahan and Gilbert 1979). Men who are highly involved with family roles are behaving in a manner inconsistent with societal and organizational norms (Duxbury 1991). Women are expected to adjust career aspirations and reduce career demands to meet their family demands (Duxbury 1991).

The historic societal expectation is that career-oriented men are expected to keep their home life from interfering with work by properly managing their home domain. Additionally, the family is required to work around the man’s career obligations so he will not be inundated with family matters during work.

Spain et al reports that some of the most significant changes for women have occurred in the past few decades (1996). For example, the growing incidence of motherhood outside of marriage is unprecedented. In the portrait of contemporary women’s lives, children are in the foreground, marriage is in the background and employment is in the ever expanding middle landscape (Spain 1996).

### Women in Dentistry

Women are finding enjoyment in the profession of dentistry. This once male-dominated profession has seen a great influx of women since the 1970’s. In 2003, the

composition of active dentists was 82.8% males and 17.2% women. Of all new active practitioners (practicing less than 10 years), 65.4% were men and 34.6% were women. More than two-thirds (68.2%) of male dentists were older than 45 years old, whereas, approximately two-thirds (66.6%) of female dentists were younger than 45 years old (Carlisle 2010).

In the *Feminization of the Professions*, Traci Adams discussed dentists in Ontario and the impact of the influx of women into the dental profession. As 28% of Ontario dentists were women, she questioned whether the influx of women into dentistry had caused a decline in the professional status of dentists or if it brought about change in the nature of the practice itself (Adams 2005). In other words, Adams explored the impact of feminization on male dominated professions (2005). That is, Adams examined whether women practiced differently and thought differently about professional dental issues. If differences exist, then there may be a change within the profession of dentistry.

Women dentists in Ontario typically earn 58.3% of the amount their male counterparts earn for the same amount of hours worked (Adams 2005). Canada's national average of women dentists' earnings reflect women earning 63.7% of what male dentists earn (Adams 2005). This difference is suggested to be a result of more women practicing as associates than male practice owners (Adams 2005). Additionally, it may be a result of female practitioners spending more time with their patients and treating fewer patients per hours than their male counterparts (Adams 2005).

Adams' case study involved analyzing the results of a survey of practicing Ontario dentists' beliefs about dentistry. Studies show that female practitioners spend more time with their patients and see more patients per hour than their male counterparts (Adams 2005).

Female dentists have also risen to leadership positions at the local and national levels. Lynn Carlisle reported that the number of women elected as presidents of U.S. state dental societies rose from 2 states having women at the helm in 1998 to 8 states in 2006 having women presidents. The first woman president of the American Dental Association (ADA), Geraldine T. Morrow DMD, was elected in 1990 at the ADA's 131<sup>st</sup> Annual Session in Boston, Massachusetts. In 2007, Kathleen Roth, became the second woman to occupy the office of President of the American Dental Association.

Erwin L. Linn used questionnaires to assess practice preferences of women dentists. In 1968, Linn mailed these questionnaires to women listed in the 1967 Directory of the American Dental Association. The criterion for inclusion was a feminine sounding first name. Additional names were received from the Association of American Women Dentists, the Sorority of Women Dentists and feedback from the women who received the initial survey. Exclusion criterion from the survey was written feedback stating the person contacted was either male or deceased. After eliminations were made, 1,588 estimated women dentists were selected. Three attempts were made to contact these providers so that a comprehensive study would be conducted. The final number of questionnaires received was 803. This cross-sectional survey concluded that 60% of the respondents were married at the time, 20% were previously married and 19% were single. Of those dentists who reported being married (currently or previously), 80% reported having children. Thirty five percent of women reported an interruption in their profession at least once since graduation. Twenty five percent reported decreasing the time they spent in their practice at least once since graduation. Though 25 – 35% reported a desire for more time to focus on career, a larger number desired more time with family. Sixty four percent of mothers with children younger than twelve years of age and 50% of

mothers with children over twelve years of age all wished for more time with their children.

Forty four percent of women surveyed reported practicing in more than one city or town. This reported statistic was consistent with the research that a woman will move for her husband's job. Final results of the study showed that half of the women surveyed reported changing locations for their husband's jobs. This study contributes to the belief that the dental practice of women dentists is affected by spouses and children. What the study failed to mention was whether these effects were adverse to a successful and productive career. These findings did not report the productivity of these women who were spending fewer hours in practice. They did not discuss the types of procedures and the number of patients/procedures accomplished during their day in relation to their male counterparts. If women dentists work fewer hours, it may be possible that they are producing equal or comparable amounts of dentistry when controlling for hours worked. This study's limitation is that there is no information concerning production of men versus women dentists, differences in hours worked and overall patient/production information. Future research should determine if decrease in hours worked by married women dentists with children contributes to an adverse affect in their practice of dentistry. Furthermore, a more updated study would be warranted and worthwhile to assess whether these data were consistent 40 years later. However, current literature suggests women are still decreasing their working hours to maintain their familial responsibilities, but specific information concerning productivity is not available.

Walton et al analyzed cross-sectional national survey data from 1979 to 1999 to analyze practice patterns (2004). Information was assessed via descriptive analysis to determine gender differences when estimating hours worked. These observational data provide descriptive accounts of why women dentists report fewer work hours than men.

They used surveys to determine demographic factors (i.e.: age, marital status, gender, children, etc.) that may potentially affect the number of hours worked (Walton et al 2004). Three groups of dentists were divided according to age, hours worked and parental status (dentists with children younger than 18) and then determined how these factors affected the number of hours worked. Linear regression analyses were conducted to examine the relationship between hours worked and the independent variables. Two regression analyses were done to determine how the independent variable related to the average number of hours worked. This was a good way to analyze how each specific demographic factor influenced the number of hours worked. Age and parental status impacted the number of hours worked by dentists. Parents of children under 18 years of age worked a different number of hours than non parents. Women of young children worked fewer hours, but men with young children worked more hours (Walton et al 2004). When evaluating constant terms between men and women dentists, there is a 2.71 hour difference worked (36.46 vs. 33.75) per week between genders. When children are factored into the equation, women reported fewer hours worked than men (33 vs. 30.01).

Current information concerning what types of procedures and number of patients seen would be useful to determine if this decrease in work hours adversely affects the overall practice of dentistry. Additionally, there were some other limitations with previous research including: data concerning weekly hours worked is not as thorough as data concerning number of hours worked annually; production and number of patients seen were not included; no income information was provided; and no information concerning practice location or patient selection was included. Due to the cross sectional nature of the data, it was not possible to assess information about work patterns. Additionally, there is a strong likelihood of a reporting bias. The literature has continuously shown a change in work hours occurring when children are born. There

have been no significant changes in work hours associated with marriage only (i.e., no children) in the literature. In conclusion, parental status, not marital status, is more of a factor in women changing their work hours. Good follow up will be needed to ascertain the difference in gender productivity.

Female and male dentists have different practice styles. Avery and Martin hypothesized that young male and female dentists are more alike in clinical productivity than their predecessors from previous generations (1988). The purpose of this study was to examine the balance between the demand for care and the adequacy of the workforce to provide services.

A great amount of consideration is given to the question of how this surge of female dentists will affect other aspects of the dental care delivery system. Male graduates reported working four more hours per week than females (Avery and Martin 1988), which equates to one more half day per week, four more weeks per year and more patients annually. Additionally, 19.5% of respondents reporting they took maternity leave, many of which lasted longer than 3 months (Avery and Martin 1988).

Atchison et al surmised there is no question that family commitments are the principal reason why women dentists work part time (2002). One study conducted in the United Kingdom (UK) shows as kids get older these dentists go back to working the same hours as male dentists and women dentists without kids (Matthews and Scully 1994). These reduced hours from an estimated 20% of the workforce are speculated to decrease the population's access to care (Atchison et al 2002).

Access to dental care, especially underserved areas of the population, continues to be a problem and a subject of considerable interest. Three factors critical to solving access to dental care are 1) effective demand for dental care (the gap between the number of patients who need dental care and those who seek dental care) 2) adequate dental



workforce able to respond to the need and 3) economic environment that supports patients and providers so they can participate in the program (Guay 2004). Numerous studies and publications are devoted to describing and quantifying dental care needs that exist and are not being met in multiple and diverse populations (Guay 2004). Substantial evidence suggests that barriers other than finances prevent patients with dental needs from seeking appropriate and timely care (Guay 2004). For example, fear of dental treatment is a common reason that many people do not receive necessary dental treatment (Guay 2004). However, access to care may also be decreased due to differing work patterns.

One barrier to access is the availability of providers (Isman and Isman 1997). Access is a shorthand term for a broad set of concerns that center on the degree to which individuals and groups are able to obtain needed services from the health care system (Isman and Isman 1997). Institute of Medicine (IOM) defined access as “the timely use of personal health services to achieve the best possible health outcomes (Lambrew 1996).” The patients’ desire to visit the dentist must be considered. The ADA Survey and Economic Research on Dentistry concluded the greatest reason for not going to the dentist more often was that it costs too much (34%) (ADA 2010). More than half of consumers (51%) who have not been to the dentist in the past five years reported that high costs are an important factor. About 26% of consumers had a previous bad experience with a dentist and one-quarter do not feel that it is necessary to go to the dentist until a problem occurs.

Alex Berenson reported in the New York Times, “Many poor and lower-middle class families do not receive adequate care because most dentists want patients who pay with cash or have private insurance. Many of these dentists do not accept Title XIX patients. Publicly supported dental clinics have months-long waiting lists even for people

who need major surgery for decayed teeth” (Berenson 2007). Fewer hours means less available chair time. Women practitioners spend more time with patients, provide greater attention to social and preventive aspects of patient care, and are more sensitive and empathetic (Atchison et al 2002). Female dentists reported seeing fewer patients, annually, than male dentists (Atchison et al 2002). Concurrently, there will be a shortage of dentists occurring as the high numbers of “Silent Generation” and older Cohort of the “Baby Boom” generation retire. This shortage is a result of the reduction of dental school enrollment in the 1980’s because of the “busyness problem” (Brown 2001). It also reflects the number of women who are choosing to practice part time. However, it must still be noted that women’s entry into the dental work force has been significant and has helped maintain the supply of dentists (Walton et al 2004). Sex differences in the work force should be considered in evaluating the supply of dentists and related work force policy (Walton et al 2004).

### Why Dentistry?

Why do people migrate toward a career in dentistry? Weaver et al determined through a survey of the graduating dental class of 2003 that control of time at work, along with self employment and service to others, were the primary reasons reported by recent graduates for their interest in dental careers (Weaver et al 2004). This finding is consistent throughout the literature (Weaver et al 2004). If the ability to control one’s time spent working is one of the top reasons men and women choose careers in dentistry, this would explain the great influx of women into the profession. As the literature has shown throughout the course of the 20<sup>th</sup> and 21<sup>st</sup> century, women have consistently been entering the workforce and attempting to have careers while balancing the demands of

work and family. If women are motivated by the ability to have a successful career while maintaining the ability to care for their familial obligations, this would corroborate the projections of women continuing to enter the dental profession.

The literature has shown that women, regardless of profession, typically decrease the number of hours they work when they are mothers of young children (Scarr 1989). However, there is no information concerning the state of Iowa. Is Iowa consistent with the remainder of the country? Do women dentists in Iowa work fewer hours than male dentists? If women dentists in the state of Iowa work fewer hours than their male counterparts, why and what are the reasons for fewer work hours? Do marital status and children affect the number of hours worked by women dentists in Iowa? How does this decrease affect overall productivity and availability to dental care for Iowans?

## CHAPTER III

### MATERIALS AND METHODS

#### Introduction

A survey was developed to gain knowledge concerning the predictor variables associated with the hours worked among Iowa dentists. As discussed in chapter two, there is very little information concerning dentists in Iowa and how their work hours compare with the hours worked by all dentists in the country. Women dentists work fewer hours, on average, than their male counterparts throughout the United States. The literature does not provide any information concerning the work patterns of Iowa dentists, how these hours differ between genders or how they compare to the national average. A possible reason for differences in work hours between female and male professionals takes into account household and domestic responsibilities, thus they were included in this study. The methods section will explain how this study was developed, conducted and analyzed.

