national healthy marriage resource center

Making the Connection Between Healthy Marriage and Health Outcomes

What the Research Says

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Making the Connection Between Healthy Marriage and Health Outcomes: What the Research Says

This research is scattered among different disciplines, and has emerged both from analyses of general population health surveys and in research on specific populations and diseases.

Making the Connection

There are no public or privately funded research programs designed to study the connections between marriage and health. However an extensive body of research has accumulated in recent years clearly documenting that married adults are physically and emotionally healthier, live longer than adults that are never married, divorce, separated or widowed, and that their children will be healthier as well. This research is scattered among different disciplines, and has emerged both from analyses of general population health surveys and in research on specific populations and diseases. There have been several recent efforts to synthesize the findings from these disparate sources (see Waite & Gallagher, 2000, Chapter Four; Wilson & Oswald, 2005, Wood, Goesling & Avellar, 2007).

While these syntheses conclude that the associations between marriage and health are strong, they also make clear that the research is not yet nuanced, or robust enough to identify the causal pathways leading from marriage to health outcomes. Moreover, these reviews rely primarily on analyses of large population surveys that treat all marriages as the same, and include bad, "unhealthy" marriages along with the good, healthy or "good enough" marriages. It is generally acknowledged that unhappy, unhealthy, high-conflict marriages have negative effects on both physical & mental health.

The purpose of this research brief is to go beyond an examination of the effects of marital *status* to explore what is being learned about the effects of marital *quality* on health. We discuss the increasing body of evidence on the protective effects of healthy, higher-quality marriages, as well as the health hazards of lower-quality marriages, especially as adults grow

[1] This brief has greatly benefited from the presentations and discussions at the NHMRC Wingspread Making Connections conference held in October 20-22, 2008. We are also grateful for the comments of many of the participants on an earlier draft.

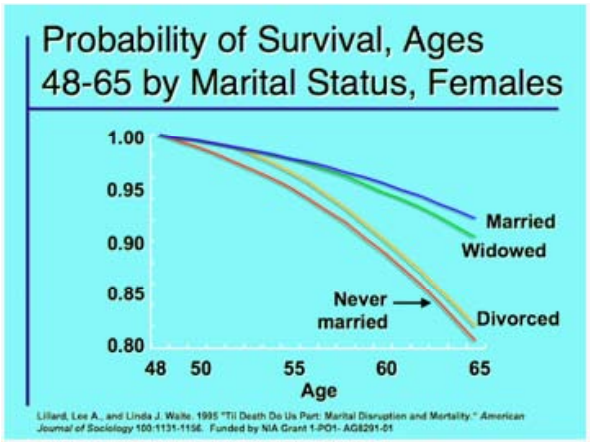
older. And we give examples of some emerging, fascinating clinical and laboratory-based studies that are beginning to identify some of the psycho-physiologic pathways through which marital quality affects health outcomes. It is these studies that suggest efforts to improve marital and relationship quality may be able to positively affect some health outcomes, especially at key points during the various stages of marriage.[1]

