

# International compendium of health behavior

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# CONTENTS

|                 |  |            |
|-----------------|--|------------|
|                 | <b>Preface</b>                               | <b>1</b>   |
| <b>PART I</b>   | <b>GETTING STARTED</b>                       |            |
|                 | <b>Introduction</b>                          | <b>3</b>   |
| <b>ONE</b>      | <b>Compendium format</b>                     | <b>4</b>   |
|                 | A standard format                            |            |
| <b>TWO</b>      | <b>How to use the compendium</b>             | <b>6</b>   |
|                 | A process to learn about health behaviors    |            |
| <b>PART II</b>  | <b>CLASSIFICATION OF AGENTS AND BEHAVIOR</b> |            |
|                 | <b>Introduction</b>                          | <b>9</b>   |
| <b>THREE</b>    | <b>Classification of agents</b>              | <b>10</b>  |
|                 | A taxonomy of agent roles                    |            |
| <b>FOUR</b>     | <b>Classification of behavior</b>            | <b>16</b>  |
|                 | A taxonomy of agent behavior                 |            |
| <b>PART III</b> | <b>HEALTH BEHAVIORS</b>                      |            |
|                 | <b>Individual care recipient role</b>        | <b>20</b>  |
|                 | <b>Individual healthcare role</b>            | <b>137</b> |
|                 | <b>Group healthcare role</b>                 | <b>163</b> |
|                 | <b>Group financial role</b>                  | <b>177</b> |
|                 | <b>Group social policy role</b>              | <b>219</b> |
|                 | <b>Group administrative role</b>             | <b>228</b> |
|                 | <b>APPENDICES</b>                            |            |
|                 | <b>Classification index</b>                  |            |
|                 | <b>Agent role index</b>                      |            |
|                 | <b>Alphabetical index</b>                    |            |
|                 | <b>References</b>                            |            |

## PREFACE

This *International compendium of health behavior* catalogs and describes what is known about each of the significant health behaviors that health system agents perform.<sup>1</sup>

It is in three parts:

- **Part I (Getting started)** introduces you to the *Compendium*, describes its format, and shows you how to use it.
- **Part II (Classification of agents and behavior)** describes how the *Compendium*'s behaviors are classified. The classification scheme is based on a taxonomy of health system agent roles and a taxonomy of health goals.
- **Part III (Health behaviors)** is the bulk of the *Compendium*. Here each health behavior is fully described.

To help you easily locate health behaviors in the *Compendium*, there are three indexes, one organized based on the classification scheme, one organized according to agent roles, and one that is alphabetical. At the end of the *Compendium* are references to the research literature cited in the *Compendium*.

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<sup>1</sup> For a discussion of health system agents and the behaviors they perform, see the report prepared by Alan Mills for the Society of Actuaries Health Section, titled "Simulating health behavior: a guide to solving complex health system problems with agent-based simulation modeling". The report is found at "[www.soa.org/Research/Research-Projects/Health/Simulating-Health-Behavior-A-Guide-to-Solving.aspx](http://www.soa.org/Research/Research-Projects/Health/Simulating-Health-Behavior-A-Guide-to-Solving.aspx)".

## **PART I: GETTING STARTED**

## INTRODUCTION

This part shows you how to use the *Compendium*. It consists of two chapters:

- **Chapter one (Compendium format)** covers how the health behavior entries in Part III (Health behaviors) are organized. As you will see, each health behavior is described in a standard format.
- **Chapter two (How to use the Compendium)** provides a simple process for finding a particular health behavior and extracting information about it.

## CHAPTER ONE: COMPENDIUM FORMAT

### A. OVERVIEW

The bulk of the *Compendium* is Part III (Health behaviors), which describes what is known about each significant health behavior. The format for the description of each health behavior is described in Section B (Health behavior description format) below.

Supporting the health behavior descriptions are:

- **Indexes.** At the end of the *Compendium* are three indexes of the health behaviors, one in classification order (the order in which the behaviors are presented in the *Compendium*), one in agent role order, and one in alphabetical order.
- **References.** Also at the end of the *Compendium* is a list, in alphabetical order, of references to the research literature that are cited in the *Compendium*.

Part II (Classification of agents and behavior) presents the scheme that is used to organize the health behaviors.

### B. HEALTH BEHAVIOR DESCRIPTION FORMAT

Each health behavior is described in a separate section of Part III (Health behaviors). The figure on the next page shows a sample of the first page of each such section. It contains the following information:

1. **Classification reference.** The classification reference, according to the classification scheme described in Part II (Classification of agents and behavior).
2. **Behavior title.** The health behavior's title. Generally, this is a brief description, in active verbal form, of the behavior.
3. **Behavior description.** A description of the behavior.
4. **Date of latest update.** The date that the section was last updated.
5. **Behavior components.** The components of the behavior, as described in Chapter four (Classification of behavior).
6. **Terminology.** Key terms that are used in the section.
7. **Research results.** The results of research about the behavior.
8. **Reference citations.** In the footnotes of each page are citations for the research referenced on the page.

B. HEALTH BEHAVIOR DESCRIPTION FORMAT continued

International compendium of health behavior

UPDATED: OCTOBER 29, 2012

**1 Classification reference**: A1.1.01:G1.1:B001.001

**2 Behavior title**: SELECT A PRIMARY CARE PHYSICIAN (US)

**3 Behavior description**: An individual in the US health system selects a primary care physician.

**6 Terminology**: A. TERMINOLOGY  
 Primary care physician (PCP): A physician who takes care of the general medical needs of an individual, and who refers the individual to "secondary care" for specialized medical services. PCPs are also called "family practice physicians" and "general practice physicians".

**7 Research results**: B. RESEARCH RESULTS  
 I. Introduction  
 In the US, individuals generally have significant freedom to select their PCPs. Because every year many people change their health insurance plans, requiring nearly a third of them to find a new PCP, the number of such selections is large.<sup>1</sup> Thus, understanding how people in the US select a PCP is important.

For most individuals, the PCP selection process is difficult. Part of the difficulty is that PCP services have three kinds of attributes:

- Search attributes. These are attributes that an individual can evaluate before selecting a PCP, such as location and accessibility.
- Experience attributes. These are attributes that an individual can evaluate only during or after consumption of the PCP service, such as physician empathy, friendliness, and courtesy.
- Credence attributes. These are attributes that an individual cannot generally evaluate confidently before, during, or after consumption—such as medical competence.

Making an informed choice is difficult because an individual has only a few attributes to evaluate before selection (the search attributes), several more attributes to evaluate during or after consumption (the experience attributes), and a large number of attributes that the individual is unable to ever confidently evaluate (the credence attributes). As a consequence, many people do not seek information about a PCP beyond word of mouth or physician referral.<sup>2</sup>

**4 Date of the latest update**: UPDATED: OCTOBER 29, 2012

**5 Behavior components**:

| Behavior components   |                           |
|-----------------------|---------------------------|
| Acting agent role:    | A1.1.01 Individual person |
| i. Goals:             | G1.1 Enhance health       |
| ii. Attributes:       | Any                       |
| iii. Input messages:  | Any                       |
| iv. Get input:        | Any                       |
| v. Experience:        | Any                       |
| vi. Roles:            | Any                       |
| vii. Context:         | US health system          |
| viii. Produce output: | Any                       |
| ix. Send output:      | Any                       |
| x. Output messages:   | PCP selection             |

**8 Reference citations**:  
<sup>1</sup> Dickey & McMenamin (1999)  
<sup>2</sup> Kelley & Schwartz (2005)

21

The research results section commences with an introduction. This is followed by a summary of the research results, and then by the detailed research results. The detailed research results are organized by behavior components (Attributes, Input messages, Get input, Experience, etc.). Following the detailed research results are observations about conflicting research results and about limitations of the research results.