#### Hypotheses

Null hypotheses that were tested:

- 1) There is no difference in the number of weekly hours worked between male and female dentists.
- 2) There is no difference in the weekly hours worked between female dentists who report having minor children and female dentists who do not have minor children.

### Operational Definitions

Several definitions were compiled to allow for clarification of numerous terms. These definitions were as follows:

**Available chair time:** The number of hours worked per week in direct patient care (i.e., administering treatment) as reported by the dentist.

**Busyness index:** A self-determined measure of the desired amount of work the dentist would like in comparison to how much work he/she already has.

**Dependent adults:** Dependent adults are considered as aging parent or grandparents, disabled spouse or adult children who are unable to handle their daily affairs without assistance.

**Dependent children:** Dependent children are considered as children who are 21 years of age or younger (i.e., includes college students).

**Domestic Responsibilities:** Household tasks that must be completed to maintain the function of the home.

**Educational debt:** The amount of combined debt currently owed for education by the dentist and his or her spouse (excluding children and grandchildren) for dental school, undergraduate, etc., as reported by the dentist.

**Full Time:** 32 or more hours worked per week.

**Graduation Year:** The year of graduation from dental school, as reported by the dentist on the survey.

**Minor:** Children under the age of 18 for whom the dentist is responsible (i.e., foster children, step children, biological children, guardians, etc.), as reported by the dentist.

Preschool children: Preschool children are children who are considered too young to attend school and may require childcare accommodations.

Relationship Status: The current personal relationship status of the dentist (e.g., married) as reported by the dentist on the survey.

Significant Other: The existence of a mate (e.g., boyfriend, partner, etc.) defined as ‘yes’ or ‘no’ by the dentist

Work Hours: The number of weekly hours spent in direct patient care or performing professional responsibilities as reported by the dentist on the survey.

### Variables

Hypothesis 1-

Response variable:

- 1) The sum of hours worked per week by the dentist providing direct patient care and other professional responsibilities, as reported by the dentist in the survey.

Explanatory Variables:

- 1) Gender of dentist completing the survey.
- 2) Age of dentist (in years) completing the survey.
- 3) Age group of dentists completing survey divided into 5 – 10 year increments.
- 4) Years since graduation from dental school of dentist completing the survey.
- 5) Busyness of dentist was grouped into four categories: a. not busy enough (desired more patients), b. enough patients, c. overworked but treated everyone who requested care, d. too busy to treat everyone who requested treatment.
- 6) Educational debt was converted to a dichotomous variable where the responses were divided into “no educational debt” or “>0-\$200,000+”.

- 7) Relationship status was grouped into two categories of “married + partner” and “single and others”
- 8) Household contribution was grouped into two categories of “0 - 60%” and “61% or greater”.
- 9) Having children represented children of any age as reported by the dentist.
- 10) Presence of minor children was a variable that was created and represented children who were reported by the dentist as being 18 years of age or younger.
- 11) Number of minor children represented how many children 18 years or younger each dentist (who reported having minors) reported having.
- 12) Presence of regular caregivers for preschool age children was defined as having people who cared for young children who were not yet of school age.
- 13) Hired help to assist with adult care-giving, as reported by the dentists, was paid personnel who helped care for aging adults for whom the dentist was responsible.
- 14) Employment type was grouped into “solo proprietor” and “others”.

Hypothesis 2-

Response variable:

- 1) The sum of hours worked per week by female dentist providing direct patient care and other professional responsibilities, as reported by the dentist in the survey.

Explanatory Variables:

- 2) Age in years as determined from the dentists’ date of birth. This information was retrieved from the Iowa dentist tracking system (IDTS).
- 3) Age group of dentist completing the survey was divided into 5 – 10 year increments.

- 4) Years since graduation from dental school was reported by dentist completing survey. This information was also available from the IDTS.
- 5) Busyness was the surveyed dentists' perception of workload. The dentists were grouped into four categories: a. not busy enough (desired more patients), b. enough patients, c. overworked but treated everyone who requested care, d. too busy to treat everyone who requested treatment.
- 6) Educational debt was the amount of educational debt owed by the dentist and their spouse or partner only. The variable was grouped into "no educational debt" vs. "any educational debt".
- 7) Relationship status was reported by surveyed dentists as their current relationship status. The variable was grouped into "married + partner" and "single and others".
- 8) Percentage of household income contribution was reported and grouped into dentists who contributed "0 – 60%" of their household income and those who contributed "61% - 100%" of household income.
- 9) Having children represented children of any age as reported by the dentist.
- 10) Presence of minor children was a variable that was created and represented children that were reported by the dentist as being 18 years of age or younger.
- 11) Number of minor children represented how many children 18 years or younger each dentist (who reported having minors) reported having.
- 12) Presence of regular caregivers for preschool age children was defined as the presence of people who cared for young children who were not yet of school age.
- 13) Hired help to assist with adult care-giving, as reported by the dentists, was paid personnel who helped care for aging adults for whom the dentist was responsible.
- 14) Desire to work part time was determined by dentists who answered "yes" to any reason for working less than 32 hours per week.



- 15) Reasons for taking leave of absence longer than 45 consecutive days within the last two years was determined by dentists who answered “yes” to any reasons cited in the survey (including other) for taking a leave of absence longer than 45 consecutive work days within the last two years.
- 16) Change in patient schedule to accommodate care-giving demands within the past two years to accommodate child care-giving responsibilities.
- 17) Reduced work schedule during the past two years to accommodate child care-giving responsibilities.
- 18) Work schedule has been interrupted by frequent emergencies within the past two years to accommodate child care-giving responsibilities.
- 19) Other reasons cited for interruptions in work schedule to accommodate child care-giving responsibilities.
- 20) Employment type was grouped into “solo proprietor” and “others”.

The Iowa Dentist Tracking System (IDTS) provided additional information about respondents and non-respondents. Most information that was already available through the IDTS was not asked in the survey. Variables that were available in the IDTS that were used in the analysis but were not asked on the survey consisted of the specific number of dentists in the practice (practice type) and date of birth (age). Additionally, gender, graduation year, county of primary practice location, practice specialty and specialty type were data extracted from the IDTS for dentists who did not answer one of these specific questions. Some questions, such as county of primary practice location and graduation year, were asked on the survey to confirm the dentist who responded to the survey was the intended dentist as reported by the IDTS.

### Population

The research question addresses the number of hours worked by dentists in Iowa. Iowa dentists have similar percentages of practicing dentists (by gender, part time and full time status) as that of all United States (US) dentists (ADA 2011). A list of names and addresses of Iowa dentists was received from the Iowa Dentist Tracking System (IDTS), which is administratively housed at the Carver College of Medicine's Statewide Clinical Education Program. The IDTS provides an ongoing monitoring system of dentists currently practicing in Iowa, along with demographic (birth date, sex), education and practice characteristics (type of practice, location, number of hours). All dentists in the 2009 IDTS were automatically included in the study. No dentists were excluded.

### Survey Design

This was a descriptive, cross-sectional study of Iowa dentists. Given the hypotheses that were to be tested, a series of topics were compiled that would need to be included in the questionnaire. These topics were selected based on previously conducted studies pertaining to women's workforce issues, both within dentistry and within the general public, and topics that were deemed as potentially important by the thesis committee. The dependent and independent variables were determined and questions were written based upon the information that was pertinent for the research. Several drafts were compiled, reviewed and rewritten until a consensus was reached among the thesis committee about having questions that specifically addressed the hypotheses.

A total of 28 questions were asked on the survey (Appendix C). The first 5 questions contained demographic information concerning gender, practice specialty, year of graduation and commute time. The next few questions inquired about the number of hours worked treating patients and performing administrative duties along with the reason for working these reported hours. The next few pages contained questions attempting to determine additional factors that could be attributed to the hours each dentist spent in practice. These questions asked about educational debt, relationship status, family and domestic responsibilities along with total financial household contribution.

The survey was pilot-tested by three practicing dentists who were not licensed in the state of Iowa to prevent bias or contamination of the candidate pool. None of these colleagues received verbal or written instruction or clarification from the researcher. Each of the dentists were provided with a typed cover letter and a typed survey and asked to complete the written survey. Each of these colleagues provided verbal and written feedback concerning areas that were unclear or confusing on the survey. The feedback included questions about the intended response of some questions, the reason for some of the questions, clarification of how some questions were worded and an approximation of the amount of time it took to complete the survey. The survey was rewritten to remove the areas of confusion noted by the pilot-test group. The survey was then presented to the thesis committee for final approval. The committee consisted of professors in the Department of Preventive and Community Dentistry at the University of Iowa. The committee reviewed the cover letter and survey and made grammatical and punctuation changes prior to determining the survey was complete.

A University of Iowa Biomedical Research Institutional Review Board (IRB) application was completed online. In addition to completing the application form, the

following items were included in the IRB submission: 1) the proposed survey; 2) a cover letter that accompanied the survey; 3) a copy of wording for a brightly colored postcard that would be disseminated three days before the survey was to be mailed alerting Iowa dentists that the survey was forthcoming; 4) follow up cover letter; and 5) a Delta Dental grant application (Appendix F) that was requesting financial support in conducting this research. IRB requested numerous changes, revisions, and clarification of various areas of the application. After several revisions to the IRB application, approval was granted with exempt status.

### Sampling

After receiving IRB approval, an Excel spreadsheet with the names and addresses of the 1465 dentists registered to practice in December 2009, was submitted to University of Iowa printing and mailing. All dentists were surveyed concerning their hours worked. The spreadsheet contained a 7 digit identification code that was placed on every page of the survey and the return envelope that was mailed to the dentists. This identification code was used to keep track of which dentists returned surveys. This secret number was matched next to the dentists' name on the master list. This list was stored in a secure location to provide confidentiality to the survey participants.

On February 21, 2011, a brightly colored postcard (Appendix A) was mailed to all Iowa dentists (N=1465) alerting them that the survey and cover letter would be arriving in 3 days. On February 24<sup>th</sup>, a mailing was sent to all potential subjects. The mailing consisted of a cover letter (Appendix B), a survey (Appendix C), and a postage paid return envelope. As previously mentioned, an identification code was placed on the survey and return envelope.

A 24% response rate (n=352) was achieved after three weeks. Feedback was received from several subjects who noted that one of the skip questions did not take into account that a specific question needed to be answered before they were to skip forward. This change was discussed and confirmed with the thesis chair. The survey was modified to correct this problem prior to distributing the second mailing to non-respondents on March 18, 2011. The survey was accompanied by a new cover letter (Appendix D) informing the participant that this was the second mailing that was sent regarding this survey and making a request for them to fill it out. A caveat was made on the letter that if the survey was already completed and mailed recently, it was not necessary to send in another copy. The master list was removed and destroyed in a shredder to protect the responder's confidentiality.

### Data Entry

A master survey was coded to provide an efficient method for data entry. Categorical variables were coded for ease of entry. Prior to data entry, the principal investigator reviewed all surveys for discrepancies. A common clarification that was noted was respondents who entered numerous answers to one survey question. When this occurred the answer that best matched the other survey responses was selected by the principal investigator. The findings from the survey were supplemented with the findings recorded in the IDTS records.

The data were entered into a database software program (Data Entry). Rick Paulos, University of Iowa application developer, was contracted to enter these survey responses. To ensure accuracy during data entry, all returned surveys were double entered. The data entry specialist identified errors during the data entry process and

contacted the principal investigator to allow corrections and/or clarification of these problems.