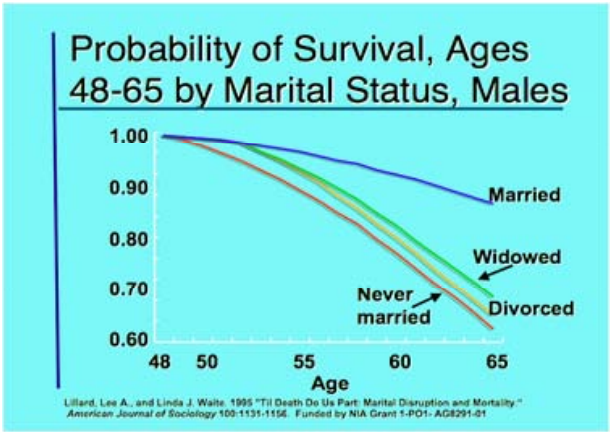
The link between Marriage and Health

In the *Case for Marriage*, Linda Waite and co-author Maggie Gallagher summarized an extensive body of survey research and concluded that getting married and being married is linked to many positive physical and mental health outcomes (Waite & Gallagher, 2000). In fact, these benefits seem to persist even when factors that affect health outcomes, such as health status prior to marriage, income levels and race/ethnicity are taken into account (Johnson et al, 2000; Kaplan & Kronick, 2006; Lillard & Waite, 1995; Wilson & Oswald, 2005; Wood, Goesling & Avellar, 2007). Also research suggests that married couples living in poverty have better physical health compared to their low-income peers who are unmarried, divorced or widowed (Schoenborn, 2004). Research also indicates a man or woman's marital status at age 48 – that is, whether married, divorced, widowed, or never married -- strongly predicts their chances of either surviving to age 65 or dying prematurely. For example, as depicted in the charts below (Waite, 2005), divorced men have only a 65 percent chance of living to age 65, compared to a 90 percent chance for married men, and a never-married woman has an 80 percent chance of living to age 65, compared to a 95 percent chance for married women (Lillard & Waite, 1995, Waite, 1995).

What is it about marriage that has these positive effects on health? Various factors play a role. First, there is the "selection effect." This refers to the premise that people who are inherently healthier mentally and physically, may be more likely to get married and to stay married, inflating the apparent effects of marriage on health. The "selection effect" may also work to 'select out' individuals for divorce who have unhealthy (but undetected behaviors) and mental health traits (such as hostility) that independently affect health outcomes. This can contribute to an over-estimation of the effects of divorce itself on subsequent health.

Second, there is the "protection" effect, which asserts that marriage itself changes individual health risk behaviors and encourages behaviors that are more likely to promote and protect health. Third, there is the social support, companionship, caring and care





giving that marriage generally brings to individual partners, especially as they grow older (Uchino et a1, 1996, Uchino 2004). Fourth, there are the additional economic resources that are associated with marriage, such as the fact that married individuals earn more, are more likely to have health insurance and have access to health care (see Wood et al, 2007 for a rigorous, extensive review of research on marital status and health).

In summary, in previous decades, selection of healthier partners for marriage was thought to be sufficient to explain the health benefits of marriage. The current research consensus is that the health benefits of marriage appear to result from a combination of *selection* and *protection* effects, as well as the additional resources and social support that healthy marriage brings over time.

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The links between marital quality and health

An increasing number of studies suggest that it is the quality of the marital relationship, rather than simply being married that affects health. The term "marital quality" includes both positive experiences (feeling loved, cared for and satisfied in the relationship), and negative experiences (excessive demands, criticism, emotional withdrawal, marital conflict). Having a marriage with relatively low levels of negative interactions appears to be what leads to lifelong cumulative health benefits. But what is generally meant by the terms a "healthy" or "good enough" marriage? There is no blueprint for a "healthy" marriage but researchers have identified a number of core characteristics that healthy marriages share including effective communication and conflict resolution, commitment over the long haul, and emotional support and companionship. A truly *healthy* marriage is physically and emotionally safe for both partners and for their children (Moore et al, 2004; Stanley et al, 2002).

A marriage in which there is violence is *unhealthy* by definition— physical and/or emotional abuses within a marriage are clear health risks. Even without physical conflict, marriages that are high in negative distress and discord carry health hazards by creating a high-stress environment that may increase the likelihood of divorce, which is strongly associated with poorer health outcomes for both men and women (Kiecolt-Glaser & Newton, 2001; Williams & Umberson 2004). A recent national representative survey of adults has demonstrated that an unhappy marriage [reported negativity, distress, lack of support, etc.] eliminates any predicted health benefits for adults (Brim et al, 2004). Moreover, even when conflicted marriages end via divorce, symptoms of distress continue as the former spouses spar over financial and custody issues (Kalmijn & Monden, 2006)

In the following sections we discuss some key findings from both representative population surveys and clinical studies. They are organized from a life course perspective and demonstrate the links between marriage and health, highlighting those that focus on marital/relationship quality by stages of the life cycle. For reasons of space we do not discuss the economic resources and access issues at length, and our major focus is on physical health outcomes; however, the same risk and protective factors have been found to affect mental health outcomes as well, especially for depression (see Wood et al, 2007). We have included only high quality studies, and relied especially on research which controls for other fac-

tors affecting health outcomes, such as income, prior health or other health conditions.