Following the research results section are sections about hypotheses relating to the health behavior, gaps in the research, simulation models that use the health behavior, and cross references.

## CHAPTER TWO: HOW TO USE THE COMPENDIUM

### A. INTENDED USES

The *Compendium's* primary intended use is to help researchers to easily locate what is known about a particular health behavior, and to incorporate such knowledge in agent-based simulation models of health systems.

Of course, because the *Compendium* is a comprehensive reservoir of facts about health behavior, it can also help health system stakeholders of all kinds better understand and think about the behavior of health system agents.

### B. LEARNING ABOUT A HEALTH BEHAVIOR

Following is an efficient way for you to use the *Compendium* to find out what is known about a particular health behavior:

- **Determine the agent role.** First, determine the role of the health agent performing the behavior. The list of possible agent roles is found in Chapter three (Classification of agents). For example, suppose you would like to learn what is known about how a person in the US chooses a primary care physician. The agent performing the behavior is a person, or, according to the taxonomy of agent roles in Chapter three, a person acting in the “individual person” role.
- **Use the agent role index.** For the agent role determined in the prior step, examine the associated behaviors in the agent role index at the end of the *Compendium*. For example, under the role “individual person” you would find the behavior “Select a primary care physician (US)”.
- **Locate the behavior.** The role index provides the page number of the desired behavior. Go to that page.
- **Read the description.** Read the behavior’s description, focusing on the behavior components that interest you most.



**B. LEARNING ABOUT A HEALTH BEHAVIOR** continued

- **Read relevant references.** Based on citations in the behavior's description, obtain and review relevant literature about the behavior.
- **Consider cross-references.** To make sure that you have covered all the *Compendium's* material about the behavior, consult the behavior's cross references.

## **PART II: CLASSIFICATION OF AGENTS AND BEHAVIOR**

## INTRODUCTION

Just as we need the alphabet to organize words in a dictionary, we need a behavior classification scheme to organize myriad health system behaviors.

This part presents two classification schemes, one for health system agents (Chapter three) and one for health system agent behaviors (Chapter four).

The two classification schemes are components of a knowledge ontology about health systems called the “Health Systems Ontology”. Accompanying the *Compendium* is the ontology’s knowledgebase. The ontology was developed and is maintained in the “frames” version 3.5 of the Protégé framework. Background information about the ontology (its purpose, how it was developed, etc.) is found in the report accompanying the *Compendium*, titled “Simulating health behavior: a guide to solving complex health system problems with agent-based simulation modeling” Information about the Protégé framework is found at “[protege.stanford.edu](http://protege.stanford.edu)”.

## CHAPTER THREE: CLASSIFICATION OF AGENTS

### A. AGENT ROLES

A health system agent is classified according to the roles it plays in a health system. For example, a mother of two might be a pediatric physician, a hospital board member, head of a professional organization, and a sick patient, all at the same time.

To enable classification of agents by their roles, this chapter presents a hierarchical taxonomy of agent roles. As shown in the table at right, the top two levels of the taxonomy are: individual role (such as the role of an individual physician) and group role (such as the role of a hospital).

The next hierarchical level is based on six function classes:

- **Care recipient class.** The roles associated with receiving health care. Two roles associated with this class are the “Sick patient” and the “Well patient”.
- **Healthcare class.** The roles associated with providing health care. An example of a role in this class is the “Primary care practitioner”.
- **Financial class.** The roles associated with the financial processes of healthcare systems. A prominent example of this role is a “Health insurer organization role”.
- **Social policy class.** The roles associated with social policies for a health care system, such as policies about healthcare equity. Group roles within this class are “Healthcare legislation role”, and “Healthcare social policy consumer advocacy”.
- **Scientific class.** The roles associated with scientific research to support health systems. An example of this role is “Research laboratory role.”
- **Administrative class.** The roles associated with the functioning of health system processes. An example of a role in this class is “Healthcare information systems supplier role.”

#### A1. Individual role

- A1.1. Individual care recipient role
- A1.2. Individual healthcare role
- A1.3. Individual financial role
- A1.4. Individual social policy role
- A1.5. Individual scientific role
- A1.6. Individual administrative role

#### A2. Group role

- A2.1. Group care recipient role
- A2.2. Group healthcare role
- A2.3. Group financial role
- A2.4. Group social policy role
- A2.5. Group scientific role
- A2.6. Group administrative role

## B. NUMBERING AND METADATA

The identifier for each agent role starts with “A” (for “agent”). Then, the entry terms within a level are numbered sequentially starting at 1. For levels that could have more than 9 entry terms, the number is two digits, such as “01”. For levels that do not explicitly list all possible roles, the numbers “9” or “99” are provided for an “other” category. This numbering scheme enables additional roles to be added in the future.

In order to conform to taxonomy standards, each entry item in the agent taxonomy has the following attributes or “metadata”:

- **Name:** The preferred term.
- **Approval status:** The status of the entry term. Allowed entries are “final” and “pending”. This item enables the creation of candidate entry terms that may later be modified or eliminated.
- **Identifier:** A unique combination of a letter plus integers separated by “.” to indicate the hierarchical level in a taxonomy.
- **Synonyms:** Non-preferred, but equivalent, terms.
- **Related terms:** Entry terms that are related but not synonymous.
- **Creation date:** The date when the term was entered into the ontology.
- **Creation author:** The name of the person who created the entry.
- **Latest modification date:** The latest date when the term was modified.
- **Modification author:** The name of the person who last modified the entry term.
- **Scope note:** A note to clarify how the term is used.
- **General note:** A general note about the entry term.
- **Documentation:** The reference sources used to develop the entry term.
- **Historical note:** Information about the entry term’s history.

|                 |                                   |
|-----------------|-----------------------------------|
| A1.2.           | <b>Individual healthcare role</b> |
| A1.2.1.         | Healthcare practitioner role      |
| A1.2.1.1.       | Primary care practitioner         |
| A1.2.1.2.       | Specialist practitioner           |
| A1.2.1.2.01.    | Anatomical specialist             |
| A1.2.1.2.01.01. | Ear nose throat specialist        |
| A1.2.1.2.01.02. | Eye specialist                    |
| A1.2.1.2.01.03. | Dental specialist                 |
| A1.2.1.2.01.04. | Respiratory system specialist     |
| A1.2.1.2.01.05. | Digestive system specialist       |
| A1.2.1.2.01.06. | Genito-urinary system specialist  |
| A1.2.1.2.01.07. | Reproductive system specialist    |
| A1.2.1.2.01.08. | Podiatry specialist               |
| A1.2.1.2.01.09. | Dermatological specialist         |
| A1.2.1.2.01.10. | Cardiovascular system specialist  |
| A1.2.1.2.01.11. | Hemic and lymphatic specialist    |
| A1.2.1.2.01.12. | Endocrine system specialist       |
| A1.2.1.2.01.13. | Genetic specialist                |
| A1.2.1.2.01.14. | Immune system specialist          |
| A1.2.1.2.01.15. | Musculo-skeletal specialist       |
| A1.2.1.2.01.16. | Nervous system specialist         |
| A1.2.1.2.01.17. | Multiple systems specialist       |
| A1.2.1.2.01.99. | Other anatomical specialist       |