### Statistical Methods

Descriptive statistics were conducted and bivariate analyses were performed using standard chi-square tests, Fisher's exact test and Cochran-Mantel-Haenszel chi-square tests were used for categorical variables, and Wilcoxon Rank Sum test or the two sample t-test was used for quantitative measures. Multivariate logistic regression models were used to identify factors associated with weekly working hours of Iowa dentists. The stepwise logistic regression, including forward selection and backward elimination process were used to determine which variables were statistically significant. The Hosmer and Lemeshow test was used to test the goodness of fit for the logistic regression models. The level of significance was set at  $p < 0.05$ . SAS for Windows (Version 9.2, SAS Institute Inc., Cary, NC, USA) was used for data analysis.

### Power and Sample Size Consideration

Previous research was done concerning hours worked by dentists in Iowa, however, there was uncertainty about how the explanatory variables related to these working hours (Kuthy et al 2009). Funding from Delta Dental of Iowa Foundation allowed for a survey to be conducted of all Iowa dentists to determine if there was a connection between hours worked and the explanatory variables. As the entire group of

Iowa dentists was included, power and sample size were moot issues for the purpose of this study.

### Data Analysis

Statistical analyses were carried out on the data from the completed questionnaires. Descriptive statistics were computed and frequencies were generated from the demographic characteristics of Iowa dentists (county of practice, year of graduation, gender, practice specialty, number of hours worked, etc). The mean number of hours worked by women versus the mean number of hours worked by men was obtained for hypothesis one, and the mean number of hours worked by women with minor children vs. women without minor children regarding household income contribution was obtained for hypothesis two. Bivariate analyses were conducted on hours worked (0-31 vs. 32+ hours per week) by gender, relationship status, presence of children, presence of minor children, presence of caregivers for preschool children, hired help to assist with adult caregiving responsibilities, busyness, educational debt, contribution to household income and employment type of dentist. Variables with p values  $<0.05$ , were entered into the multivariable logistic regression model using a forward stepwise and backward elimination process.

## CHAPTER IV

### RESULTS

This study identified the variables that influence the hours worked by Iowa dentists. Univariate analyses were performed for all variables in the study to describe the data as related to the responses to the survey (Tables 1-5). Bivariate analyses were conducted to explore the significant associations between weekly hours worked by Iowa dentists and various factors that would influence these hours (Tables 6 & 7).

#### Response Rate

The survey was mailed to 1,465 Iowa dentists, and 942 people responded to the survey after 7-1/2 weeks. Among the returned surveys, there were: 19 blank surveys (indicating unwillingness to participate as requested in the cover letter that was mailed with the survey); and 3 with notes stating the dentist was retired; and 2 with notes stating the dentist had moved and no longer was accessible. The response rate of useable surveys was 63%. Of the completed surveys, 8 were removed from the study because the dentists either stated they worked zero hours per week or did not answer this question. As this was the dependent variable, surveys with no response to this question were removed. Additionally, 6 surveys were removed because the number of years reported at the dentists' primary practice location was impractical for the dentists' age.

Thus, 904 surveys were included in the final statistical analyses. After subtracting numbers for dentists who retired (n=3), reported zero working hours (n=8) or who moved (n=2), the response rate for the final analysis was 62% percent.



### Descriptive Data and Demographics of Iowa Dentists

Women accounted for 21.2% percent (192 women) and men accounted for 78.8% percent (712 men) of people responding to the survey (Table 1). There were 112 female non respondents and 448 male non respondents.

The majority of respondents reported being married or having a significant other (825; 91.6%). Of those not married 28 reported being single, never married, 44 reported being divorced or separated, and 4 reported being widowed. Approximately 41% of dentists reported being married to someone who was a college graduate (329; 40.6%). Some dentists reported being married to someone with a graduate or professional degree (269; 33.2%).

The majority of dentists in Iowa (86.4%) reported having children (n=775). The majority of dentists (54.7%) reported that their dependent children (21 years of age or younger) lived with them a majority of the time. 409 Iowa dentists (45.2%) reported having minor children (18 years of age or younger). Almost fourteen percent of Iowa dentists (13.9%) reported having preschool age children (n=126).

The mean age of responding Iowa dentist was 50.8 years of age (standard deviation 11.6 years; range: 27 to 88). Of respondents, the mean number of hours worked for women dentists was 37.37 hours, and the mean for men dentists was 39 hours. 739 dentists (81.8%) identified themselves as general dentists, and 169 dentists (18.3%) identified themselves as specialists. The breakdown of specialists who responded was as follows:

Dental Public Health	4 (2.4%)	Pediatric dentists	31 (18.8%)
Endodontics	19 (11.5%)	Periodontics	14 (8.1%)
Oral Pathology	1 (0.6%)	Prosthodontics	14 (8.5%)
Oral Radiology	1 (0.6%)	Orthodontics	48 (29.1%)
		Oral Surgery	32 (18.6%)

All Iowa counties were represented in the survey. The plurality of the dentists who responded was concentrated in Polk (145; 15.5%), the largest populated county, and Johnson (84; 9%) county which is the location of the University of Iowa College of Dentistry. Approximately 45 percent of dentists reported a ten minute round trip commute time or less to their primary practice location.

The majority of dentists (796; 88.1%) reported working full time. Of the dentists who reported they did not work full time (n=175; 19.3% of respondents), the reasons, which may be more than one per person, for part time work included the following:

1. Only desire part time work 89 (82.4%)
2. Semi- retired 49 (28%)
3. Desire more work, but there is a lack of patient demand 33 (18.9%)
4. Desire more work, but employment opportunities are limited 6 (3.4%)
5. Other 42 (24%)

Other responses included written comments such as maternity leave and desire for more time off work to enjoy life. Of 108 self-reported part time dentists (defined as less than 32 hours per week), 89 (82.4%) report their primary reason for being part time is that they only desire part time work.

When asked about the number of years at their primary practice location, the mean number of years was 19.5 with a standard deviation of 12.2 and a range of 0-58 years. The mean number of patients seen weekly by dentists was 60.3 with a standard deviation of 52.3 and a range of 3-450 patients per week.

### Financial Obligations and Contributions to Household

#### Income

The survey sought to find financial obligations that may impact the number of hours worked by Iowa dentists. Various factors such as educational debt, financial household contribution, number of dependent children and dependent adults were all evaluated to determine if any of these variables were associated with the number of hours worked.

The majority (692; 77.5%) of respondents reported having no educational debt. This debt was reported to range from >\$0-\$50,000 up to more than \$200,000. Eleven dentists did not respond to the question about educational debt.

When asked about their household financial contribution, 872 dentists responded to the question. The majority of dentists (n=570; 58%) reported being responsible for 76-100% of their household income; whereas, 266 dentists (30.5%) reported being responsible for 41-75% of their household income, 24 dentists (2.65%) reported being responsible for 26-40% of their household income and 12 dentists (1.33%) reported being responsible for 0-25% of their household income. These categories were later collapsed into two categories consisting of dentists responsible for 0-60% of household income and those responsible for 61-100%.

### Time-Off Work

The overwhelming majority of dentists (93.6%) denied taking any leaves of absence from their practice longer than 45 consecutive working days within the past two years. Of those who responded taking time away from work, the two most frequently noted reasons were child rearing (21; 2.66%) and personal illness (23; 2.88%).

### Household Responsibilities

When considering household responsibilities, most dentists (507; 56.3%) reported equally sharing household responsibilities with a spouse or significant other, and 246 (27.3%) dentists reported doing a minimal amount of household chores. Most dentists (64.5%) denied hiring domestic help to assist with household chores during the past two weeks.

### Practice Specialty

Fifty-four point four percent (54.4%) of dentists reported sole proprietor as their primary practice or employment type, 26.5% reported being a partner or co-worker, 10.3% were employees or associates, 2% were independent contractors, 4% were academicians, 0.64% were federal or state employees and 2% reported other. The most common answer for the number of years at the dentists' current primary practice was 30 years.

### Care-giving Responsibilities

Almost eighty-six percent (85.7%) of Iowa dentists report having children. Of the dentists who reported having children, 409 dentists reported having minor children (18 years of age or younger) and 126 dentists reported having preschool age children (Table 4). The majority of dentists with preschool children report having a spouse or partner as the regular caregiver of their children (87.3%). Almost forty-eight percent report having daycare centers for the primary care-giving responsibility of preschool age children (Table 4). Respondents were able to select more than one answer for regular caregivers so the responses were not mutually exclusive.

When asked whether childcare responsibilities affected the dentists' work schedule, 34.2% of dentists reported changing their work schedule to accommodate care-giving demands (Table 4). Seventeen percent (17.1) reported a reduction in their work schedule to accommodate childcare demands (Table 4).

Seventy-one dentists reported providing care for dependent adults. Forty-nine point three percent (49.3) of dentists reported hiring help to assist with their adult care-giving responsibilities (Table 5). Almost fifty-eight (57.8) percent of dentists reported providing financial support for adult dependents and 63.4% reported being responsible for transportation (Table 5). The dentists could select more than one answer for the type of dependent adult care they provided.

#### Null Hypothesis 1

There is no difference between female and male Iowa dentists for working full time.

Approximately 89% of male dentists worked 32 or more hours per week while approximately 85% of female dentists worked 32 or more hours per week (Table 7). There was a statistical significance in the mean age ( $p < 0.0001$ ), reported practice busyness ( $p < 0.0001$ ), presence of educational debt ( $p = 0.0250$ ), type of practice (i.e. solo practice vs. other) ( $p = 0.0006$ ), percentage contribution to total household income ( $p = 0.0012$ ), and the presence ( $p = 0.0145$ ) and number of minor children ( $p = 0.0267$ ) of dentists working less than 32 hours per week and dentists working 32 or more hours per week (Table 6). No statistical significance existed between the hours worked when considering gender (in the bivariate analysis), relationship status, having any children, having regular caregivers for preschool children, and caring for dependent adults (Table 7). Table 8 displays the simple logistic regression model for full versus part time employment compared to gender, the primary predictor variable. When gender alone is included in the regression model, there is no statistical difference for full- versus part-time practice.

A multiple logistic regression was performed to assess the association between gender on the likelihood of working full time after controlling for statistically significant variables (age, busyness, educational debt, contribution to household income and type of practice) (Table 9). Two of the categories for busyness (provided all care but felt overworked and too busy to treat all who requested it) had insufficient cell sizes and were collapsed into one category (too many patients) to allow for sufficient cell size for statistical manipulation. Forward stepwise logistic regression analysis was conducted and verified using backward elimination logistic regression analysis. Both procedures yielded the same significant results with the same p-value for the goodness of fit test ( $p = 0.9676$ ).

The final multiple logistic regression model explored the significant factors that affected the weekly working hours of Iowa dentists. The results indicated that dentists

who were younger ( $p < 0.0001$ ), male ( $p = 0.0082$ ), sole proprietor ( $p = 0.0001$ ), financial contribution of 61-100% of household income ( $p = 0.0145$ ), and had too many or sufficient patients ( $p = 0.0012$ ) were more likely to work 32 or more hours per week compared with their counterparts (Table 9).

In the final multiple regression model, the odds of working 32 or more hours per week of males were 2.37 times that of females, whereas every unit increase in age demonstrated an 8% decrease in the odds of working 32 or more hours per week. Dentists who contributed between 61% and 100% to household income were 2.07 times as likely to work 32 or more hours per week compared with those who contributed between 0% and 60% to the household income. For sole proprietors, the odds of working 32 or more hours per week were 2.48 times as likely as dentists who indicated other types of primary practices. Among dentists who reported having too many patients, the odds of working 32 or more hours per week were 3.67 times as likely as dentists who had insufficient patients. The odds of working 32 or more hours per week for dentists who reported having sufficient patients were about 20% lower than those with insufficient patients, but this difference was not statistically significant.

In developing the final logistic regression model, multicollinearity diagnostics were conducted to examine the effects of significant correlation between the explanatory (independent) variables on the results of the final regression. Variance inflation factor (VIF) and eigenvalue analysis were used. Both tests revealed that age and years since graduation were highly correlated. As such, age was selected in the final model due to the results of the better goodness of fit test for the logistic regression model.