The Effects of Marriage and Marital Quality on Child Health

Studies reviewed by Wood and colleagues in a recent synthesis of research on marriage and health (Wood et al, 2007); show that marriage also benefits the health of children during their childhood and into their adult years. Children raised to adulthood by married parents live longer, and have better physical health as children and later in life as adults, compared to children raised in other living arrangements. Children living with two biological parents are healthier than children growing up in other family arrangements (e.g., step-parent, single mother, grandparents), regardless of income levels (Bramlett, & Blumberg, 2003). When these children reach adulthood, surveys show that they will have better physical health and a longer lifespan (Wood et al, 2007). Because most research on children's health (until recently) only measured family structure and did not explore parental lifetime health status or parental marital relationship quality, the association of better children's health outcomes with marriage factors clearly needs further investigation.

It is well-known that parents' divorce can negatively affect children's academic, social and psychological well-being, and can lead to greater incidence of risky behaviors, such as unprotected sexual activity and substance abuse, that will affect their health (Amato, 2001, Doherty & Needle, 1991; Hoffman & Johnson, 1998). If we look specifically at the health outcomes over their life span, children whose parents divorced before they were 17, grow up to have shorter a lifespan (for males) and more acute and chronic health conditions (for both males and females), compared to children whose parents remain married (Dawson, D.A., 1991; Maier & Lachman, 2000). Additionally, new research supports that marital discord / conflict between parents is a better predictor of illness later in life for their offspring than just measuring the marital status of the parents (Troxel & Matthews, 2004). More recent studies have pointed to pre-divorce relationship aspects, such as parental conflict, as often-unmeasured factors contributing to the effects of divorce on children's health (Furstenberg & Kiernan, 2001). This underlines the potential equivalence of distressed marriages and of divorce on a child's health & well-being (Carr & Springer, forthcoming 2010). Interestingly, research has found that children of distressed, highly negative couples have higher levels of stress-related hormones in their system, which is a marker for the presence of chronic physiological stress (Gottman & Katz, 1989).

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One ongoing longitudinal study funded by the Centers for Disease Control (CDC) focuses on the effects of adverse childhood experiences (ACE) on lifetime health outcomes. This study is beginning to demonstrate strong correlations, not just between later life health risk and physical and sexual abuse experiences in childhood, but with a number of other childhood risk factors such as problem drinking, violence against the mother, separation or divorce, emotional abuse or neglect. Many of these in turn are associated with the quality of the marriage relationship (Felitti

& Anda, 2008).

A few studies describe specific, measurable consequences for children's health of less stable, nurturing, parental relationships, when income levels and other societal factors are taken into account. For example, a child's chance of being diagnosed with asthma is more likely if the biological parents are unmarried and also not living together, after controlling for income levels, compared with either cohabiting parents and married parents (Harknett, 2005). In this study, the incidence of emergency hospital visits for asthma attacks increases in direct proportion with more tenuous and distant parent relationships, i.e., from married to cohabiting to not living together.