## C. AGENT ROLE TAXONOMY

Following is the complete agent role taxonomy.

|                    |  |
|--------------------|--|
| A1.                | <b>Individual role</b>                           |
| A1.1.              | <b>Individual care recipient role</b>            |
| A1.1.01.           | Individual person role                           |
| A1.1.02.           | Patient role                                     |
| A1.1.02.01.        | Well patient                                     |
| A1.1.02.02.        | Sick patient                                     |
| A1.1.02.99.        | Other patient                                    |
| A1.1.03.           | Care recipient group - Prominent individual role |
| A1.1.99.           | Other individual care recipient role             |
| A1.2.              | <b>Individual healthcare role</b>                |
| A1.2.1.            | Healthcare practitioner role                     |
| A1.2.1.1.          | Primary care practitioner                        |
| A1.2.1.2.          | Specialist practitioner                          |
| A1.2.1.2.01.       | Anatomical specialist                            |
| A1.2.1.2.01.01.    | Ear nose throat specialist                       |
| A1.2.1.2.01.02.    | Eye specialist                                   |
| A1.2.1.2.01.03.    | Dental specialist                                |
| A1.2.1.2.01.04.    | Respiratory system specialist                    |
| A1.2.1.2.01.05.    | Digestive system specialist                      |
| A1.2.1.2.01.06.    | Genito-urinary system specialist                 |
| A1.2.1.2.01.07.    | Reproductive system specialist                   |
| A1.2.1.2.01.08.    | Podiatry specialist                              |
| A1.2.1.2.01.09.    | Dermatological specialist                        |
| A1.2.1.2.01.10.    | Cardiovascular system specialist                 |
| A1.2.1.2.01.11.    | Hemic and lymphatic specialist                   |
| A1.2.1.2.01.12.    | Endocrine system specialist                      |
| A1.2.1.2.01.13.    | Genetic specialist                               |
| A1.2.1.2.01.14.    | Immune system specialist                         |
| A1.2.1.2.01.15.    | Musculo-skeletal specialist                      |
| A1.2.1.2.01.16.    | Nervous system specialist                        |
| A1.2.1.2.01.17.    | Multiple systems specialist                      |
| A1.2.1.2.01.99.    | Other anatomical specialist                      |
| A1.2.1.2.02.       | Mental health specialist                         |
| A1.2.1.2.02.01.    | Counselor  |
| A1.2.1.2.02.02.    | Psychologist                                     |
| A1.2.1.2.02.03.    | Psychiatrist                                     |
| A1.2.1.2.02.99.    | Other mental health specialist                   |
| A1.2.1.2.03.       | Social specialist                                |
| A1.2.1.2.03.01.    | Family planning specialist                       |
| A1.2.1.2.03.02.    | Marriage and family counselor                    |
| A1.2.1.2.03.03.    | Social worker                                    |
| A1.2.1.2.03.99.    | Other social specialist                          |
| A1.2.1.2.04.       | Functional specialist                            |
| A1.2.1.2.04.01.    | Childbirth and maternity care specialist         |
| A1.2.1.2.04.01.01. | Obstetrician                                     |
| A1.2.1.2.04.01.02. | Nurse-midwife                                    |
| A1.2.1.2.04.01.03. | Midwife  |
| A1.2.1.2.04.01.99. | Other childbirth and maternity care specialist   |
| A1.2.1.2.04.02.    | Dietary specialist                               |
| A1.2.1.2.04.03.    | Rehabilitation specialist                        |
| A1.2.1.2.04.03.01. | Massage rehabilitation therapist                 |
| A1.2.1.2.04.03.02. | Occupational therapist                           |
| A1.2.1.2.04.03.03. | Physical therapist                               |
| A1.2.1.2.04.03.99. | Other rehabilitation specialist                  |
| A1.2.1.2.04.04.    | Speech and language specialist                   |
| A1.2.1.2.04.05.    | Hearing specialist                               |
| A1.2.1.2.04.06.    | Sleep specialist                                 |
| A1.2.1.2.04.07.    | Vision specialist                                |
| A1.2.1.2.04.08.    | Sports medicine specialist                       |
| A1.2.1.2.04.99.    | Other functional specialist                      |

**C. AGENT ROLE TAXONOMY** continued

|                 |  |
|-----------------|--|
| A1.2.1.2.05.    | Age specialist   |
| A1.2.1.2.05.01. | Pediatric specialist   |
| A1.2.1.2.05.02. | Adolescent medicine specialist                                       |
| A1.2.1.2.05.03. | Adult medicine specialist  |
| A1.2.1.2.05.04. | Geriatric specialist   |
| A1.2.1.2.05.99. | Other age specialist   |
| A1.2.1.2.06.    | Emergency care specialist  |
| A1.2.1.2.07.    | Disease specialist   |
| A1.2.1.2.07.01. | Infectious disease specialist  |
| A1.2.1.2.07.02. | Oncologist   |
| A1.2.1.2.07.03. | Rheumatologist   |
| A1.2.1.2.07.99. | Other disease specialist   |
| A1.2.1.2.08.    | Preventive care specialist   |
| A1.2.1.2.09.    | General surgical specialist  |
| A1.2.1.2.10.    | Traditional and complementary medicine practitioner                  |
| A1.2.1.2.10.01. | Acupuncturist  |
| A1.2.1.2.10.02. | Chiropractor   |
| A1.2.1.2.10.03. | Homeopath  |
| A1.2.1.2.10.05. | Oriental medicine practitioner                                       |
| A1.2.1.2.10.99. | Other traditional and complementary medicine practitioner            |
| A1.2.1.2.99.    | Other specialist   |
| A1.2.1.3.       | Support practitioner   |
| A1.2.1.3.01.    | Anesthesia practitioner  |
| A1.2.1.3.02.    | Emergency support practitioner                                       |
| A1.2.1.3.03.    | Nursing practitioner   |
| A1.2.1.3.04.    | Pathology and laboratory practitioner                                |
| A1.2.1.3.05.    | Pharmacy practitioner  |
| A1.2.1.3.06.    | Physician assistant  |
| A1.2.1.3.07.    | Radiology practitioner   |
| A1.2.1.3.99.    | Other support practitioner   |
| A1.2.2.         | Healthcare group - Prominent individual role                         |
| A1.2.2.01.      | Family group - Prominent individual role                             |
| A1.2.2.02.      | Healthcare provider organization - Prominent individual role         |
| A1.2.2.03.      | Healthcare provider support organization - Prominent individual role |
| A1.2.2.04.      | Public health service provider - Prominent individual role           |
| A1.2.2.05.      | Public health regulatory agency - Prominent individual role          |
| A1.2.2.99.      | Other healthcare group - Prominent individual role                   |
| A1.2.3.         | Friend role  |
| A1.2.9.         | Other individual healthcare role                                     |
| A1.3.           | <b>Individual financial role</b>                                     |
| A1.3.01.        | Head of household role   |
| A1.3.02.        | Financial group - Prominent individual role                          |
| A1.3.99.        | Other individual financial role                                      |
| A1.4.           | <b>Individual social policy role</b>                                 |
| A1.4.01.        | Social policy group - Prominent individual role                      |
| A1.4.99.        | Other individual social policy role                                  |
| A1.5.           | <b>Individual scientific role</b>                                    |
| A1.5.01.        | Scientific group - Prominent individual role                         |
| A1.5.99.        | Other individual scientific role                                     |
| A1.6.           | <b>Individual administrative role</b>                                |
| A1.6.01.        | Administrative group - Prominent individual role                     |
| A1.6.99.        | Other individual administrative role                                 |