In summary, there is no statistically significant difference between the percent of males and females who work full versus part time in a simple logistic regression model (i.e., without the inclusion of other variables). However, when controlling for other

substantive variables in a stepwise regression model, the odds of working full time for males was 2.37 times that of females.

#### Null Hypothesis 2

There was no difference between female dentists who report having minor children and who report not having minor children for working full-time.

There were 192 female dentists who were included in this analysis. Twenty-eight female dentists reported working less than 32 hours per week and 164 reported working 32 or more hours per week. When categorized by age, 48 (25%) were less than 30 years old, 59 (30.7%) were 30-35, 42 (21.9%) were 36-45, 27 (14.1%) were 46-55 and 16 (8.3%) were 56-65 years old (Table 10).

When asked about educational debt, 96 female dentists reported having no educational debt and 92 dentists reported having some educational debt (Table 10). Ninety percent of female dentists reported having a husband or partner and 19 dentists were divorced, widowed, separated or single (collapsed into 'other') (Table 10).

Seventy-eight percent (n=150) of female dentists report having children and almost 60 percent (n=115) of those dentists reported having minor children (18 years of age or younger) (Table 10).

Among Iowa female dentists, there was a statistically significant difference in percentage contributed to household income ( $p=0.0097$ ), the presence of children ( $p=0.0001$ ) and minor children ( $p=0.0291$ ), desire to only work part time ( $p=0.0332$ ), having taken a leave of absence from dental practice longer than 45 consecutive days ( $p=0.0126$ ), percentage contributed to total household income ( $p=0.0097$ ) and whether or not there was a reduction in work schedule ( $p=0.0168$ ) in relation to whether the dentist works full or part-time (Table 11). However, there were no statistically significant



differences for females who work fulltime vs. part-time regarding their age, perceived busyness or primary employment. There are a couple of variables that are close to statistical significance (i.e., educational debt –  $p=0.0540$ ; relationship status –  $p=0.0814$ ) (Table 12). Other variables that were not deemed statistically significant to the number of hours worked by Iowa dentists were the number of minor children, presence of regular caregivers for preschool children, hired help to assist with adult care-giving responsibilities or interruptions or changes in work schedules to accommodate care-giving demands (Table 12). Age and years since graduation were highly correlated. As such, age was selected as the variable to be reported for bivariate analysis.

In order to answer the research question “Is having minor children and percentage of contribution to the household income associated with the weekly working hours of Iowa female dentists”, a logistic regression analysis was conducted. There was a significant difference between the Iowa female dentists who had or did not have minor children ( $p=0.0353$ ) regarding the number of weekly working hours. The odds of working 32 or more hours per week for female respondents who had no minor children were 3.06 times as likely as for females who had minor children (Table 10). A significant difference was also found between dentists who contributed 0-60% and 61-100% of the household income ( $p=0.0129$ ). Iowa female dentists who contributed between 61% and 100% to household income were 3.01 times as likely to work 32 or more hours per week as female dentists who contributed 60% or less to household income (Table 14).

An additional multiple logistic regression was performed to answer the question “What is the association with having minor children and percentage contribution to the household income on the likelihood of a number of weekly working hours after controlling for age, busyness, having regular caregivers for preschool children, marital status, educational debt and type of practice?” Forward stepwise logistic regression

analysis was conducted and verified using backward elimination logistic regression analysis. Both procedures yielded the same significant results with the same p-value for the goodness of fit test ( $p=0.6291$ ).

Female dentists who contributed 61-100% of household income ( $p=0.0096$ ), and had no leave of absence longer than 45 consecutive working days within the past two years ( $p=0.0483$ ) were more likely to work 32 or more hours per week than their counterparts. In conclusion, female subjects who contributed between 61% and 100% to household income were 3.33 times as likely to work 32 or more hours per week compared with those who contributed 60% or less to the household income, when controlling for leaves of absence during the past two years. The odds of working 32 or more hours per week for dentists who did not take a leave of absence longer than 45 consecutive working days were 2.85 times as likely as those dentists who took a leave of absence longer than 45 working days within the past two years, when controlling for contribution to household income.

**Table 1 Selected Demographic Findings from a Survey of Iowa Dentists (N=904)**

<b>Variable</b>	<b>Mean</b>	<b>Standard Deviation</b>
<b>Age of Iowa dentists</b>	50.8	11.6
<b>Years since graduation</b>	24.2	12.1
<b>Number of hours worked per week</b>	38.8	9.3
<b>Number of minors</b>	2.1	1.0
<b>Variable</b>	<b>Frequency</b>	<b>Valid Percent (%)</b>
<b>Gender</b>		
Male	712	78.8
Female	192	21.2
<b>Age group</b>		
<30	23	2.5
30-35	90	10.0
36-45	176	19.5
46-55	219	24.2
56-65	321	35.5
65+	75	8.3

\*Due to missing data, not all variables add up to the total sample size population of 904

**Table 2 Employment Characteristics of Iowa Dentists (N=904)**

<b>Variable</b>	<b>Frequency</b>	<b>Valid Percent (%)</b>
<b>Practice Specialty</b>		
<b>General dentist</b>	739	81.8
<b>Specialist</b>	165	18.3
<b>Specialty Types</b>		
<b>Dental Public Health</b>	4	2.4
<b>Endodontics</b>	19	11.5
<b>Oral Pathology</b>	1	0.6
<b>Oral Radiology</b>	1	0.6
<b>Oral Surgery</b>	33	20.0
<b>Pediatric Dentistry</b>	31	18.8
<b>Periodontics</b>	14	8.5
<b>Prosthodontics</b>	14	8.5
<b>Orthodontics</b>	48	29.1
<b>Hours Worked</b>		
<b>Full time (<math>\geq 32</math> hours/week)</b>	796	88.1
<b>Part time (<math>&lt; 32</math> hours/week)</b>	108	12.0

Table 2 – continued

<b>Reasons part time dentists work &lt;32 hours/week**</b>		
<b>Dentist desires only part time work</b>	89	82.4
<b>Dentist is semi-retired</b>	49	45.4
<b>Dentist desires more work but lack of patient demand</b>	33	30.6
<b>Dentist desires more work but limited employment opportunities</b>	6	5.6
<b>Other</b>	42	38.9
<b>Reasons for leaves of absence longer than 45 consecutive days within last two years (n=58)**</b>		
<b>Further educational study</b>	4	0.1
<b>Personal illness</b>	23	0.4
<b>Family illness</b>	2	0.0
<b>Child rearing</b>	21	0.4
<b>Family issues (other than medical illness)</b>	0	0.0
<b>Other</b>	8	0.1

\*Percentages reflect number of dentists who report working <32 hours/week (n=108) as denominator.

\*\*Dentist could choose more than one answer for reasons for working part time and leave of absence.

**Table 3 Relationship Status, Spousal Education and Domestic Responsibilities of Iowa Dentists (N=904)**

<b>Variable</b>	<b>Frequency</b>	<b>Valid Percent (%)</b>
<b>Relationship status</b>		
<b>Married</b>	810	89.9
<b>Partner in an unmarried couple</b>	15	1.7
<b>Single, never married</b>	28	3.1
<b>Widowed</b>	4	0.4
<b>Divorced</b>	40	4.4
<b>Separated</b>	4	0.4
<b>Highest education of dentists' spouse</b>		
<b>I do not have a spouse/significant other</b>	1	0.1
<b>Some high school</b>	0	0
<b>High school graduate</b>	39	4.8
<b>Technical school</b>	36	4.4
<b>Some college</b>	82	10.1
<b>College graduate</b>	329	40.6
<b>Some graduate school</b>	54	6.7
<b>Graduate/professional degree</b>	269	33.2

**Table 3 – continued**

<b>Percentage contributed to household income*</b>		
<b>0-25%</b>	12	1.5
<b>26-40%</b>	24	2.9
<b>41-60%</b>	97	11.8
<b>61-75%</b>	169	20.5
<b>76-100%</b>	570	69.1
<b>Current educational debt of dentist and spouse**</b>		
<b>No educational debt</b>	692	77.5
<b>&lt; \$50,000</b>	46	5.2
<b>\$50,001-100,000</b>	57	6.4
<b>\$100,001-150,000</b>	36	4.0
<b>\$150,001-200,000</b>	40	4.5
<b>&gt;\$200,000</b>	22	2.5

Table 3 – continued

<b>Dentists' reported household responsibilities</b>		
<b>Dentist is responsible for all chores at home.</b>	55	6.1
<b>Dentist does a majority of chores at home</b>	89	9.9
<b>Dentist equally shares chores at home</b>	507	56.3
<b>Dentist does a minimal amount of chores at home</b>	246	27.3
<b>Dentist does not do any chores at home***</b>	3	0.3
<b>Dentists who have hired domestic help to assist with household chores in the past two weeks.</b>		
<b>Yes</b>	318	35.5
<b>No</b>	586	64.5

\*Percentages reflect number of dentists who responded to this question (n=872) as denominator

\*\*Percentage reflects number of dentists who answered the question (n=893) concerning educational debt.

\*\*\*Percentages reflect number of dentists who responded to question concerning household responsibilities (n=900).



**Table 4 Children and Childcare Responsibilities for Iowa Dentists (N=775)**

<b>Variable</b>	<b>Frequency</b>	<b>Valid Percent (%)</b>
<b>Number of children</b>		
<b>Dentists with children</b>	775	85.7
<b>Dentists with minor children</b>	409	45.2
<b>Dentists with preschool children*</b>	126	13.9
<b>Regular caregivers for preschool children*^</b>		
<b>Spouse/partner</b>	110	87.3
<b>Other family member (e.g., grandparent)</b>	25	19.8
<b>Paid employee (e.g., nanny)</b>	24	19.1
<b>Friend</b>	6	4.8
<b>Daycare center</b>	60	47.6
<b>Other**</b>	17	13.5

Table 4- continued

<b>Effects of childcare responsibilities on dentists' work schedule*^</b>		
<b>Dentist changed schedules to accommodate care-giving demands</b>	140	34.2
<b>Dentist reduced work schedule to accommodate demands</b>	70	17.1
<b>Dentists schedule interrupted by frequent emergencies</b>	27	6.6
<b>Other***</b>	29	7.1

\*Percentages reflect total number of reporting dentists (n=904) as denominator for number of children.

\*\*Percentages reflect total number of dentists reporting preschool age children (n=126) as denominator.

\*\*\*Percentages reflect number of dentists reporting minor children (n=409) as denominator for effects of childcare of dentists' work schedule.

\*^ Dentist could select more than one answer.

**Table 5 Iowa Dentists Who Have Dependent Adult Responsibilities (N=71)**

<b>Variable</b>	<b>Frequency</b>	<b>Valid Percent (%)</b>
<b>Dentists who report providing care for dependent adults</b>		
<b>Yes</b>	71	7.9
<b>No</b>	833	92.1
<b>Dentists who have hired help to assist with adult care-giving responsibilities *^</b>	35	49.3
<b>Type of dependent adult care provided by dentist*^</b>		
<b>Financial</b>	41	57.8
<b>Personal assistance (e.g., bathing, grooming)</b>	18	25.4
<b>Domestic care (e.g., meal preparation)</b>	24	33.8
<b>Transportation</b>	45	63.4
<b>Other</b>	18	25.4

\*^Dentist could select more than one answer.