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Adolescent Health & Risk Behaviors

Adolescent high risk behaviors—smoking, excessive drinking/drug use, poor diet, risky sexual activities—are of concern because of lifelong health consequences. Risky teen behaviors have long been known to be influenced by family structure (married, cohabiting, stepfamily, single parenting). The presence of two married biological parents who can provide greater parental involvement, monitoring, supervision and closeness provide the best outcomes for teen health and well-being. Now research is showing that the quality of the parents' relationship with each other can affect (i.e., increase or decrease) an adolescent's health risk behaviors, and may be more powerful than just marital status. Family structure effects are mediated by the quality of family processes, and by family disruption from separation, divorce or even remarriage. Early and unprotected sexual activity in teens, a known health risk factor, is explained by the presence of marital conflict as well as by the adolescent's relationship with each parent (Kaye et al, 2009). This holds particularly true for teenage girls.

Adolescents living with married parents are less likely to use illegal drugs, compared to those who live with single parents or are in stepparent families in similar community/SES contexts (Hoffman, 2002), and are less likely to have depressive symptoms than young adults in stepfamilies, single parent families, or single parent families with other adults present (Barrett & Turner, 2005).

Adolescents appear especially vulnerable to family disruptions (Brown, 2006). Much of this vulnerability is explained by levels of prior marital discord, pointing to low marital quality before and after disruption as a key factor that explains the well-established association of adolescent health risk behaviors with divorce (Feinberg et al, 2007, Furstenberg & Kiernan, 2001; Peris & Emery, 2004).

When Young Adults Marry

Research indicates that when young adults marry they reduce their participation in risky behaviors (e.g., substance abuse, reckless driving, unprotected sex, poor nutrition). A large part of the lifetime protective value of marriage for men, especially younger men, comes from this reduction in risky behaviors upon marrying, particularly with alcohol and substance abuse (Bachman et al, 1997; Duncan et al, 2006; Horwitz et al, 1996; Horwitz & White, 1998). When women marry, their risk of alcohol abuse also decreases (Horwitz et al, 1996, Wilson & Oswald,

2005). Finally, studies show that when young adults marry, they consistently report immediate reductions in depressive symptoms, which are known risk factors for physical health problems later in life (Wood et al, 2007).

Being Married: Differences by gender, race and income

Gender

As noted, the couple that marries and stays married will increase their longevity and reduce their risk of chronic illness later in life. However, the effects of marriage on health tend to differ for men and women.

Men, in general, physically benefit from the transition to being married. Their health status improves, negative physical symptoms decrease, and positive behaviors increase, for the most part, when they get married, compared to their still-unmarried peers. Specifically, one recent study of low-income unmarried parents found that fathers who married their partners in the year following the birth of their child were healthier (based on a global self-assessment of health) than fathers choosing to remain single (Meadows, 2007).

However, the health effects of marriage are not all positive for men. Over time, married men are more likely to become overweight or obese (Schoenborn, 2004, Averett et al, 2008), and exercise less frequently than their unmarried counterparts (Nomaguchi & Bianchi, 2004). Research indicates that any 'disruption' in marital history shortens the lifespan significantly more for men than for women and undermines men's self-reported health (Lillard & Waite, 1995; Waite, 1995; Williams & Umberson 2004). Studies show that men who are divorced experience health risks equal to smoking a pack of cigarettes a day (House & Umberson, 1988).

Women. While men's health shows immediate benefits from just being married, the health advantages for women appear to increase with the duration of the marriage, which may also reflect women's greater sensitivity to the quality of the relationship itself. For each year of marriage, a woman's risk of dying prematurely decreases (Lillard & Waite, 1995). Women's health generally appears to be more susceptible to marital discord than men's health. For women, poor relationship quality seems to be associated with increased risk of premature mortality and an increased risk of heart disease (Umberson & Williams, 2005; Coyne et al, 2001; Gallo, Troxel et al, 2005; Kiecolt-Glaser & Glaser, 2001). Recent studies now show that while women who marry are thinner than their peers and potentially healthier to begin with (a selection effect), women's body mass index also increases once married, albeit modestly, just as it does for men (Averett et al, 2008).

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Racial/ethnic Factors

Once income levels have been adjusted, the protective benefits of marriage are as significant for African American couples as for Caucasian couples (Lillard & Waite, 1995; Schoenborn, 2004). The effects of marriage, divorce, and widowhood on health are the same across major racial/ethnic groups, including African Americans (Schoenborn, 2004).