**C. AGENT ROLE TAXONOMY** continued

|                |   |
|----------------|---|
| A2.            | <b>Group role</b>                               |
| A2.1.          | <b>Group care recipient role</b>                |
| A2.1.01.       | Family role                                     |
| A2.1.02.       | Healthcare recipient consumer group role        |
| A2.1.99.       | Other group care recipient role                 |
| A2.2.          | <b>Group healthcare role</b>                    |
| A2.2.01.       | Healthcare provider organization role           |
| A2.2.01.01.    | Ambulatory care facility                        |
| A2.2.01.01.01. | Primary care practitioner office                |
| A2.2.01.01.02. | Specialist practitioner office                  |
| A2.2.01.01.03. | Urgent care facility                            |
| A2.2.01.01.04. | Ambulatory surgical center                      |
| A2.2.01.01.05. | Birth center                                    |
| A2.2.01.01.06. | Community health center                         |
| A2.2.01.01.07. | Family planning center                          |
| A2.2.01.01.99. | Other ambulatory care facility                  |
| A2.2.01.02.    | Inpatient facility                              |
| A2.2.01.02.01. | Hospital  |
| A2.2.01.02.02. | Nursing facility                                |
| A2.2.01.02.03. | Residential substance-abuse treatment facility  |
| A2.2.01.02.04. | Residential psychiatric treatment center        |
| A2.2.01.02.05. | Hospice   |
| A2.2.01.02.99. | Other inpatient facility                        |
| A2.2.01.03.    | Healthcare provider system                      |
| A2.2.01.99.    | Other healthcare provider organization role     |
| A2.2.02.       | Healthcare provider support organization role   |
| A2.2.02.01.    | Diagnostic laboratory                           |
| A2.2.02.02.    | Medical equipment manufacturer                  |
| A2.2.02.03.    | Medical non-durable goods manufacturer          |
| A2.2.02.04.    | Pharmaceutical manufacturer                     |
| A2.2.02.05.    | Dietary supplement manufacturer                 |
| A2.2.02.06.    | Medical goods supplier                          |
| A2.2.02.06.01. | Durable medical equipment supplier              |
| A2.2.02.06.02. | Pharmacy  |
| A2.2.02.06.03. | Retail store                                    |
| A2.2.02.06.99. | Other medical goods supplier                    |
| A2.2.02.07.    | School  |
| A2.2.02.08.    | Healthcare information supplier                 |
| A2.2.02.09.    | Professional organization role                  |
| A2.2.02.10.    | Practitioner licensing role                     |
| A2.2.02.99.    | Other healthcare provider support organization  |
| A2.2.03.       | Public health service provider role             |
| A2.2.04.       | Public health regulatory agency role            |
| A2.2.99.       | Other group healthcare role                     |
| A2.3.          | <b>Group financial role</b>                     |
| A2.3.01.       | Health insurer organization role                |
| A2.3.02.       | Health insurance purchaser organization role    |
| A2.3.03.       | Collective bargaining organization role         |
| A2.3.99.       | Other group financial role                      |
| A2.4.          | <b>Group social policy role</b>                 |
| A2.4.01.       | Healthcare legislation role                     |
| A2.4.02.       | Healthcare regulation role                      |
| A2.4.03.       | Health social policy research role              |
| A2.4.04.       | Healthcare social policy consumer advocacy role |
| A2.4.99.       | Other group social policy role                  |
| A2.5.          | <b>Group scientific role</b>                    |
| A2.5.01.       | Research laboratory role                        |
| A2.5.02.       | Clinical research role                          |
| A2.5.03.       | Public health research role                     |
| A2.5.04.       | Healthcare grant foundation role                |
| A2.5.99.       | Other group scientific role                     |
| A2.6.          | <b>Group administrative role</b>                |
| A2.6.01.       | Health system administration organization role  |
| A2.6.02.       | Healthcare information systems supplier role    |
| A2.6.99.       | Other group administrative role                 |



#### **D. EXAMPLE**

For example, the mother we introduced at the beginning of this chapter might be classified as:

**Mother:** A1.2.2.01.Family group – Prominent individual role

**Pediatrician:** A1.2.1.2.05.01.Pediatric specialist

**Hospital board member:** A1.2.2.02.Healthcare provider organization – Prominent individual role

**Head of professional organization:** A1.2.2.03.Healthcare provider support organization - Prominent individual role

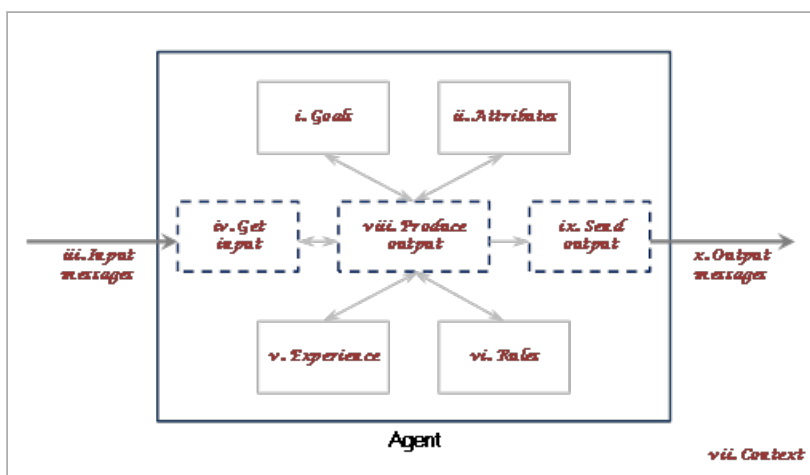
**Patient:** A1.1.02.02.Sick patient

## CHAPTER FOUR: CLASSIFICATION OF BEHAVIOR

### A. BEHAVIOR

A behavior of a health system agent is specified by ten parameters:<sup>1</sup>

- i. **Goals:** States of the world that the agent wants to achieve.
- ii. **Attributes:** Data uniquely identifying the agent producing the behavior.
- iii. **Input messages:** Messages the agent receives that enable or induce the agent to produce the behavior. The agent may actively seek these messages, or may receive them passively.
- iv. **Get input:** The agent's process for seeking and interpreting input messages.
- v. **Experience:** The agent's memory and evaluation of its past experiences. This component also includes the agent's processes for storing and retrieving experiences from memory.
- vi. **Rules:** The agent's store of rules that are used to produce output. One can think of these as the sub-processes of the "Produce output" behavior component.
- vii. **Context:** The environment in which the behavior is rooted, such as the place and time and culture.
- viii. **Produce output:** The agent's process to develop its "output messages".
- ix. **Send output:** The agent's process to send its output message.
- x. **Output messages:** The messages associated with the behavior that the agent sends.