\*Percentages reflects number of dentists who responded affirmatively to question concerning dependent adults (n=71)

**Table 6 Statistically Significant variables concerning Iowa dentists who worked full ( $\geq 32$  hours/week vs. part time ( $<32$  hours/week) (N=904).**

<b>Variable</b>	<b>Less than 32 hours/week (n=108)</b>	<b>32 or more hours/week (n=796)</b>	<b>p-Value</b>
<b>Age (yrs)</b> <b>Mean<math>\pm</math>SD</b>	57.4 ( $\pm 13.4$ )	49.9 ( $\pm 11.1$ )	<0.0001*
<b>Busyness</b>			<0.0001*
<b>Not busy enough</b>	30 (12.7%)	207 (87.3%)	
<b>Enough patients</b>	67 (15.0%)	379 (85.0%)	
<b>Over-worked</b>	6 (4.2%)	138 (95.8%)	
<b>Too Busy to treat</b>	2 (3.2%)	61 (96.8%)	
<b>Educational debt</b>			0.0250*
<b>No educational debt</b>	92 (13.3%)	600 (86.7%)	
<b>Some educational debt</b>	15 (7.5%)	186 (92.5%)	
<b>Percent contribution to household income</b>			0.0012*
<b>0-60%</b>	27 (20.3%)	106 (79.7%)	
<b>61-100%</b>	77 (10.4%)	662 (89.6%)	
<b>Having minor children (<math>\leq 18</math> yrs)</b>			0.0145*
<b>Yes</b>	37 (9.1%)	372 (90.9%)	
<b>No</b>	71 (14.3%)	424 (85.7%)	

**Table 6 – continued**

<b>Number of minor children</b>			0.0267*
<b>1</b>	9 (6.9%)	121 (93.1%)	
<b>2</b>	15 (9.6%)	142 (90.4%)	
<b>3</b>	10 (11.1%)	80 (88.9%)	
<b>4</b>	0 (0%)	25 (100%)	
<b>5</b>	2 (42.9%)	4 (57.1%)	
<b>Primary practice or employment type</b>			0.0006*
<b>Solo proprietor</b>	42 (8.5%)	450 (91.5%)	
<b>Others</b>	66 (16.0%)	346 (84.0%)	

\*Significant at  $p < 0.05$

**Table 7 Non-statistically significant variables ( $p \geq 0.05$ ) concerning Iowa dentists who worked full ( $\geq 32$  hours/week) vs. part time ( $< 32$  hours/week) (N=904).**

<b>Variable</b>	<b>Less than 32 hours/week (n=108)</b>	<b>32 or more hours/week (n=796)</b>	<b>p-Value</b>
<b>Gender</b>			0.2044
<b>Male</b>	80 (11.2%)	632 (88.8%)	
<b>Female</b>	28 (14.6%)	164 (85.4%)	
<b>Relationship Status</b>			0.1358
<b>Married and Partner</b>	102 (12.4%)	723 (87.6%)	
<b>Single and Other</b>	5 (6.6%)	71 (93.4%)	
<b>Having Children</b>			0.1022
<b>Yes</b>	97 (12.5%)	678 (87.5%)	
<b>No</b>	9 (7.4%)	113 (92.6%)	
<b>Number of Minors</b>			
<b>Mean +/- SD</b>	2.3 (+/-1.1)	2.1 (+/-0.95)	0.2946
<b>Having Regular Caregivers for Preschool Children</b>			0.9999
<b>Yes</b>	18 (10.7%)	151 (89.3%)	
<b>No</b>	1 (7.7%)	12 (92.3%)	
<b>Hired help to assist with adult caregiving</b>			0.7048
<b>Yes</b>	4 (11.4%)	31 (88.6%)	
<b>No</b>	31 (13.8%)	194 (86.2%)	

**Table 8 A simple logistic regression model for weekly working hours of Iowa dentists by gender (N=904).**

	Less than 32 hours/week (n=108)	Less than 32 hours/week (n=796)	Odds ratio 95% CI	p-Value
<b>Gender</b>				
<b>Male</b>	11.2%	88.8%	1.35 (0.85, 2.14)	0.2054
<b>Female</b>	14.6%	85.4%	1.00	

\*Significant at  $p < 0.05$

**Table 9 Multiple logistic regression model for weekly working hours of Iowa dentists by gender controlling for other statistically significant bivariate variables (n=904).**

	<b>Less than 32 hours/week (n=108)</b>	<b>32 or more hours/week (n=796)</b>	<b>Odds Ratio 95% CI</b>	<b>p-Value</b>
<b>Age</b>				
<b>Mean years</b>	57.4	49.9	0.92 (0.90, 0.94)	<0.0001*
<b>Gender (%)</b>				
<b>Male</b>	11.2	88.8	2.37 (1.25, 4.51)	0.0082*
<b>Female</b>	14.6	85.4	1.00	
<b>Contribution to the household income</b>				
<b>61-100%</b>	10.4	89.6	2.07 (1.16, 3.71)	0.0145*
<b>0-60%</b>	20.3	79.7	1.00	
<b>Primary practice (%)</b>				
<b>Sole proprietor</b>	8.5	91.5	2.48 (1.57, 3.92)	0.0001*
<b>Others</b>	16.0	84.0	1.00	



Table 9 – continued

<b>Busyness (%)</b>				0.0012*
<b>Too many patients (3+4)***</b>	3.9	96.1	3.67 (1.53, 8.81)	0.0036*
<b>Sufficient number of patients</b>	15.0	85.0	0.80 (0.48, 1.32)	0.3714
<b>Insufficient number of patients</b>	12.7	87.3	1.00	

\*Significant at  $p < 0.05$

\*\*Hosmer and Lemeshow Goodness-of-Fit Test ( $p = 0.9676$ )

\*\*\*Busyness categories 3 and 4 collapsed into 1 category due to insufficient cell size.

**Table 10 Selected Demographic Findings of Iowa Female Dentists (n=192).**

<b>Variable</b>	<b>Frequency</b>	<b>Valid Percent (%)</b>
<b>Female</b>	192	
<b>Age Group</b>		
<30	48	25
30-35	59	30.7
36-45	42	21.9
46-55	27	14.1
56-65	16	8.3
<b>Educational debt</b>		
No educational debt	96	50
Some educational debt	92	47.9
Missing	4	2.1
<b>Relationship Status</b>		
Married and Partner	173	90.1
Single and other	19	9.9

Table 10 – continued

<b>Percent of total household income contribution</b>		
<b>0-60%</b>	70	36.5
<b>61-100%</b>	111	57.8
<b>Missing</b>	13	6.8
<b>Having children</b>		
<b>Yes</b>	150	78.1
<b>No</b>	41	21.4
<b>Having minor children</b>		
<b>Yes</b>	115	59.9
<b>No</b>	77	40.1
<b>Number of Minor children</b>		
<b>1</b>	37	19.3
<b>2</b>	52	27.1
<b>3</b>	18	9.4
<b>4</b>	5	2.6
<b>5</b>	3	1.6

**Table 11 Statistically significant variables concerning female Iowa dentists who worked full ( $\geq 32$  hours/week) vs. part time ( $< 32$  hours/week) (N=904).**

<b>Variable</b>	<b>Less than 32 hours/week (n=28)</b>	<b>32 or more hours/week (n=164)</b>	<b>p-value</b>
<b>Percent contribution to total household income</b>			
<b>0-60%</b>	16 (22.9%)	54 (77.1%)	0.0097*
<b>61-100%</b>	10 (9.0%)	101 (91.0%)	
<b>Having children</b>			
<b>Yes</b>	28 (18.7%)	122 (81.3%)	<0.0001*
<b>No</b>	0 (0.0%)	41 (100.0%)	
<b>Having minor children</b>			
<b>Yes</b>	22 (19.1%)	93 (80.9%)	0.0291*
<b>No</b>	6 (7.8%)	71 (92.2%)	
<b>Desire only part-time work</b>			
<b>Yes</b>	22 (66.7%)	11 (33.3%)	0.0332*
<b>No</b>	1 (16.7%)	5 (83.3%)	
<b>Leave of absence longer than 45 consecutive days within last two years</b>			
<b>Yes</b>	8 (29.6%)	19 (70.4%)	0.0126*
<b>No</b>	17 (11.4%)	132 (88.6%)	

**Table 11 – continued**

<b>Reduction in work schedule to accommodate care giving demands</b>			
<b>Yes</b>	10 (33.3%)	20 (66.7%)	0.0168*
<b>No</b>	10 (13.2%)	66 (86.8%)	

\*Significant at  $p < 0.05$

**Table 12 Non-statistically significant variables ( $p \geq 0.05$ ) concerning female Iowa dentists who worked full ( $\geq 32$  hours/week) vs. part time ( $< 32$  hours/week) (N=904).**

<b>Variable</b>	<b>Less than 32 hours/week (n=28)</b>	<b>32 or more hours/week (n=164)</b>	<b>p-value</b>
<b>Age (years)</b> <b>Mean <math>\pm</math> Std Dev</b>	44.1 ( $\pm 9.8$ )	41.8 ( $\pm 10.0$ )	0.2583
<b>Age group</b>			0.8612
<b>&lt;30</b>	5 (10.4%)	43 (89.6%)	
<b>30-35</b>	10 (16.9%)	49 (83.1%)	
<b>36-45</b>	6 (14.3%)	36 (85.7%)	
<b>46-55</b>	5 (18.5%)	22 (81.5%)	
<b>56-65</b>	2 (12.5%)	14 (87.5%)	
<b>Years since graduation (years)</b> <b>Mean <math>\pm</math> Std Dev</b>	17.6 ( $\pm 9.2$ )	14.9 ( $\pm 10.1$ )	0.1530
<b>Busyness</b>			0.2010
<b>Not busy enough</b>	7 (13.2%)	46 (86.8%)	
<b>Enough patients</b>	17 (20.0%)	68 (80.0%)	
<b>Over-worked</b>	2 (5.7%)	33 (94.3%)	
<b>Too busy to treat everyone</b>	1 (7.1%)	13 (92.9%)	

Table 12 – continued

<b>Educational debt</b>			
<b>No educational debt</b>	19 (19.8%)	77 (80.2%)	0.0540
<b>&gt;0 - \$200,000+</b>	9 (9.8%)	83 (90.2%)	
<b>Relationship status</b>			
<b>Married and Partner</b>	28 (16.2%)	145 (83.8%)	0.0814
<b>Single and others</b>	0 (0.0%)	19 (100.0%)	
<b>Number of minor children</b>			
<b>Mean ± Std Dev</b>	2.27 (±1.12)	1.94 (±0.89)	0.1848
<b>Having regular caregivers for preschool children</b>			
<b>Yes</b>	12 (20.3%)	47 (79.7%)	0.9999
<b>No</b>	0 (0.0%)	2 (100.0%)	
<b>Hired help to assist with adult care giving demands</b>			
<b>Yes</b>	0 (0.0%)	5 (100.0%)	0.9999
<b>No</b>	2 (7.1%)	26 (92.9%)	

Table 12 – continued

<b>Changed patient schedule to accommodate care giving demands</b>			0.7741
<b>Yes</b>	8 (17.8%)	37 (82.2%)	
<b>No</b>	12 (20.0%)	48 (80.0%)	
<b>Work schedule interrupted by frequent emergencies for childcare</b>			0.9999
<b>Yes</b>	2 (16.7%)	10 (83.3%)	
<b>No</b>	18 (19.6%)	74 (80.4%)	
<b>Primary practice employment type</b>			0.3524
<b>Solo proprietor</b>	9 (11.7%)	68 (88.3%)	
<b>Other</b>	19 (16.5%)	96 (83.5%)	

\*Significant at  $p < 0.05$



**Table 13 A simple logistic regression model for weekly working hours of Iowa female dentists, by having minor children (n=192)**

	Less than 32 hours/week (n=28)	32 or more hours/week (n=164)	Odds ratio 95% CI	p-Value
<b>Having minors</b>	(%)	(%)		
<b>Yes</b>	19.1	80.9	1.00	0.0353*
<b>No</b>	7.8	92.2	3.06 (1.08, 8.65)	

\*Significant at p<0.05

**Table 14 A simple logistic regression model for weekly working hours of Iowa female dentists, by percent contribution to household income (n=192)**

	<b>Less than 32 hours/week (n=28)</b>	<b>32 or more hours/week (n=164)</b>	<b>Odds ratio 95% CI</b>	<b>p-Value</b>
<b>Contribution to household income</b>	(%)	(%)		0.0129*
<b>61-100%</b>	9.0	91.1	3.01 (1.26, 7.18)	
<b>0-60%</b>	22.9	77.1	1.00	

