

THE UNIVERSITY OF CHICAGO

IN SICKNESS AND IN HEALTH:
UNDERSTANDING THE EFFECTS OF MARRIAGE ON HEALTH

A DISSERTATION SUBMITTED TO
THE FACULTY OF THE IRVING B. HARRIS
GRADUATE SCHOOL OF PUBLIC POLICY STUDIES
IN CANDIDACY FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

BY
THEODORE J. IWASHYNA

CHICAGO, ILLINOIS
AUGUST 2001

Copyright © 2001 by Theodore J. Iwashyna
All rights reserved

Table of Contents

| | |
|---------------------------------------------------------------------------------------------------------------------------------|-----------|
| List of Figures | vi |
| List of Tables | vii |
| Acknowledgements | viii |
| Abstract..... | xi |
| | |
| Chapter One: Introduction | 1 |
| 1.1 Orientation | 3 |
| 1.2 Caveats | 8 |
| 1.3 Current Period Models | 9 |
| 1.3.1 Physiologic Benefits..... | 9 |
| 1.3.2 Emotional Benefits | 10 |
| 1.3.3 Instrumental Benefits | 13 |
| 1.3.3.1 Debra Umberson: Social Control and the Imposition of Normativity | 13 |
| 1.3.3.2 Instrumental Social Support: Knowledge, Skills, Labor | 15 |
| 1.3.3.3 Spousal Social Capital | 17 |
| 1.4 Investment Models..... | 21 |
| 1.4.1.1 Pure Investment..... | 22 |
| 1.4.1.2 Instrumental Social Support: Income and Assets..... | 25 |
| 1.5 Alternatives: Selection Models..... | 27 |
| 1.6 Summary | 30 |
| | |
| Chapter Two: Empirical Results on the Association Between Marital Status and Mortality Among the Seriously Ill | 31 |
| 2.1 Data | 34 |
| 2.1.1 Detection of Marriage | 36 |
| 2.1.2 Definition of Comorbidities..... | 38 |
| 2.1.3 Race | 39 |
| 2.1.4 SES Indicators..... | 40 |
| 2.2 Whole Cohort Analyses | 41 |
| 2.2.1 Survival Analyses for All Cases | 42 |
| 2.2.2 Survival Analyses by Condition | 45 |
| 2.3 Loss of Spouse Analyses..... | 46 |
| 2.3.1 Cohort Definition | 47 |
| 2.3.2 Survival Analyses for All Causes | 47 |
| 2.3.3 Survival Analyses by Condition for Married Men..... | 49 |
| 2.3.4 Survival Analyses by Condition for Married Women | 50 |

| | | |
|-----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|------------|
| 2.3.5 | Summary for Probands | 52 |
| 2.4 | Loss of Proband Analyses | 53 |
| 2.4.1 | Summary for Spouses | 55 |
| 2.5 | The Impact of Alzheimer's Dementia..... | 56 |
| 2.6 | Caregiver Burden as Time Since Diagnosis | 58 |
| 2.7 | Sensitivity Analyses | 58 |
| 2.7.1 | Selection Test A: Decreasing Magnitude with Age of Spouse..... | 58 |
| 2.7.2 | Selection Test B: Joint Health | 59 |
| 2.7.3 | Selection Test C: Impact of Spousal Loss | 60 |
| 2.7.4 | Proportionality Violations | 60 |
| 2.7.5 | Survival of Initial Admission..... | 61 |
| Chapter Three: Interpreting the Effects of Spousal Loss on Mortality | | 62 |
| 3.1 | Assessing Past Work..... | 62 |
| 3.1.1 | Work Contradicted | 62 |
| 3.1.2 | Work Receiving Partial Support | 64 |
| 3.1.3 | Work Supported | 66 |
| 3.1.4 | Work for Which Tests were Inconclusive | 67 |
| 3.2 | Tentative Summary | 67 |
| 3.3 | Some Comments on Magnitude | 69 |
| Chapter Four: Empirical Results on the Association Between Marital Status and Health Care Use Among the Seriously Ill..... | | 78 |
| 4.1 | Data | 81 |
| 4.2 | Initial Hospital Choice | 82 |
| 4.2.1 | Results | 84 |
| 4.3 | Care at Index Hospital..... | 85 |
| 4.3.1 | Results | 88 |
| 4.4 | Limitations..... | 92 |
| 4.5 | Discussion | 93 |
| Chapter Five: Notes Towards a Theory of Relationships and Health..... | | 98 |
| 5.1 | Reviewing Empirical Results | 99 |
| 5.2 | Producing Health?..... | 101 |
| 5.3 | Changing Production and Consumption | 106 |
| 5.4 | Changing Goals | 113 |
| 5.5 | From Marriage to Community? | 117 |
| Appendix A: Data Construction..... | | 123 |
| A.1 | Empanelment | 124 |
| A.1.1 | General Data Source..... | 124 |