<sup>1</sup> These parameters are discussed in Chapter one (Dimensions of behavior) of the accompanying report titled "Simulating health behavior: a guide to solving complex health system problems with agent-based simulation modeling".

**A. BEHAVIOR** continued

Therefore, to fully classify health behavior, ideally we would create a taxonomy with ten dimensions, one for each of the behavior parameters. But, because we do not yet know how to sub-divide many of the behavior parameters (such as experience), we cannot take such an ideal approach.

Instead, we will take a practical approach, and classify behavior based on one aspect of the ten parameters, namely Goals (a subset of the Directives component). Accordingly, this chapter presents a hierarchical taxonomy of goals, shown at right. As you see, there are six goal classes:

- **Healthcare goal.** The goals in this class are related to health care.
- **Financial goal.** The goals in this class focus on financial processes of a health system.
- **Social policy goal.** The goals in this class are related to a health system's social policies.
- **Scientific goal.** The goals in this class focus on scientific research to support a health system.
- **Administrative goal.** The goals in this class are related to a health system's administrative processes.
- **Non-health system goal.** The goals in this class are not related to a health system per se. Rather they are focused on non-healthcare needs of health system agents that can affect the operation of a health system.

In the next level of the taxonomy, below each of these goal classes, are several sub-goals, as shown in the table at right. In the ontology, instances of health behavior are classified as:

- The agent role performing the behavior (from the Agent role taxonomy), plus
- The primary goal driving the behavior (from the Goal taxonomy), plus
- The agent role receiving output from the behavior (from the Agent role taxonomy), plus
- A description of the ten behavior components associated with the behavior.

|        |   |
|--------|---|
| G1.    | <b>Healthcare goal</b>                        |
| G1.1.  | Enhance health                                |
| G1.2.  | Decrease health risk                          |
| G1.3.  | Eliminate unwanted sign or symptom            |
| G1.9.  | Other healthcare goal                         |
| G2.    | <b>Financial goal</b>                         |
| G2.1.  | Decrease expenditures                         |
| G2.2.  | Decrease financial risk                       |
| G2.9.  | Other financial goal                          |
| G3.    | <b>Social policy goal</b>                     |
| G3.1.  | Increase healthcare equity                    |
| G3.2.  | Increase healthcare choice                    |
| G3.9.  | Other social goal                             |
| G4.    | <b>Scientific goal</b>                        |
| G4.1.  | Expand healthcare knowledge                   |
| G4.2.  | Improve existing healthcare procedures        |
| G4.9.  | Other scientific goal                         |
| G5.    | <b>Administrative goal</b>                    |
| G5.1.  | Perform administrative process effectively    |
| G5.2.  | Increase administrative process effectiveness |
| G5.9.  | Other administrative goal                     |
| G6.    | <b>Non-healthcare goal</b>                    |
| G6.01. | Increase agent income                         |
| G6.02. | Increase agent power                          |
| G6.03. | Increase agent enjoyment                      |
| G6.04. | Decrease agent effort                         |
| G6.99. | Other non-healthcare goal                     |

## B. NUMBERING AND METADATA

The numbering scheme and metadata for the goal taxonomy are similar to those for the agent role taxonomy.

## C. EXAMPLE

The following table illustrates how we can use the behavior classification system to classify a sequence of common health system behaviors:

| Behavior                  | Acting agent role                               | Acting agent goal                               | Recipient agent role                            |
|---------------------------|---|---|---|
| Recognize illness symptom | A1.1.01.Individual person role                  | G1.1.Enhance health                             | A1.1.01.Individual person role                  |
| Visit a physician         | A1.1.01.Individual person role                  | G1.3.Eliminate unwanted sign or symptom         | A1.2.1.1.Primary care practitioner              |
| Diagnose disease          | A1.2.1.1.Primary care practitioner              | G1.3.Eliminate unwanted sign or symptom         | A1.1.02.02.Sick patient                         |
| Refer a patient           | A1.2.1.1.Primary care practitioner              | G1.3.Eliminate unwanted sign or symptom         | A1.1.02.02.Sick patient                         |
| Prescribe treatment       | A1.2.1.2.01.10.Cardiovascular system specialist | G1.3.Eliminate unwanted sign or symptom         | A1.1.02.02.Sick patient                         |
| Submit claim              | A1.2.1.2.01.10.Cardiovascular system specialist | G5.1.Perform administrative process effectively | A2.3.01.Health insurer organization role        |
| Pay claim                 | A2.3.01.Health insurer organization role        | G5.1.Perform administrative process effectively | A1.2.1.2.01.10.Cardiovascular system specialist |
| Purchase medication       | A1.1.02.02.Sick patient                         | G1.3.Eliminate unwanted sign or symptom         | A2.2.02.06.02.Pharmacy                          |
| Take medication           | A1.1.02.02.Sick patient                         | G1.3.Eliminate unwanted sign or symptom         | A1.1.02.02.Sick patient                         |

Of course, to fully specify each of these behaviors, we would also need to describe its other behavior parameters.

To demonstrate how the Health Systems Ontology integrates behavior, the behaviors above are entered into it as instances of the class “Behavior”.

## **PART III: HEALTH BEHAVIORS**

## A1.1. INDIVIDUAL CARE RECIPIENT ROLE

A1.1.01:G1.1:B001.001

UPDATED: OCTOBER 29, 2012

**SELECT A PRIMARY CARE PHYSICIAN (US)**

An individual in the US health system selects a primary care physician.

**A. TERMINOLOGY**

**Primary care physician (PCP):** A physician who takes care of the general medical needs of an individual, and who refers the individual to “secondary care” for specialized medical services. PCPs are also called “family practice physicians” and “general practice physicians”.

**B. RESEARCH RESULTS****1. Introduction**

In the US, individuals generally have significant freedom to select their PCPs. Because every year many people change their health insurance plans, requiring nearly a third of them to find a new PCP, the number of such selections is large.<sup>1</sup> Thus, understanding how people in the US select a PCP is important.

For most individuals, the PCP selection process is difficult. Part of the difficulty is that PCP services have three kinds of attributes:

- **Search attributes.** These are attributes that an individual can evaluate before selecting a PCP, such as location and accessibility.
- **Experience attributes.** These are attributes that an individual can evaluate only during or after consumption of the PCP service, such as physician empathy, friendliness, and courtesy.
- **Credence attributes.** These are attributes that an individual cannot generally evaluate confidently before, during, or after consumption—such as medical competence.