\*Significant at p<0.05

**Table 15 A multiple logistic regression model for weekly working hours of Iowa female dentists (n=192)**

	<b>Less than 32 hours/week (n=28)</b>	<b>32 or more hours/week (n=164)</b>	<b>Odds ratio 95% CI</b>	<b>p-Value</b>
<b>Contribution to household income</b>	(%)	(%)		0.0096*
<b>61-100%</b>	9.0	91.0	3.33 (1.34, 8.27)	
<b>0-60%</b>	22.9	77.1	1.00	
<b>Leave of absence longer than 45 days within last 2 yrs</b>				0.0483*
<b>Yes</b>	29.6	70.4	1.00	
<b>No</b>	11.4	88.6	2.85 (1.01, 8.06)	

\*Significant at  $p < 0.05$

Hosmer and Lemeshow Goodness-of-Fit Test ( $p=0.4616$ )

**Table 16 Comparisons of age, gender and types of practice between respondents (n=904) and non-respondents (n=558).**

<b>Variables</b>	<b>Respondents</b>	<b>Non-Respondents</b>	<b>p-Value</b>
	904	558	0.7644
<b>Mean age ± Std dev</b>	50.8 (± 11.6)	50.7 (± 12.8)	0.8896
<b>Gender</b>			
<b>Male</b>	712 (78.8%)	446 (79.9%)	0.5932
<b>Female</b>	192 (21.2%)	112 (20.1%)	
<b>Primary practice specialty</b>			
<b>General</b>	732 (81.0%)	418 (74.9%)	0.006*
<b>Specialists</b>	172 (19%)	140 (25.1%)	

\*Significant at p<0.05

## CHAPTER V DISCUSSION

### Overview

The purpose of this study was to identify variables associated with the number of hours worked by Iowa dentists. Specifically, the study focused on whether gender, presence of minor children (18 years or younger), contribution to household income and amount of domestic household responsibilities affected working full versus part time for Iowa dentists.

### Response Rates

The response rate for this study, resulting from two mailings, was 62% or 904 dentists out of 1465 dentists. The gender breakdown of respondents when compared with non-respondents was 61.5% of all male Iowa dentists and 63.2% of all female Iowa dentists. The data showed there was no statistically significant difference in age ( $p=0.7644$ ) or gender ( $p=0.5392$ ) between respondents ( $n=904$ ) and non-respondents ( $n=558$ ). There was a statistically significant difference in the types of practice between respondents and non-respondents ( $p=0.006$ ). Respondents were more likely to be general practitioners than dental specialists (63.7% vs. 55.1% respectively) (Table 16).

### Key Outcome Measures

In general, Iowa dentists were more likely to work 32 hours or more per week if they were younger ( $p < 0.0001$ ), male ( $p = 0.0082$ ), a sole proprietor ( $p = 0.0001$ ), contribute 61-100% of household income, and had too many or sufficient number of patients ( $p = 0.0036$ ) when compared to their counterparts. When assessing female dentists, women who did not have minor (18 years or younger) children were 3.06 times as likely to work 32 or more hours per week than those who did have minor children. The final multiple regression model showed that women dentists who contributed between 61% and 100% of the household income ( $p = 0.0096$ ) and had no leave of absence longer than 45 consecutive working days ( $p = 0.0483$ ) were more likely to work 32 or more hours per week than their counterparts.

When the findings of this survey are compared to previous studies (e.g., American Dental Association Survey Center (ADA, December 2009)), 12.1% of male Iowa dentists reported working part time in the ADA study compared with 11.2% of male Iowa dentists reporting part time work in this study. Approximately 22% (22.4%) of female dentists in Iowa reported working part time according to the ADA study whereas, 14.6% of female dentists reported working part time in this study (ADA, December 2009). The results reported by the ADA showed a larger percentage of dentists reporting part time work. This difference is possibly due to a greater response rate of Iowa dentists to the ADA survey than the survey conducted for the purposes of this study. Additionally, the ADA used 30 hours as the cut-off for full- vs. part-time work and this study used 32 hours. The two hour difference between the studies may explain the difference in the results.

### Comparison to Existing Literature

When comparing the results of this study to the existing literature, other professions (e.g., cardiology, dermatology, management, psychology) have also shown a trend toward an interruption in practice patterns of females (Sobecks 1999), delay in bearing children (Powers 1969), fewer children (Sobecks 1999), reduction in hours worked (Jacobson 2004), and social prejudice or professional slights of women (Heckman, Bryson and Bryson 1977). Additionally, women in the literature have been primarily responsible for care giving needs and demands of children (Sobecks 1999). This responsibility has been associated with a decrease in mean hours worked by women (Jacobson 2004).

According to the literature, women dentists have continued to report some prejudice among their colleagues (Avery 1988), greater likelihood to accept salaried positions or practice in partnerships and groups, and account for 25% fewer patient visits annually (Avery 1988). Practice interruptions lasting more than 3 months were more common among females and 19.5% of female dentists in the study had taken maternity leave (Avery 1988). In addition, women were much more likely to be affected by their spouses' employment, much more likely to practice in cities or mid-sized towns than men and to be affected to a greater extent by family responsibilities (Avery 1988).

The findings in this study matched the existing literature supporting the first null hypothesis. The hypothesis stated there was no statistically significant difference between Iowa dentists who worked full ( $\geq 32$  hours/week) vs. part-time ( $<32$  hours/week). In the bivariate analysis, gender was not a statistically significant factor in determining hours worked. This seemed odd as all the literature from other professions showed a statistically significant difference in hours worked between genders (Jacobson et al 2004,

Sobecks et al 1999 and Avery et al 1988). When the multiple logistic regression model was conducted, controlling for other variables, gender was a significant predictor for weekly hours worked by Iowa dentists. This initially did not make sense but upon further evaluation, controlling for variables that could skew the data (specifically age and children which were shown throughout the literature to affect working hours) made all things equal and thus allowed the relationship between gender and hours worked to have a more significant relationship. As such, the original null hypothesis would be rejected because there was a statistically significant difference in the number of hours worked between male and female dentists.

The second null hypothesis states there was no statistically significant difference between hours worked by Iowa female dentists with minor children vs. Iowa female dentists without minor children. In the bivariate analysis, the presence of minor children was statistically significant in predicting the hours worked by female Iowa dentists. However, the multiple logistic regression did not show a statistical significance in the presence of minor children and hours worked by female Iowa dentists. The Hosmer and Lemeshow Goodness-of-fit test had a p-value of 0.4616. This shows that we were unsure of all of the reasons why some women worked full time and others worked part time. In addition, given the small sample size of women dentists in the study (n=192), we did not have enough power to include additional variables. If there were more women in the study, minor children could have appeared as a significant variable in the multiple logistic regression as it was so significant in the literature and in the bivariate analysis. As such, we rejected the null hypothesis that there was no statistically significant difference in hours worked between female dentists with minor children vs. female dentists without minor children in this study. However, the bivariate analysis showed a statistical significance (p=0.0291) in minor children and part- vs. full-time work.



This research supported the existing literature in numerous ways, and in other ways it did not. First, the literature showed a difference in work schedules of women with children and interruptions due to care-giving demands for women with children (Sobecks et al 1999, Jacobson et al 2004). The results of this research showed a statistically significant difference in the number of hours worked between women with children and women without children ( $p$ -value=0.0353) (Table 13). However, this research did not show a statistically significant difference in a reduction in work schedules to accommodate care-giving demands ( $p$ -value=0.7741) (Table 12). An explanation in the difference between this research and past research regarding a reduction in work schedules to accommodate care-giving demands could be explained by a greater presence or interaction with the fathers of these children in care-giving responsibilities (Aumann 2011). As men have become more actively involved in their children's lives, there has been greater support between the parents for care-giving needs. This could have been a likely explanation for the difference in previous literature and the research conducted in this study.

Previous literature looked at domestic responsibilities and how this could impact one's work. In the past, women were primarily responsible for the domestic chores and maintaining the home (Brownlee 1979). More recent studies have shown that couples are beginning to share in these responsibilities (Coltrane 2000, Kroska 2003). Though women and men did different things within the household, they were both participating in these responsibilities more now than in the past literature (Brownlee 1979, Kroska 2003). This study showed that a majority of dentists (56.3%) equally shared their household chores with a spouse or significant other (Table 3). Additionally, a very small percent of dentists reported responsibility for all chores (6.1%) or majority of chores (9.9%). This finding was synonymous with more recent literature (Coltrane 2000). Future studies

could look into these calculations to see how gender and age affects the dentists who reported being responsible for all, a majority or none of the household responsibilities.

Some additional variables that were important in the literature and included in the study were found to not be statistically significant. Household chores were included in the study but it was found not to be associated with hours worked by Iowa dentists. Marital status and education level of the dentists' spouse or significant other were variables surveyed in the data but were not statistically significant regarding hours worked. Another variable that had no statistically significant effect on hours worked in the study was the dentists' daily round trip commutes to their primary practice location.

#### Relevance of Study

There is a shortage of dentists in the country (Berenson 2007). As more dentists are retiring than are entering the profession, it is imperative for policy makers to understand some of the factors that may contribute to the shortage of the dental workforce, the maldistribution of the workforce, and other variables that may be important in determining full- versus part-time practitioners. This could possibly shed some light on the types of people to target for dental school admission. However, more research would be needed as the variables addressed in this study are not inclusive, nor does the study allow us to view these variables in a cause and effect manner to determine definitively the factors affecting the hours worked by Iowa dentists. This research is also not intended to say that one gender is more or less important to the profession than another. As this was a cross-sectional study, it only evaluated one point in time and did not look into how either gender's contribution to the profession changed over time. As women dentists have not been practicing as long as men, there is not a substantial cohort

of older women who are practicing dentistry to determine if the number of hours they spent working substantially increased after their children reached adulthood or if their hours changed once their children reached school age. Additionally, there has not been substantial research focused on how male dentists approaching retirement or the decrease in hours worked when closer to retirement affects the number of patients seen by Iowa dentists. Future research would be needed to evaluate these changes.

In the future, it would be beneficial to note if younger males who contribute the majority of their household income traditionally work the most hours (Table 9). Additionally, research has shown that women are more likely to live and practice in more populated metropolitan areas (Walton et al 2004). As such, when attempting to recruit for areas that have a shortage of dental providers, policy makers may use these findings to determine how to make rural dental practices more attractive to both.

### Study Strengths

This was the first study conducted assessing the circumstances surrounding the hours worked by Iowa dentists. A considerable response rate (62.0%) was received on the survey and will allow generalizations to be made concerning the practice patterns of Iowa dentists. Previous studies looked into how children and marriage affect the hours worked by women of various professions (Jacobson et al 2004). The American Dental Association (ADA) has conducted studies based upon the mean hours worked by gender; however, no research focused specifically on Iowa dentists or the specific variables affecting hours worked that are mentioned in this survey (ADA, Survey Center 2011). This survey looked into aspects of dentists' personal lives that were lacking in the literature such as:

1. Domestic responsibilities
2. 45 or more consecutive days out of practice in the past two years
3. Educational indebtedness
4. Presence of minors
5. Presence of dependent adults
6. Household contributions

### Study Limitations

The survey was intended to target all Iowa dentists but 38.3% of dentists did not respond. It is unclear why these dentists chose not to participate in the study. There were no statistically significant differences in the age or gender of non respondents; however, there was a statistically significant difference between general dentists and dental specialists. Additionally, the first mailing of the survey had a numbering error that caused a large number of dentists to skip a question that could have potentially provided more information. The survey was limited to Iowa dentists, but the findings could be generalized to dentists in other states as existing literature shows similar mean numbers of hours worked by United States (US) dentists (35.8 hours/week) as worked by Iowa dentists (38.8 hours/week) (ADA Survey Center 2011).

This study was subject to the limitations of all survey studies that rely solely upon self-reported data, thus causing a potential recall bias to be introduced into the study. These limitations can include intentional deception, poor memory recall, misunderstanding of questions, and possible differences in knowledge, attitude and behavior between respondents and non-respondents. As the study can only encompass a limited amount of variables, multiple other factors that may affect the number of hours

worked were not included in the survey (e.g., volunteer work, independently wealthy dentists, additional careers, etc.).