Research finds no differences in health outcomes for African Americans who marry, in comparison to Caucasian populations in the U.S. (Johnson et al, 2000); however, it is well-known that marriage rates for African Americans are now significantly lower than for Caucasians or Latinos. This demographic fact may help to account for some part of the greater health disparities experienced by African Americans as the following studies suggest:

- The existing higher mortality risk for African Americans identified by major health surveys (Kaplan & Kronick, 2006), may be due to lower rates of marriage for African Americans, as approximately only 38 percent of African Americans are married compared to 60 percent of Caucasians (ACF Healthy Marriage Initiative, 2008).

- The higher percentage of African American men raised in families without two biological parents may account for at least part of the stark gap in longevity between African American and Caucasian men, as only 35 percent of African American children live with both biological parents, compared to 75 percent of Caucasian children (Warner & Haywood, 2006).

Ten research papers exploring the connections between marriage and health among African Americans have been commissioned by the Office of the Assistant Secretary for Planning and Evaluation, DHHS, to study the relationships between marriage and chronic & acute health conditions, relationship quality & mental and physical health, life course effects of marriage on health, and gender differences in the relationship of marriage and health. Anticipated publication date for the collection of research papers will be spring 2010.

Disparities in health outcomes for Hispanic populations are well-documented, and known to vary by cultural and ethnic origins. There is a lack of research examining specific associations between marital quality or transitions out of marriage, and health outcomes. However, it is known that being married and living with the father serves as a protective factor for birth weight and other birth outcomes in Hispanic families (Albrecht et al, 1994).

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Financial

The financial stability that comes with marriage also seems to have a positive impact on health (Waite & Gallagher, 2000). Marriage is well known to provide financial benefits, and these financial advantages appear to directly influence physical health by providing greater access to health care and other social services. Research suggests that the greater access to health and other services appears to be especially important in explaining marriage's impact on increasing women's health benefits (Waite & Gallagher, 2000). For both men and women, studies show that marriage is associated with increased access to private health insurance, which leads to higher quality of care, reduced average hospital stays, and access to beneficial nursing home care near the end of life (Wood et al, 2007).

Low-Income Couples

Research indicates that marriage protects the health of low-income couples just as it does for those with higher incomes. In a recent national survey, low-

income married couples reported to be healthier on all measures than their never-married or divorced low-income peers. These measures include: health status, reporting of health conditions like back pain, headaches, serious psychological distress, and reported lower levels of limitations in daily living activities and risk behaviors such as smoking and exercise (Schoenborn, 2004). However one exception is health insurance. Unmarried, low-income mothers are more likely to have health insurance and health care access through their eligibility for public programs, such as Medicaid, WIC, etc. (Bernstein et al, 2008), underlining the importance of understanding how marriage benefits may differ across different contexts and sub-populations.

Also, marriage appears to protect the elderly from the onset of physical limitations in carrying out their daily living activities.

As We Grow Older

As married partners reach middle age, it appears that the effects of both marital status and marital relationship quality on adult health become more powerful. Growing older increases the psychological importance of having and engaging in intimate relationships, and this in turn amplifies the potential stress the elderly may experience from any negative marital interactions or from transitions out of marriage through divorce or death of a spouse (Umberson et al, 2006).

Elderly persons who are still married are likely to be healthier. That is, 76 percent report being in good or excellent health, significantly higher percentages than their peers, who are widowed, divorced, living with a partner, or never married (Schoenborn, 2004).

Also, marriage appears to protect the elderly from the onset of physical limitations in carrying out their daily living activities. For example, three times as many widowed adults over 65 reported having limitations in daily activities, compared to their married peers (Schoenborn, 2004). Research found that physical limitations for divorced or never-married elderly were somewhere in between the married and widowed rates (Schoenborn, 2004; Prigerson et al, 1999, 2000).