Making an informed choice is difficult because an individual has only a few attributes to evaluate before selection (the search attributes), several more attributes to evaluate during or after consumption (the experience attributes), and a large number of attributes that the individual is unable to ever confidently evaluate (the credence attributes). As a consequence, many people do not seek information about a PCP beyond word of mouth or physician referral.<sup>2</sup>

**Behavior components**

|                              |                           |
|------------------------------|---------------------------|
| <b>Acting agent role:</b>    | A1.1.01 Individual person |
| i. <b>Goals:</b>             | G1.1 Enhance health       |
| ii. <b>Attributes:</b>       | Any                       |
| iii. <b>Input messages:</b>  | Any                       |
| iv. <b>Get input:</b>        | Any                       |
| v. <b>Experience:</b>        | Any                       |
| vi. <b>Rules:</b>            | Any                       |
| vii. <b>Context:</b>         | US health system          |
| viii. <b>Produce output:</b> | Any                       |
| ix. <b>Send output:</b>      | Any                       |
| x. <b>Output messages:</b>   | PCP selection             |

<sup>1</sup> Dickey & McMenamin (1999)

<sup>2</sup> Kelley & Schwartz (2005)

**SELECT A PRIMARY CARE PHYSICIAN (US)** continued**B. RESEARCH RESULTS** continued**2. Summary**

Following is a summary of the research that is available, by behavior component.

- i. **Goals.** None known.
- ii. **Attributes.** An individual's PCP selection behavior varies according to several attributes, including health status, race and ethnicity, managed care experience, and health literacy.
- iii. **Input messages.** The primary sources of enabling information for individuals seeking a PCP are doctor referrals and recommendations from friends and family. The traditional forms of marketing, such as yellow pages and radio advertising, are not important.
- iv. **Get input.** None known.
- v. **Experience.** In selecting a PCP, an individual considers several attributes of PCPs that the individual has experienced, including their credentials, qualifications, appearance, ability to communicate, reputation, hospital access, location, and insurance network.
- vi. **Rules.** None known.
- vii. **Context.** None known.
- viii. **Produce output.** Most people think that taking time to search for a good PCP is important, and, to make a decision, most say they would consider two or three alternative PCPs. However, research indicates that people do not select a PCP based on comparing information about different physicians. Instead, they rely heavily on recommendations from family and friends.

Two researchers have developed a hypothesis about the process an individual employs to select a PCP.

- ix. **Send output.** None known.
- x. **Output messages.** None known.



**SELECT A PRIMARY CARE PHYSICIAN (US)** continued

**B. RESEARCH RESULTS** continued

**2. Summary** continued

Most of the research about this behavior is based on surveys, and most of the surveys are biased toward a particular segment of the US population. Moreover, as several studies highlight, people do not actually behave in the way their survey responses indicate.

There are few research studies focused on the selection of PCPs in the US. (see the sidebar). There is, in particular, a lack of experimental studies for this behavior, and a lack of research about its “produce output” parameter.

There is no known simulation model that incorporates this behavior.

**Little information**

In 2002, Butler and McGlone wrote, “There is a growing body of literature regarding patient choice of health care plans, patient satisfaction, and patient evaluation of health care quality, but there is little information concerning the factors that influence the initial selection of a primary care physician.”

Although in the intervening years a few studies have added more information, their statement is still largely true.<sup>1</sup>

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<sup>1</sup> Butler & McGlone (2002)

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**SELECT A PRIMARY CARE PHYSICIAN (US)** *continued***B. RESEARCH RESULTS** *continued***3. Detailed results**

Following are detailed research results about this behavior, organized by behavior component.

**i. *Goals***

The primary goal for this behavior is to “enhance health”. However, there is no known research specifically about this behavior parameter.

**ii. *Attributes***

Researchers have found that the following attributes are associated with variations in PCP selection behavior from person to person.

A study based on a nationwide survey from the period 2000-2003 examined the impact of various personal attributes on the PCP selection process:<sup>1</sup>

- **Poor health status.** People who have fair or poor health status are 8.4 percent less likely to seek PCP recommendations from family or friends. They are more likely to seek more formal sources of information.
- **Race and ethnicity.** People from racial and ethnic minorities are substantially less likely than their white counterparts to seek information about PCPs from family and friends
- **Recent hospital stay.** People who have been hospitalized in the last year are 7.3 percent more likely to ask a physician for a PCP recommendation.
- **Managed care experience.** People who have two or more years of managed care experience are significantly more likely to use formal sources of information (rather than informal recommendations from family or friends) to select a PCP.
- **Having switched doctors.** People who have switched doctors in the past are significantly more likely to use formal sources of information for selecting a new PCP. Such people are also significantly more likely to consider alternative PCPs.

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<sup>1</sup> Harris (2003)

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**SELECT A PRIMARY CARE PHYSICIAN (US)** *continued***B. RESEARCH RESULTS** *continued***3. Detailed results** *continued***ii. *Attributes*** *continued*

**Available time.** In a survey-based study, 38 percent of respondents reported that they do not have adequate time to search for and select a PCP.<sup>1</sup>

**Ethnicity.** In a video study of PCP selection, 57 percent of respondents of non-European American ethnicity choose a non-European American physician.<sup>2</sup>

**Current mood.** Far from rationality, a person's current mood is often the basis of PCP selection.<sup>3</sup>

**Health literacy.** The degree to which a person is capable of processing information rationally is influenced by the person's health literacy (capacity to obtain and understand basic information about PCPs).<sup>4</sup>

**iii. *Input messages***

Following are facts that researchers have found regarding the individual's input messages for selecting a PCP.

The primary sources of information for individuals seeking a PCP are doctor referrals and recommendations from friends and family.<sup>5</sup> In one survey-based study, 71 percent of respondents indicated that doctor referrals were "important" or "very important", and 81 percent indicated that recommendations from friends and family were "important" or "very important". By contrast, brochures, yellow pages, local medical associations, and physician referral services were generally rated as "somewhat important" or "not important".<sup>6</sup>

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<sup>1</sup> Butler & McGlone (2002)

<sup>2</sup> Gerbert et al. (2003)

<sup>3</sup> Victoor, Delnoij, Friele, & Rademakers (2012)

<sup>4</sup> Reyna, Nelson, Han, & Dieckmann (2009)

<sup>5</sup> Hanna, Schoenbachler, & Gordon (1994)

<sup>6</sup> Butler & McGlone (2002)

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**SELECT A PRIMARY CARE PHYSICIAN (US)** *continued***B. RESEARCH RESULTS** *continued***3. Detailed results** *continued***iii. *Input messages*** *continued*

According to another study, the most important sources of information for individuals seeking a PCP are (in order of decreasing importance): physicians, friends, spouse and children, nurses, other family members, other health-care professionals, and pharmacists. The least important sources are: local physician guides, yellow pages, news stories or articles, radio advertising, TV advertising, and newspaper advertising—in short, the traditional forms of marketing communications.<sup>1</sup>

**iv. *Get input***

There is no known research specifically about the “get input” aspect of this behavior.

**v. *Experience***

Researchers have discovered that the following facets of an individual’s experience (stored in the individual’s memory) are associated with variations in this behavior.

In a survey-based study, the following PCP attributes are significantly associated with an individual’s selection of a PCP:<sup>2</sup>

- **Reputation.** 89 percent rated “physician reputation” highly. 78 percent rated “recommended by other physicians” highly.
- **Communication ability.** 94 percent of respondents rated the attribute “physician spends adequate time answering questions” as “very important” or “important”. Similarly, 91 percent rated “physician discusses illness in a way I can understand” highly. 80 percent rated “good bedside manner” highly. And 72 percent rated “values my opinion” highly.
- **Hospital access.** 76 percent rated “access to preferred hospitals” highly.