### Possible Changes to the Study if it was Repeated

If this study was repeated, several changes that could have been incorporated would be as follows:

- 1) Evaluating additional variables as potential factors affecting Iowa dentists work patterns:
  - A. Volunteer Work
  - B. Additional employment
  - C. Hobbies
  - D. Physical limitations or conditions arising from practice of dentistry
- 2) Performing a retrospective study that compared hours worked by dentists at the end of their career to their work habits earlier in their career (sampling an older cohort of dentists) versus the hours worked within the past year to see how various factors changed or remained the same regarding hours worked by Iowa dentists.
- 3) Incorporating a happiness index to discern how the dentists' feelings about their work as a dentist governs the number of hours they practice.
- 4) Information could be obtained from sources other than a mailed survey. The information could be gathered via:

A. Telephone surveys

B. Emailed surveys

5) Additional follow up

A. Third mailing

B. Telephone call to non-respondents to encourage or request response.

6) Incentives for participation

7) Additional hypotheses that could be tested with the existing data:

A. There is no statistically significant difference between the hours worked by dentists who had the presence of an additional source of income (i.e.: spouse of significant other) and those who did not.

B. There is no statistically significant difference between the hours worked by dentists who are responsible for all or a majority of the domestic responsibilities within their home, excluding childcare, and dentists who have help with these responsibilities.

## CHAPTER VI

### CONCLUSION

It is important to realize there are many important extenuating circumstances that affect the professional lives of modern dentists. Decades ago, dentistry was predominantly a male dominated profession. During this time, women were primarily confined to the home and were responsible for child rearing and domestic responsibilities. In more recent years, women have entered the work force, and more specifically women have entered dentistry. With more than 70% of households being dual-earner couples, it is imperative that dentists, male and female, contribute to family responsibilities (i.e. child rearing, household chores, etc.). When these responsibilities are factored into a finite amount of time, the number of hours spent on professional responsibilities decreases.

This research set out to fill the gap concerning what factors may or may not affect the number of hours worked by Iowa dentists. Existing literature discussed factors affecting other professions, and dental literature touched on hours worked by gender and how children and marriage affected hours worked by dentists. However, there was no literature concerning percentage contributed to household income, domestic responsibilities, adult care giving responsibilities, relationship status, etc. This survey had not been conducted, and disseminating this type of survey brought about a level of interest that yielded a high response rate (62%).

This study indicates that male dentists work full time (i.e. 32 or more hours per week) 2.37 times as frequently as female dentists when controlling for age, busyness, contribution to household income, and whether or not the dentist was a solo practitioner. Among female dentists, those who contributed more than 60% to the household income

were 3.33 times as likely to work full-time than dentists who contributed 60% or less; and those who have not taken a leave of absence longer than 45 consecutive days during the previous two years were 2.85 times as likely to work full-time compared to those who did take a leave of absence.

There are numerous other variables that can be assessed in future studies that may contribute or shed light on the factors affecting hours worked by Iowa dentists. This study demonstrated that there are some variables that help explain whether dentists practice full or part-time; yet there are many more variables that were not considered and should be evaluated in future research. More research is needed on this subject.



APPENDIX A  
COPY OF POSTCARD

Dear Doctor,

In 2-3 days you will receive a survey concerning the factors affecting the practice patterns of Iowa dentists. This research is being conducted for my Master's Thesis through the University of Iowa College of Dentistry, Department of Preventive and Community Dentistry. Upon receipt, I would appreciate you completing and returning the survey as soon as possible.

Thank you for your consideration,

Adrienne D. Jennings, DDS

APPENDIX B  
COPY OF COVER LETTER

Dear Doctors,

We invite you to participate in a research study. The purpose of the study is to identify personal obligations that affect how much time Iowa dentists are in their practice, as well as their perceptions about workload.

We are inviting you to be in this study because very little research has been done to determine how family and household responsibilities are related to practice preferences. As an active Iowa dentist, your responses may provide policy-makers with insight into work patterns for planning purposes. We obtained your name and address from the Iowa dentist tracking system (IDTS). The IDTS is administratively housed at the Carver College of Medicine's Statewide Clinical Education Program. The IDTS provides an ongoing system about the location of each practitioner, including the number of hours worked per week. Approximately 1465 people will take part in this study at the University of Iowa.

If you agree to participate, we would like for you to complete the enclosed survey and return it in the enclosed envelope. The survey, which should take approximately 15-20 minutes to complete, will inquire about domestic and care giving responsibilities and how they may relate to the practice patterns of dentists. If there are any questions that are unclear, please feel free to contact me at the number below for clarification. Additionally, if there are questions that you prefer not to answer, you may omit these items. If you choose not to participate in the study, please return the blank survey in the enclosed envelope and you will not be contacted again. If no correspondence is received, you will be contacted one additional time with a follow up letter in the mail in approximately two weeks.

We will keep the information you provide confidential, however federal regulatory agencies and the University of Iowa Institutional Review Board (a committee that reviews and approves research studies) may inspect and copy records pertaining to this research. Each participant is assigned a six digit identification code that is kept confidential. The purpose of this code is to keep track of those dentists who have returned the survey and the dentists who have indicated that they wish to not be contacted again. Upon completion of the second mailing, this identification code will be destroyed to prevent specific information from being linked to any individual. If we write a report about this study we will do so in such a way that you cannot be identified.

There are no known risks from being in this study, and you will not benefit personally. However, we hope that others may benefit in the future from what we learn as a result of this study. You will not have any cost for being in this research study nor will you be paid for being in this research study.

Taking part in this research study is completely voluntary. If you decide not to be in this study, or if you stop participating at any time, you won't be penalized or lose any benefits for which you otherwise qualify.

If you have any questions about the research study, please contact Dr. Adrienne D. Jennings at (214) 476-8007. If you experience a research-related injury, please contact Dr. Raymond Kuthy at (319) 335-7201. If you have questions about the rights of research subjects, please contact the Human Subjects Office, 105 Hardin Library for the Health Sciences, 600 Newton Rd, The University of Iowa, Iowa City, IA 52242-1098, (319)

335-6564, or e-mail [irb@uiowa.edu](mailto:irb@uiowa.edu). To offer input about your experiences as a research subject or to speak to someone other than the research staff, call the Human Subjects Office at the number above.

Thank you very much for your consideration. Returning the completed survey will indicate your willingness to participate in the study.

Sincerely,

Dr. Adrienne Douglas Jennings

APPENDIX C  
COPY OF SURVEY

### Factors affecting Iowa dentist practice patterns

- 1) In which county is your primary practice or place of employment located?  
\_\_\_\_\_county
- 2) How long (in minutes) is your average round trip daily commute from home to your primary practice or place of employment?  
\_\_\_\_\_minutes
- 3) What year did you graduate from dental school?  
\_\_\_\_\_
- 4) What is your gender?
  1. Male
  2. Female
- 5) What is your primary practice specialty?
  1. General dentist
  2. Specialist – Please state which specialty:  
\_\_\_\_\_
- 6) How many hours do you work per week
  1. Providing patient care? \_\_\_\_\_hours/week
  2. Doing other professional responsibilities? \_\_\_\_\_hours/week
- 7) Which of the following reasons explain why you work less than 32 hours per week?

	YES	NO
<b>A.</b> I work 32 hours or more per week. <b>(If “yes”, skip to Question 9.)</b>	<b>1</b>	<b>2</b>
<b>B.</b> I desire only part-time work.	<b>1</b>	<b>2</b>
<b>C.</b> I am semi-retired.	<b>1</b>	<b>2</b>
<b>D.</b> I desire more work, but there is a lack of patient demand.	<b>1</b>	<b>2</b>
<b>E.</b> I desire more work, but employment opportunities are limited.	<b>1</b>	<b>2</b>
<b>F.</b> Other, please specify: _____	<b>1</b>	<b>2</b>

8) In the previous question, which option is the main reason why you work less than 32 hours per week?

1. **B.** I desire only part-time work.
2. **C.** I am semi-retired.
3. **D.** I desire more work, but there is a lack of patient demand.
4. **E.** I desire more work, but employment opportunities are limited.
5. **F.** Other.

9) How much combined educational debt (undergraduate, dental school, etc.) do you and your spouse/significant other currently have?

*Note: Please do not include debt from your children's or grandchildren's education or other personal debt.*

1. No educational debt.
2. 0 - \$50,000
3. \$50,001 – 100,000
4. \$100,001 – 150,000
5. \$150,001 – 200,000
6. >\$200,000

10) For each of the following reasons, have you taken a leave of absence(s) longer than 45 consecutive working days from your career as a dentist within the last two years?

	<b>YES</b>	<b>NO</b>
<b>A.</b> Further educational study	<b>1</b>	<b>2</b>
<b>B.</b> Personal illness	<b>1</b>	<b>2</b>
<b>C.</b> Family illness	<b>1</b>	<b>2</b>
<b>D.</b> Child rearing	<b>1</b>	<b>2</b>
<b>E.</b> Family issues (other than medical illness)	<b>1</b>	<b>2</b>
<b>F.</b> Other, please specify: _____	<b>1</b>	<b>2</b>



The next few questions will ask you about marital or relationship status that could have an impact on your work patterns.

11) What is your current relationship status?

1. Single, never married
2. Married
3. Widowed
4. Divorced
5. Separated
6. Partner in an unmarried couple

12) Please select the highest level of education attained by your spouse/significant other.

1. I do not have a spouse/significant other. **Skip to Question 14.**
2. Some high school
3. High school graduate
4. Technical school
5. Some college
6. College graduate
7. Some graduate school
8. Graduate/professional degree

13) Approximately what percentage do you contribute to total household income?

1. 0 – 25%
2. 26 – 40%
3. 41 – 60%
4. 61 – 75%
5. 76 – 100%

The next few questions will ask you about household responsibilities and how much of them you are responsible for completing.

14) Which of the following best describes your share of responsibilities, excluding childcare, at home?

*Note: For this survey, household responsibilities include things like cooking, indoor chores, shopping for goods and services, vehicle repair, outdoor repair and maintenance, lawn care, and pet care.*

1. I am responsible for all chores at home.
2. I do a majority of chores at home.

3. I equally share chores at my residence (e.g., with a spouse, significant other, roommate).
4. I do a minimal amount of chores at home.
5. I do not do any chores at home.

15) Within the past two weeks, have you had any hired or domestic help assist with household chores other than care giving?

1. Yes
2. No

The next few questions will ask you about household and family responsibilities that could have an impact on your work patterns.

16) Do you have any children?

1. Yes
2. No **If no, skip to Question 22.**

17) Please list the ages of your children (in years).

Child 1	Child 2	Child 3	Child 4	Child 5	Child 6	Child 7

18) Do any of your dependent children (21 and under) live with you a majority of the time?

1. Yes
2. No **If no, skip to Question 21.**

19) Do you have any preschool children?

1. Yes
2. No **If no, skip to Question 21.**

20) Who are the regular caregivers for your preschool children while you are working?

	YES	NO
A. Spouse/partner	1	2
B. Other family member (e.g., grandparent)	1	2
C. Paid employee (e.g., nanny)	1	2
D. Friend	1	2
E. Daycare Center	1	2

<b>F. Other, please specify:</b> _____	<b>1</b>	<b>2</b>
---	----------	----------

- 21) Please identify whether your child care-giving responsibilities have affected your work during the past two years for each of the following reasons. If your practice has not been affected by child care-giving responsibilities, please skip to Question 24.

**YES      NO**

<b>A. I have changed patient schedules to accommodate care-giving demands.</b>	<b>1</b>	<b>2</b>
<b>B. I have reduced my work schedule.</b>	<b>1</b>	<b>2</b>
<b>C. My work schedule has been interrupted by frequent emergencies.</b>	<b>1</b>	<b>2</b>
<b>D. Other, please specify:</b> _____	<b>1</b>	<b>2</b>

- 22) Do you provide care for any dependent adults?