Many longitudinal studies are documenting the relationship of marital quality and health over time. A three-year community study of roughly 400 married couples, reported declines in marital quality (e.g., reported satisfaction, happiness & commitment) were associated with increased symptoms of physical illness later in life for both men and women. In contrast, increases in marital quality were associated with improvements in physical health later in life, in studies able to control for other factors influencing health such as education, income, income changes, and job difficulties (Wickrama et al, 1997).

Two large representative studies of middle-aged and older married adults (50+) found that those who reported higher levels of negative spousal behaviors, such as experiencing criticism, arguments, and demands, had poorer health over time. This was indicated by their general health status, list of physical symptoms, presence of specific chronic health problems, or report of limitations in activities of daily living (ADLs) (Bookwala, 2005; Umberson et al, 2006). One study using data from the National Survey of Midlife Development in the U.S. (MIDUS), found that the association of negative marital functioning with poorer health outcomes was as strong for older men

as it was for older women (Bookwala, 2005, Umberson & Williams, 2005). Interestingly, the study also found that negative spousal behaviors were only associated with changes in general health status and no association could be found with the frequency of positive, caring, or helpful behaviors (i.e., "Does your spouse understand the way you feel, can he/she be relied on for help, etc." Bookwala, 2005).

These studies show that over an eight-year period, the relationship between negative marital quality and health declines was strongest for the oldest subjects (aged 70+ years) (Umberson et al, 2006). Younger adults did not report declines in health even when reporting negative marital quality, thus underscoring the increasing impact of marital quality on physical health in growing older (Umberson et al, 2006).

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Heart Disease. The effects of negative marital quality on health have been strikingly captured in studies of heart disease, which is a disease typically associated with aging. The following presents some noteworthy findings from these research studies:

- Overall, married men and women have a lower risk for death from heart attacks (Johnson et al. 2000), compared to other marital status categories; and married couples enjoy a better chance of returning to health when they receive a diagnosis of cardiovascular disease (Kiecolt-Glaser & Newton, 2001).
- Women over the age of 50 may have a higher risk of developing cardiovascular disease than men if they are divorced, remarried, or widowed. Between the ages of 50 and 60, the risk of cardiovascular disease for women was about 60 percent higher for divorced women and 30 percent higher for widows, compared to married women (Zhang & Hayward, 2006).
- A Swedish study showed that marital stress for women increased the risk of having a reoccurrence of a cardiovascular event such as angina, a heart attack, surgery for blocked arteries, or death. Work stress was not associated with an increased reoccurrence for women, unlike the known outcome of work stress on men. The increased risk of reoccurrence persisted after adjusting for other health factors and severity of initial diagnosis (Orth-Gormer et al, 2000).
- Higher marital relationship quality predicted long-term survival (i.e., defined as over 4 years) in a study of 189 heart disease patients, independent of other known risk factors including initial severity of the diagnosis. The most seriously ill patients in satisfied, low-conflict marriages lived significantly longer than much healthier patients in less-satisfying marriages (Coyne et al, 2001). Over eight years, the quality of the marital relationship continued to predict prolonged survival for the women in this study, but not for the men. Marital quality was a better predictor of survival than individual patient characteristics, such as hostility, optimism, and emotional support from others in general. Over half of women in the high quality marriages were still alive after eight years (Rohrbaugh et al, 2006).

- A recent study of 9,000 British subjects (De Vogli et al., 2007) found that negative close relationships significantly increased the risk of coronary events over a 12-year period, independent of socio-demographic characteristics, biological health factors (obesity, hypertension, diabetes, cholesterol level), psychosocial factors (depression, work stress), and health risk behaviors (smoking, drinking, exercise, diet). In contrast, and like Bookwala's findings (2005), emotional and practical support (positive quality) was not associated with reduced risk of heart disease. The independence of the effect of negative relationship quality from gender and from social position, both known to affect incident coronary disease, is especially striking.