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<sup>1</sup> K. W. King & Haefner (1988)

<sup>2</sup> Butler & McGlone (2002)

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**SELECT A PRIMARY CARE PHYSICIAN (US)** continued**B. RESEARCH RESULTS** continued**3. Detailed results** continued**v. *Experience continued***

In a survey-based study, many respondents, especially women, report that they cannot find adequate information to effectively select a PCP. 39 percent said that PCP professional qualifications are difficult to obtain.<sup>1</sup>

Two survey-based studies found that respondents rated “how well the doctor communicates with me and shows a caring attitude” as the most influential PCP attribute in choosing a new PCP.<sup>2</sup>

- **Malpractice record.** 69 percent rated “physician malpractice record” highly (but 96 percent indicated that they had not checked to see if their current PCP had any malpractice claims, and a majority indicated lack of awareness about medical professional reference sources).
- **Location.** 55 percent rated “convenient office location” highly.
- **Qualifications.** 68 percent rated “physician credentials” highly. (But only 38 percent had inquired about their current PCP’s credentials.)
- **Experience.** 50 percent rated “number of years in practice” highly.
- **Office criteria.** 51 percent rated “office atmosphere” highly, 76 percent rated “ease of getting an appointment” highly, and 70 percent rated “up to date technology” highly.
- **Insurance.** 90 percent rated “physician accepts my insurance” highly.

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<sup>1</sup> Butler & McGlone (2002)

<sup>2</sup> Moore & Bopp (1999) and Butler (1996)

## SELECT A PRIMARY CARE PHYSICIAN (US) continued

## B. RESEARCH RESULTS continued

## 3. Detailed results continued

v. *Experience continued*

One survey-based study found that respondents ranked “whether the doctor is board certified” most highly. The relative importance (mean and standard deviation) of this and other factors are shown in the following table. Respondents ranked the importance of each factor from 1 to 10.<sup>1</sup>

| <i>Item</i>   | <i>Mean</i> | <i>SD</i> |
|---|-------------|-----------|
| Whether the doctor is board certified                           | 9.31        | 1.67      |
| Physical appearance of the doctor's office (i.e. neatness)      | 8.15        | 2.13      |
| Physical appearance of the doctor (i.e. neatness)               | 8.00        | 2.25      |
| Recommendations from friends/family                             | 7.92        | 2.23      |
| Specialization in a particular illness                          | 7.88        | 2.68      |
| Which hospital(s) the doctor uses                               | 7.88        | 2.27      |
| Waiting time for an appointment                                 | 7.73        | 2.25      |
| Whether malpractice cases filed against the doctor              | 7.62        | 2.66      |
| Waiting time at office visit                                    | 7.39        | 2.37      |
| Which HMO's (or insurance plans) the doctor is in               | 6.93        | 3.19      |
| Where the doctor attended medical school/residency              | 6.79        | 2.94      |
| Cost of the care (that patient must pay)                        | 6.46        | 3.09      |
| How long the doctor has been practising                         | 6.33        | 2.68      |
| Proximity of the doctor's office                                | 5.94        | 2.76      |
| Whether the doctor has weekend office hours                     | 5.65        | 2.83      |
| Whether the doctor has evening office hours                     | 4.98        | 2.81      |
| Number of doctors in the office                                 | 3.95        | 2.75      |
| The doctor's age  | 3.85        | 2.57      |
| The doctor's gender   | 3.29        | 3.01      |
| The doctor's native country (assuming doctor's English is good) | 2.75        | 2.61      |
| The doctor's ethnicity or race                                  | 2.46        | 2.47      |
| The doctor's religion   | 2.06        | 2.26      |
| The doctor's marital status                                     | 1.68        | 1.92      |

<sup>1</sup> Bornstein, Marcus, & Cassidy (2000)

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**SELECT A PRIMARY CARE PHYSICIAN (US)** continued**B. RESEARCH RESULTS** continued**3. Detailed results** continued**vi. Rules**

There is no known research specifically about the “rules” aspect of this behavior.

**vii. Context**

There is no known research specifically about the “context” aspect of this behavior.

**viii. Produce output**

Researchers have discovered the following about the “produce output” component of this behavior.

In a survey-based study, 75 percent of respondents rated the PCP selection process as “very important” or “important”. 65 percent indicated that taking time to search for a PCP is worthwhile. In making a selection, 12 percent would consider four or more PCPs, 53 percent would consider two or three, and 35 percent would evaluate only one PCP.<sup>1</sup>

Much research indicates that people do not select a PCP rationally. In spite of their responses to survey questions, people do not actually make a PCP selection based on comparing unbiased and statistically valid information about different physicians, and then weighing pros and cons. Instead, they generally rely on recommendations from family and friends.<sup>2</sup>

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<sup>1</sup> Butler & McGlone (2002)

<sup>2</sup> Foster, Earl, Haines, & Mitchell (2010) and Hoerger & Howard (1995)

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**SELECT A PRIMARY CARE PHYSICIAN (US)** *continued***B. RESEARCH RESULTS** *continued***3. Detailed results** *continued***viii. Produce output** *continued*

Kelley and Schwartz suggest that to select a PCP, an individual goes through a five-step consumer decision-making process:<sup>1</sup>

- **Need recognition.** Consumers recognize needs when their desired state exceeds some threshold level of difference from their actual state.
- **Search.** The consumer then searches for a set of PCPs to consider. The search can be conducted internally through recollection of past experiences or externally through review of information sources, such as the Internet, friends, and family. Information economics theory suggests that consumers will search as long as the marginal gains of the search exceed its marginal costs.
- **Evaluation.** In this stage, the individual evaluates the set of PCPs found in the previous stage. However, in many cases, the individual will skip this stage, because of the limited amount of information available about PCPs during the search stage. This lack of information does not permit the individual to establish beliefs or attitudes about the PCPs in the search set.
- **PCP selection.** The individual selects the PCP. In the PCP selection process, the consumer selects the product (the PCP), consumes the product (utilizes the PCPs services), and then purchases the product—a sequence that is markedly different from the usual purchase process in which a consumer selects a product, purchases the product, and then consumes it.
- **Post-selection evaluation.** In this stage, the individual evaluates the PCP. This stage is difficult to complete effectively, because, in general, the individual cannot accurately assess the quality of the core benefit sought (that is, improved health). As a result, post-purchase evaluation often hinges on largely irrelevant service characteristics such as staff friendliness or room temperature.

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<sup>1</sup> Kelley & Schwartz (2005)



## SELECT A PRIMARY CARE PHYSICIAN (US) *continued*

### B. RESEARCH RESULTS *continued*

#### 3. Detailed results *continued*

##### ix. *Send output*

There is no known research specifically about the “send output” aspect of this behavior.

##### x. *Output messages*

The primary output message for this behavior is “PCP selection”. There is no known research specifically about this behavior parameter.

#### 4. Conflicting results

There appears to be no research result that conflicts significantly with the results presented above.