| | | |
|---------|----------------------------------------------------------------------------------------------------------|------------|
| A.1.2 | Selection of Initial Conditions and their Operationalization | 125 |
| A.1.3 | Other Empanelment Issues: Exclusion of Other Diagnoses | 130 |
| A.1.4 | Other Empanelment Issues: Exclusions Based Only on Inpatient Acute Care Hospital Claims | 131 |
| A.1.5 | Other Empanelment Issues: Definition of a Single Hospitalization | 132 |
| A.1.6 | Other Empanelment Issues: Minimal Data Completeness Restrictions | 133 |
| A.1.7 | Other Empanelment Issues: Geographic Restrictions | 133 |
| A.2 | Finding Spouses | 134 |
| A.2.1 | Overview | 134 |
| A.2.2 | Finding Spouses in the Denominator File: Direct Matching | 136 |
| A.2.3 | Finding Predeceased Spouses from our Cohort: Hypothetical HIC Generation | 137 |
| A.2.4 | Dealing with Divorcees | 139 |
| A.3 | Variable Definitions | 139 |
| A.3.1 | Defining the Death Date | 139 |
| A.3.2 | Expanding the Racial and Ethnic Coding Based on Name Algorithms for Hispanicity and Asian Origin..... | 140 |
| A.3.3 | Developing Comorbidity Measures | 141 |
| A.4 | Characterizing the Initial Hospitalization | 142 |
| A.4.1 | External Data Linkages: Hospitals..... | 143 |
| A.4.2 | External Data Linkages: Individual Patients | 144 |
| A.4.2.1 | U.S. Census | 145 |
| A.4.2.2 | Area Resource File: County-level Definition of Market Variables | 146 |
| | Appendix B: Figures | 148 |
| | Appendix C: Tables | 168 |
| | Bibliography | 224 |

List of Figures

| | |
|----------------------------------------------------------------------|-----|
| 1.1 Comparisons to be Used | 149 |
| 1.2 Time Course of Spousal Social Capital vs. Caregiver Burden | 150 |
| 2.1 Marital Status in COSI | 151 |
| 2.2 Survival Following Diagnosis..... | 152 |
| 2.3 Survival Following Diagnosis by Gender..... | 153 |
| 2.4 Effect of Spousal Loss – Men – by Diagnosis | 155 |
| 2.5 Effect of Spousal Loss – Women – by Diagnosis | 157 |
| 2.6 Effect of Proband Loss – Men – by Diagnosis | 159 |
| 2.7 Effect of Proband Loss – Women – by Diagnosis | 161 |
| 5.1 Effect of Losing a Spouse – Men | 163 |
| 5.2 Effect of Losing a Spouse – Women..... | 164 |
| 5.3 Relationship of Investment, Stock, Flow, and Mortality..... | 165 |
| 5.4 Patterns of Death from Investment Models | 166 |
| A.1 Overview of Data Construction..... | 167 |

List of Tables

| | |
|-----------------------------------------------------------------------------------------------------------------------|-----|
| 1.1 How Might Marriage Work? | 168 |
| 1.2 Summary of Hypotheses | 169 |
| 2.1 Characteristics of Full COSI Cohort | 171 |
| 2.2 Cox Models for Mortality of Full COSI Cohort | 172 |
| 2.3 Impact of Marital Status at Diagnosis on Survival of Men – by Diagnosis | 174 |
| 2.4 Impact of Marital Status at Diagnosis on Survival of Women – by Diagnosis . | 178 |
| 2.5 Characteristics of Married Members of the COSI Cohort..... | 182 |
| 2.6 Cox Models for Mortality for Married COSI Cohort | 183 |
| 2.7 Impact of Loss of Spouse on Survival of Men – by Diagnosis | 185 |
| 2.8 Impact of Loss of Spouse on Survival of Women – by Diagnosis | 189 |
| 2.9 Characteristics of the Spouses of the COSI Cohort | 193 |
| 2.10 Impact of Loss of a COSI Woman on Male Spouses’ Survival – by Diagnosis..... | 194 |
| 2.11 Impact of Loss of a COSI Man on Female Spouses’ Survival – by Diagnosis..... | 198 |
| 2.12 Impact of Alzheimer’s Disease on Mortality in Men | 202 |
| 2.13 Impact of Alzheimer’s Disease on Mortality in Women..... | 203 |
| 2.14 Selection into COSI..... | 204 |
| 2.15 Tests for Violation of Proportionality Assumption for Bereavement Effects . | 205 |
| 2.16 Tests for Violation of Proportionality Assumption on Age..... | 206 |
| 3.1 Summary of Hypotheses | 207 |
| 4.1 Characteristics of Cohort for Hospital Choice Analyses | 209 |
| 4.2 Impact of Marital Status on Likelihood of Choosing a Teaching Hospital or a U.S. News-Ranked Hospital | 210 |
| 4.3 Impact of Marital Status on Technology Level of Hospital Chosen..... | 211 |
| 4.4 Impact of Marital Status on Length of Stay..... | 212 |
| 4.5 Impact of Marital Status on Suffering a Complication | 213 |
| 4.6 Impact of Marital Status on Early Readmission Rates | 214 |
| A.1: ICD-9-CM Operationalizations of COSI Diagnoses | 215 |
| A.2: Alternative Definitions of Incidence: Unique Index Hospitalizations | 218 |
| A.3: Alternative Estimates of the Incidence of COSI Diagnoses in the Elderly, in thousands of events per year..... | 219 |
| A.4: Number of Index Hospitalizations in 1993, by Unique Individuals | 220 |
| A.5: Marital Status of All COSI-cohort as of Jan. 1, 1993 | 221 |
| A.6: Death by End of 1997 Among Decedents | 222 |
| A.7: Characteristics of Initial Hospitalization | 223 |