Care giving & Health in the Later Years. Spousal care giving in later years can be both a health benefit for the ill spouse and a health risk for the caregiver. On the benefit side, married persons are known to be less likely to enter a nursing home or pay for costly long-term care, because they can turn to their spouse for care giving (Iwashyna & Christakis, 2003). Care and support are thought to be particularly beneficial to married men as they age. Correspondingly, older cohabiting women may feel less call to provide care giving, and thus older cohabiting men may gain fewer health benefits (Carr & Springer, forthcoming 2010). On the health cost, or health risk side, the physiological impact of extended pre-loss care giving by a spouse, and the neglect of one's own health concerns, takes a toll on the caregiver's health (Carr et al, 2001).

The Risks of Ending a Marriage

One important factor explaining the association of marriage with longevity and better physical health is the mental and physical health risks that accompany divorce. Divorce is not simply the loss of marital status and its associated positive health benefits. In most cases, divorce also involves the emotional and physiological stress that comes with poor marital relationships prior to dissolution, and with the traumatic disruption and the breaking of the primary adult attachment bond (Hughes & Waite, 2009; Kiecolt-Glaser & Newton, 2001). Research continues to show that divorce carries significant risks of illness and premature death for both partners, but especially for men (Lillard & Waite, 1995; Williams & Umberson, 2004). Men and women who have divorced have a greater likelihood of developing cardiovascular disease than adults who never marry or who remain continuously married without any disruption (Zhang & Hayward, 2006). While younger men report modest improvements in self-rated health after divorce, men over 50 report poorer health when they divorce (Umberson et al, 2006). Moreover, even when conflicted marriages end via divorce, symptoms of distress continue as the former spouses' spar over financial and custody issues (Kalmijn & Monden, 2006).

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Because most research on the effects of divorce on health look only at marital status (married, separated, divorced), little is yet known about the relative health consequences of staying in an un-healthy, distressed marriage vs. getting divorced.

marriage vs. getting divorced. One recent longitudinal study (Hawkins & Booth, 2005) provides some clues. It found that long-term, low-quality marriages where the couples stayed together had significant negative effects on a partners' well-being, including self-rated health, and is even worse than comparable, equally unhappy couples who divorced during the 12-year study.

It is important to briefly note the complex connection between depression and the occurrence of physical health problems later in life. One study that compared women at midlife who had divorced with their married peers over a ten-year period, found that women who divorce reported more symptoms of depression and did not report any significant changes in physical health in the first three years after separating. However, within ten years after their divorce, the same divorced women reported significantly more physical health symptoms than their married peers (Lorenz & Wickrama, 2006).

Domestic violence experts agree that the process of separating or divorcing when there has been a history of physical or emotional violence is one of the most dangerous situations for a woman to be in. This does not imply that women should stay in an unhealthy marriage to avoid harm, but rather that women who have decided to leave a violent relationship need to take extra precautions to assure their (and their children's safety) when doing so (Department of Justice, 2007). Data from the Department of Justice shows that reported non-fatal physical assaults are much higher for separated or divorced women than for those who are either married or unmarried. However, this data has an inherent bias: married adults are less likely to report incidents of domestic violence (see Johnson, 2009).

Pathways to Health in Marriage

How does a healthy, safe marriage – one which partners rate as high in quality and low in negativity – specifically protect the health of couples? Some answers are obvious. Married couples tend to monitor each other's health and risk behaviors. While men appear to benefit particularly from the health monitoring behaviors and support of their wives, women do not seem to receive the same degree of benefit (Waite & Gallagher, 2000). Research on compliance has long supported the value of involving family members, particularly spouses, in ensuring compliance with medical regimens. Interestingly, in one study that coached spouses to reduce negative interactions – specifically criticism and nagging—was found to be effective in increasing compliance with health care; while coaching spouses to increase positive, supportive behaviors was not (Campbell, 2003). A recent meta-analysis of adherence to medical treatment found only small positive effects for marital status, but much larger effects on patient adherence due to the quality of the relationship (DiMatteo, 2004).