*Note: Examples of dependent adults include aging parent or grandparents, a disabled spouse or adult child, etc.*

1. Yes
2. No

**If no, skip to Question 25.**

- 23) What types of care do you provide for the dependent adult(s)?

**YES      NO**

<b>A. Financial</b>	<b>1</b>	<b>2</b>
<b>B. Personal assistance (e.g., bathing, grooming)</b>	<b>1</b>	<b>2</b>
<b>C. Domestic care (e.g., meal preparation)</b>	<b>1</b>	<b>2</b>
<b>D. Transportation</b>	<b>1</b>	<b>2</b>
<b>E. Other, please specify:</b> _____		

24) Have you had any recent hired help to assist you with your adult care-giving responsibilities?

1. Yes
2. No

The next few questions will ask you about practice and employment responsibilities that could have an impact on your work patterns.

25) What is your primary practice or employment type?

1. Sole proprietor
2. Partner/co-worker
3. Employee/Associate
4. Independent contractor
5. Academics
6. Federal or state employee
7. Other, please specify: \_\_\_\_\_

26) How long have you been at your current primary practice/place of employment?  
\_\_\_\_\_ years

If you are a dentist who does not provide clinical services, please stop here.

27) Approximately how many patients do you see per week (excluding dental hygiene visits)?

\_\_\_\_\_ patients per week

28) Which of the following best describes how busy your dental practice has been over the past 6 months?

1. I was not busy enough and would have liked to see more patients.
2. I provided care to all who requested it, had enough patients, and did not feel over-worked.
3. I provided care to all who requested it, but felt over-worked.
4. I was too busy to treat all those who requested care.

**Thank you for answering the questions in this survey.  
Please return in the enclosed envelope to:**

Adrienne D. Jennings DDS  
Department of Preventive and Community Dentistry  
Room N332  
University of Iowa  
Iowa City, Iowa 52242-1010

APPENDIX D  
COPY OF FOLLOW UP LETTER

December 1, 2010

Greetings Doctors,

A couple of weeks ago, you received a copy of a survey entitled “Factors affecting Iowa dentist practice patterns”. If you have already returned it, thank you for participating in this study. If not,

I would like to request a few moments of your time to complete this survey. I am a graduate student at the University of Iowa pursuing a Master’s Degree in Dental Public Health. The focus of my thesis project is to examine the factors that affect the practice patterns of Iowa dentists.

This survey is designed to identify personal obligations that affect how much time Iowa dentists are in their practice, as well as their perceptions about workload. Very little research has been done to determine how family and household responsibilities are related to practice preferences. Your responses may provide policy-makers with insight into work patterns for planning purposes.

Participation in this study is voluntary. Your answers will be kept confidential and the responses will be compiled and analyzed in aggregate form. By answering these questions, you are consenting to have your answers analyzed with the group of surveys. If you choose not to participate in the study, please return the blank survey in the enclosed envelope and you will not be contacted again.

If you have any questions about any of the items in this survey, please contact me at the phone number or email listed below.

Thank you for your time,

Adrienne D. Jennings DDS

Department of Preventive and Community Dentistry, Room N332

University of Iowa

Iowa City, Iowa 52242-1010

Adrienne-jennings@uiowa.edu

(214) 476-8007 cell

APPENDIX E  
COPY OF FOLLOW-UP SURVEY

### Factors affecting Iowa dentist practice patterns

- 1) In which county is your primary practice or place of employment located?  
\_\_\_\_\_ county
- 2) How long (in minutes) is your average round trip daily commute from home to your primary practice or place of employment?  
\_\_\_\_\_ minutes
- 3) What year did you graduate from dental school?  
\_\_\_\_\_
- 4) What is your gender?
  1. Male
  2. Female
- 5) What is your primary practice specialty?
  1. General dentist
  2. Specialist – Please state which specialty:  
\_\_\_\_\_
- 6) How many hours do you work per week
  1. Providing patient care? \_\_\_\_\_ hours/week
  2. Doing other professional responsibilities? \_\_\_\_\_ hours/week
- 7) Which of the following reasons explain why you work less than 32 hours per week?

	YES	NO
<b>A.</b> I work 32 hours or more per week. (If “yes”, skip to Question 9.)	<b>1</b>	<b>2</b>
<b>B.</b> I desire only part-time work.	<b>1</b>	<b>2</b>
<b>C.</b> I am semi-retired.	<b>1</b>	<b>2</b>
<b>D.</b> I desire more work, but there is a lack of patient demand.	<b>1</b>	<b>2</b>
<b>E.</b> I desire more work, but employment opportunities are limited.	<b>1</b>	<b>2</b>
<b>F.</b> Other, please specify: _____	<b>1</b>	<b>2</b>



8) In the previous question, which option is the main reason why you work less than 32 hours per week?

1. **B.** I desire only part-time work.
2. **C.** I am semi-retired.
3. **D.** I desire more work, but there is a lack of patient demand.
4. **E.** I desire more work, but employment opportunities are limited.
5. **F.** Other.

9) How much combined educational debt (undergraduate, dental school, etc.) do you and your spouse/significant other currently have?

*Note: Please do not include debt from your children's or grandchildren's education or other personal debt.*

1. No educational debt.
2. 0 - \$50,000
3. \$50,001 – 100,000
4. \$100,001 – 150,000
5. \$150,001 – 200,000
6. >\$200,000

10) For each of the following reasons, have you taken a leave of absence(s) longer than 45 consecutive working days from your career as a dentist within the last two years?

	<b>YES</b>	<b>NO</b>
<b>A.</b> Further educational study	<b>1</b>	<b>2</b>
<b>B.</b> Personal illness	<b>1</b>	<b>2</b>
<b>C.</b> Family illness	<b>1</b>	<b>2</b>
<b>D.</b> Child rearing	<b>1</b>	<b>2</b>
<b>E.</b> Family issues (other than medical illness)	<b>1</b>	<b>2</b>
<b>F.</b> Other, please specify: _____	<b>1</b>	<b>2</b>

The next few questions will ask you about marital or relationship status that could have an impact on your work patterns.

11) What is your current relationship status?

1. Single, never married
2. Married
3. Widowed
4. Divorced
5. Separated
6. Partner in an unmarried couple

12) Please select the highest level of education attained by your spouse/significant other.

1. I do not have a spouse/significant other. **Skip to Question 14.**
2. Some high school
3. High school graduate
4. Technical school
5. Some college
6. College graduate
7. Some graduate school
8. Graduate/professional degree

13) Approximately what percentage do you contribute to total household income?

1. 0 – 25%
2. 26 – 40%
3. 41 – 60%
4. 61 – 75%
5. 76 – 100%

The next few questions will ask you about household responsibilities and how much of them you are responsible for completing.

14) Which of the following best describes your share of responsibilities, excluding childcare, at home?

*Note: For this survey, household responsibilities include things like cooking, indoor chores, shopping for goods and services, vehicle repair, outdoor repair and maintenance, lawn care, and pet care.*

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2. I do a majority of chores at home.
3. I equally share chores at my residence (e.g., with a spouse, significant other, roommate).
4. I do a minimal amount of chores at home.
5. I do not do any chores at home.

15) Within the past two weeks, have you had any hired or domestic help assist with household chores other than care giving?

1. Yes
2. No

The next few questions will ask you about household and family responsibilities that could have an impact on your work patterns.

16) Do you have any children?

1. Yes
2. No

**If no, skip to Question 22.**

17) Please list the ages of your children (in years).

Child 1	Child 2	Child 3	Child 4	Child 5	Child 6	Child 7

18) Do any of your dependent children (21 and under) live with you a majority of the time?

1. Yes
2. No

**If no, skip to Question 21.**

19) Do you have any preschool children?

1. Yes
2. No

**If no, skip to Question 21.**

20) Who are the regular caregivers for your preschool children while you are working?

	<b>YES</b>	<b>NO</b>
<b>A.</b> Spouse/partner	<b>1</b>	<b>2</b>
<b>B.</b> Other family member (e.g., grandparent)	<b>1</b>	<b>2</b>
<b>C.</b> Paid employee (e.g., nanny)	<b>1</b>	<b>2</b>
<b>D.</b> Friend	<b>1</b>	<b>2</b>
<b>E.</b> Daycare Center	<b>1</b>	<b>2</b>
<b>F.</b> Other, please specify: _____	<b>1</b>	<b>2</b>

- 21) Please identify whether your child care-giving responsibilities have affected your work during the past two years for each of the following reasons. If your practice has not been affected by child care-giving responsibilities, please skip to Question 22.

	<b>YES</b>	<b>NO</b>
<b>A.</b> I have changed patient schedules to accommodate care-giving demands.	<b>1</b>	<b>2</b>
<b>B.</b> I have reduced my work schedule.	<b>1</b>	<b>2</b>
<b>C.</b> My work schedule has been interrupted by frequent emergencies.	<b>1</b>	<b>2</b>
<b>D.</b> Other, please specify: _____	<b>1</b>	<b>2</b>

- 22) Do you provide care for any dependent adults?

*Note: Examples of dependent adults include aging parent or grandparents, a disabled spouse or adult child, etc.*

1. Yes
2. No

**If no, skip to Question 25.**

- 23) What types of care do you provide for the dependent adult(s)?

	<b>YES</b>	<b>NO</b>
<b>A.</b> Financial	<b>1</b>	<b>2</b>
<b>B.</b> Personal assistance (e.g., bathing, grooming)	<b>1</b>	<b>2</b>
<b>C.</b> Domestic care (e.g., meal preparation)	<b>1</b>	<b>2</b>
<b>D.</b> Transportation	<b>1</b>	<b>2</b>
<b>E.</b> Other, please specify: _____		

- 24) Have you had any recent hired help to assist you with your adult care-giving responsibilities?

1. Yes
2. No

The next few questions will ask you about practice and employment responsibilities that could have an impact on your work patterns.

25) What is your primary practice or employment type?

1. Sole proprietor
2. Partner/co-worker
3. Employee/Associate
4. Independent contractor
5. Academics
6. Federal or state employee
7. Other, please specify:

\_\_\_\_\_

26) How long have you been at your current primary practice/place of employment?

\_\_\_\_\_ years

If you are a dentist who does not provide clinical services, please stop here.

27) Approximately how many patients do you see per week (excluding dental hygiene visits)?

\_\_\_\_\_ patients per week

28) Which of the following best describes how busy your dental practice has been over the past 6 months?

1. I was not busy enough and would have liked to see more patients.
2. I provided care to all who requested it, had enough patients, and did not feel over-worked.
3. I provided care to all who requested it, but felt over-worked.
4. I was too busy to treat all those who requested care.

**Thank you for answering the questions in this survey.  
Please return in the enclosed envelope to:**

Adrienne D. Jennings DDS  
Department of Preventive and Community Dentistry  
Room N332  
University of Iowa  
Iowa City, Iowa 52242-1010

APPENDIX F  
COPY OF GRANT LETTER TO DELTA DENTAL

30 November 2010

Hello,

I am a graduate student in the Department of Preventive and Community Dentistry at the University of Iowa and I would like to apply for the Delta Dental Thesis Award Program. The focus of my graduate studies research concerns factors that affect the hours worked by dentists in Iowa. I plan to disseminate a survey to Iowa dentists inquiring about their clinical and non-clinical (i.e., administrative) responsibilities. My research will allow policy makers to assess these factors and implement ways to help solve the problems concerning access to dental care in Iowa.

I am a 2003 graduate of the University Of Texas Health Science Center San Antonio School Of Dentistry. During my years of practice as a dentist, I have worked in Community Health Centers in the states of Maryland and Iowa. While working in these centers, I was able to provide treatment to underserved patients who had no other options for seeking care.

Feel free to contact me if you have any questions concerning any of the content.

Thank you,

Adrienne D Jennings DDS

Adrienne-Jennings@uiowa.edu

(214) 476-8007

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