Acknowledgements

When things go well, a dissertation is more than a single research project. It is the culmination of several years of training – training whose goal is to make the student see the world differently. Some programs try to teach a skill. It takes a lot more time, more care, and more dedication to teach someone to see the world differently. But the benefits to the student are correspondingly greater. The fact that dissertations represent so much more than just project reports may be the reason that dissertation acknowledgements tend to be so exuberant. My teachers did more than help me write a book – as if that were not enough – they taught me to see the world more clearly. It has been an amazing experience.

Over the last seven years I have had the privilege of working with an enormous number of excellent scholars at the University of Chicago. Doors have always been open to me, for as long as I needed. I am grateful. My committee of Nicholas Christakis, Bob Michael, and Linda Waite deserve special thanks. Bob and Linda have taught me in seminars, organized a qualifying exam for me, and then worked through several versions of this dissertation. They are examples of the diligent application of careful empirical work to complement rigorous thinking about real issues – models of how to do social science as if it mattered. Nicholas, my committee chair, has been a mentor, an employer, a confidant, an advisor, a collaborator. He has been unstintingly generous with his intellect, time, compassion,

and resources. He has read every part of this dissertation at least three times. I can not sufficiently express my gratitude; I can only try to emulate his skill and dedication with my own students someday.

Several other faculty members deserve particular thanks. Diane Lauderdale has consistently provided a reliable sounding board for big ideas and precise help in thinking through the details that matter; she has been an invaluable resource. Will Manning and Paul Rathouz have consulted on study design and some of the myriad statistical concerns. Participants in the Demography, Health Studies, General Internal Medicine and Harris School Ph.D. workshops have all improved this work. The errors that remain despite all this help are, of course, my responsibility alone.

This work would have been impossible to accomplish without excellent computer help. Dr. James Zhang performed the cleaning of the claims and the data assembly without which this work simply could not have been done. Fay Booker introduced me to Census data and has provided me with five years of invaluable technical support. Thanks to them both.

Many other colleagues, faculty members, and staff members at the University of Chicago have been of help to me. I cannot thank them all. Let me simply say that this has been a wonderful place to be a student, and I am very lucky to have had so many people teach me.

This work was made possible by two grants from the National Institutes of Health. The Medical Scientist Training Program at the University of Chicago, under Jose Quintans leadership, took the unusual step of funding a Ph.D. outside of the

biological sciences, in addition to supporting my medical training. This was through National Research Service Award Grant 5 T32 GM07281. The Population Research Center has also provided me with support as a predoctoral fellow, through National Research Service Award Grant T32-AG00243.

My family have been encouraging and supportive for the many years of this task. Although they may sometimes have doubted that I would ever actually complete a dissertation, they were always there to help, prod, and encourage. My mother and father imbued in me a deep sense of respect for the written word and for scholarship; I would never have been able to do this work without the skills and love they have given me.

Finally, I need to thank my wife, Stefanie. This work is better than it would have been without her. More importantly, I am a better human being than I would have been without her.

Abstract

Despite substantial research, how marriage reduces mortality remains unclear. Using a novel data set of over 150,000 elderly couples developed from the Medicare claims and examining the impact of widowhood vs. marriage on mortality, this dissertation seeks to adjudicate among the many plausible mechanisms.

First, I exploit the variation between diseases in how responsive those diseases are to putative intervening processes to test which hypotheses can explain patterns of relative mortality. I find that in general the less healthy a person is, the less responsive they are to the death of a spouse – the most enduring mortality effects of spousal death are found among the healthiest elderly. Thus, support is found for models in which marriage provides immediate instrumental help; marriage does not appear to improve health by improving habits or by increasing some other stock of health capital that inheres in patients after the death of their spouse. The major mortality benefits of marriage also are not mediated via direct emotional or physiological effects, nor are they an artifact of selection or shared environment.

Second, I show that the married appear to choose better inpatient hospital care, as measured in a number of different ways. They then have longer lengths of stay than the widowed, but do not appear to receive differential quality of care given the provider chosen. In a final chapter, I argue that relationships improve health by

serving as a form of general capital, most useful when individuals face a wide variety of choices about their health.