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Clinical and laboratory studies are now beginning to identify some of the psycho-physiologic pathways by which marital interactions (positive and negative emotions) impact the physiological systems associated with physical health. The following presents some of these findings about how positive interactions affect physiology:

- Healthy women who reported being in highly satisfying relationships developed significantly fewer early indicators of cardiovascular disease (metabolic syndrome), such as elevated blood pressure, triglyceride and cholesterol levels, elevated glucose, and body-mass index over an 11-year period, compared to women in moderate and low-satisfaction relationships (Gallo et al, 2003; Troxel et al, 2005).

- Maintaining physical contact with a spouse while under stressful experimental conditions, lowered blood pressure and heart rate, and increased the hormone oxytocin, which prevents the body's stress responses from negatively influencing the cardiovascular and endocrine systems (Grewen et al, 2003, 2005a, 2005b; Light et al, 2005).

- Women holding their husband's hands while undergoing painful electric shocks experienced less pain, and showed decreased activity in areas of their brain responsible for directing the body's stress response versus other women undergoing the same test while holding a stranger's hand or no one's hand (Coan et al, 2006).

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Our immune systems are also sensitive to the amount of discord or conflict in a relationship. Research is documenting direct physiological responses to negative, hostile arguments, responses which in turn are associated with illness (Gottman, 1998; Kiecolt-Glaser & Newton, 2001; Robles & Kiecolt-Glaser, 2003). Studies show that:

- Older adults (in their 60s and 70s) in long-term marriages characterized by more negative conflict behaviors had worse-functioning immune systems compared to older adults in marriages with less conflict negativity. Older wives who reported less marital satisfaction and were in relationships with more negative behaviors during an (observed) marital argument had greater stress hormone responses to that argument. Older husbands' stress hormones were unrelated to marital quality or negative conflict behavior (Kiecolt-Glaser et al, 1997).

- In clinical experiments, the more a couple acted negatively toward one another during an observed argument about a real-life problem, the higher the stress hormone response of both spouses, especially the wives. The couples that showed the least negativity when actually having a marital argument had the best immune system responses the day after the conflict (Kiecolt-Glaser et al, 1997; Robles & Kiecolt-Glaser, 2003).

- An earlier study found that open physiological wounds were fought less aggressively by the body's immune system and healed more slowly when healthy couples experienced marital conflict, compared to the rate of wound healing when the same couples experienced a positive, supportive situation. Specifically, physical wounds of couples that normally have high levels of hostile interactions healed a day slower compared to couples that typically are not hostile towards each other (Kiecolt-Glaser et al, 2005).

Conclusion

In summary the research reviewed here and elsewhere is very promising. It suggests that a good-enough, or healthy marriage - one that is low in

negativity - will provide cumulative, lifelong protection against chronic illness and premature death for both men and women, as well as greatly increasing the chances that their children will grow up healthy. These benefits seem only to increase as couples grow old together.

A combination of factors account for these positive effects: physically and especially mentally healthier people may be "selected" into marriage and may be more likely to stay continuously married or to remarry; a healthy marriage itself encourages more health producing behaviors and interactions; and marriage brings more economic resources and access to health care. In addition, the research suggests that for many, a healthy marriage is the most intimate and enduring social support network, and that it is the transitions out of marriage that have the most impact on adult and children's immediate and long-term health outcomes. This is consistent with the large body of research documenting the positive effects of social support, and the strong negative effects of social isolation on health.

A great deal more needs to be known about the nature of the connections between marriage and health before we can come to any firm conclusions about recommending policy or program interventions. But the findings are robust enough, and from so many different sources, to suggest that an investment in additional research, perhaps starting with analyses of existing data sets—could prove very fruitful and could help us design and test educational interventions for the public and for health care professionals.

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