#### 5. Limitations

Most studies of this behavior are survey-based. They have the following limitations:

- **Biased.** Most of the studies have a relatively small number of respondents that are biased toward particular segments of the US population. For example, the survey by Butler and McGlone is based on 222 respondents, and is biased toward highly educated professionals with health insurance.<sup>1</sup>
- **Insufficient recognition of actual behavior.** As several studies highlight, people do not actually behave in the way that survey responses indicate.<sup>2</sup>

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<sup>1</sup> Butler & McGlone (2002)

<sup>2</sup> Butler & McGlone (2002) and Victoor, et al. (2012)

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**SELECT A PRIMARY CARE PHYSICIAN (US)** continued**C. RESEARCH GAPS**

There are several gaps in the research about this health behavior:

- **Lack of studies.** There is a marked lack of studies about how an individual in the US health system selects a PCP.
- **Lack of experiments.** The existing research is primarily based on survey results analyzed by statistical correlation. It appears that no experiment in a real-life situation has been performed to determine how an individual selects a primary care physician.<sup>1</sup>
- **Lack of “produce output” research.** There is inadequate research about the “produce output” behavior parameter. This parameter is particularly important, because it ties together all the other parameters. The research that has been done generally assumes that individuals select a PCP rationally. However, several studies suggest that patients are often not capable of making rational choices. It appears that there has been no behavioral economics research to determine the actual cognitive process people use to select a PCP.
- **Missing behavior components.** Little or no research has been performed to elucidate the “acting agent role”, “goal”, “get input”, “rules”, “context”, “send output”, “output messages”, or—most importantly—the “produce output” components of this behavior.

**D. SIMULATION MODELS**

There is no known simulation model that incorporates this behavior.

**E. CROSS REFERENCES**

Related behaviors:

A1.1.01:G1.1:B002.001: Switch primary care physicians (US)

A1.1.01:G1.3:B003.001: Assess the quality of physician performance (US)

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<sup>1</sup> Victoor, et al. (2012)

A1.1.01:G1.1:B002.001

UPDATED: OCTOBER 29, 2012

**SWITCH PRIMARY CARE PHYSICIANS (US)**

An individual in the US health system voluntarily switches from one primary care physician to another.

**A. TERMINOLOGY**

**Primary care physician (PCP):** A physician who takes care of the general medical needs of an individual, and who refers the individual to “secondary care” for specialized medical services. PCPs are also called “family practice physicians” and “general practice physicians”.

**Loyalty:** “A deeply held commitment to re-buy or re-patronize a preferred service consistently in the future, thereby causing repetitive same-service provider purchasing, despite situational influences and marketing efforts having the potential to cause switching behavior.”<sup>1</sup>

**Capitation:** A payment arrangement for healthcare services that pays a physician or group of physicians a set amount per time period for each person assigned to them, whether or not that person seeks care.

**B. RESEARCH RESULTS****1. Introduction**

About 50 percent of individuals in the US health system switch PCPs at some time, either voluntarily or involuntarily. Although physician and patient relocation are common reasons for a patient to switch, another major reason is dissatisfaction with care.<sup>2</sup> This behavior concerns voluntary switching resulting from such dissatisfaction.

It is important to understand the reasons why patients voluntarily switch PCPs, because continuity of care with a PCP is associated with healthcare cost savings, improved health outcomes, and greater satisfaction for patients and PCPs.

**Behavior components**

|                              |                           |
|------------------------------|---------------------------|
| <b>Acting agent role:</b>    | A1.1.01 Individual person |
| i. <b>Goals:</b>             | G1.1 Enhance health       |
| ii. <b>Attributes:</b>       | Any                       |
| iii. <b>Input messages:</b>  | Any                       |
| iv. <b>Get input:</b>        | Any                       |
| v. <b>Experience:</b>        | Any                       |
| vi. <b>Rules:</b>            | Any                       |
| vii. <b>Context:</b>         | US health system          |
| viii. <b>Produce output:</b> | Any                       |
| ix. <b>Send output:</b>      | Any                       |
| x. <b>Output messages:</b>   | New PCP selection         |

<sup>1</sup> Oliver, R. (1999). Whence consumer loyalty? Journal of Marketing, 63, 33-44

<sup>2</sup> Sorbero, Dick, Zwanziger, Mukamel, & Weyl (2003)

SWITCH PRIMARY CARE PHYSICIANS (US) continuedB. RESEARCH RESULTS continued

## 2. Summary

Following is a summary of the research available about this behavior, by behavior component.

- i. **Goals.** None known.
- ii. **Attributes.** A patient's propensity to voluntarily switch PCPs varies by the patient's age, location, health status, level of healthcare utilization, and duration of a relationship with a PCP. It does not appear to vary by race, education level, or income level.
- iii. **Input messages.** Individuals are more inclined to switch PCPs if they receive information suggesting that another PCP has a higher quality rating.
- iv. **Get input.** None known.
- v. **Experience.** In deciding whether to switch PCPs, a patient considers several PCP attributes, including the PCP's quality of service, the strength of the patient-PCP relationship, how often the PCP cares for the patient, how easy it is for the patient to obtain access to care, and whether the PCP coordinates the patient's overall medical care.
- vi. **Rules.** None known.
- vii. **Context.** Capitation payment arrangements are associated with a higher propensity for patients to voluntarily switch PCPs.
- viii. **Produce output.** Researchers have developed two hypotheses about the processes underlying an individual's propensity to switch PCPs.
- ix. **Send output.** None known.
- x. **Output messages.** None known.

Most of the research about this behavior is based on surveys, and most of the surveys are biased toward a particular segment of the US population. There is a lack of experimental studies for this behavior, and a lack of research about its "produce output" parameter.

There is no known simulation model that incorporates this behavior.

**SWITCH PRIMARY CARE PHYSICIANS (US)** continued**B. RESEARCH RESULTS** continued**3. Detailed results**

Following are detailed research results about this behavior, organized by behavior component.

**i. Goals**

The primary goal for this behavior is to “enhance health”. However, there is no known research specifically about this behavior parameter.

**ii. Attributes**

Researchers have found that the following attributes are associated with variations in PCP switching behavior from person to person.

- **Age.** Older patients, especially those who have more education and income, tend to stay with their PCPs until they are forced to change.<sup>1</sup> In another study, older patients reported being more willing to pay more to maintain continuity with their PCP.<sup>2</sup>
- **Location.** A common reason for a patient to switch PCPs is that the patient’s residence or work location changes.<sup>3</sup>
- **Health status.** Sicker patients are more prone to switch PCPs. Such patients tend to be less satisfied with PCPs than healthier patients, perhaps because PCPs spend less social time with them during visits and because PCPs can have negative feelings about them.<sup>4</sup>
- **Utilization.** Higher medical care utilization is associated with higher patient loyalty to their PCPs.<sup>5</sup>
- **Relationship duration.** In a longitudinal survey study, researchers found that the duration of a patient’s relationship with a PCP is strongly associated with the patient’s loyalty to the PCP.<sup>6</sup> In a longitudinal study of older adults, researchers found that those with a longer relationship with a PCP were less likely to switch.<sup>7</sup>

A patient’s race, education level, and income level do not appear to be associated with the patient’s decision to switch PCPs.<sup>8</sup>

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<sup>1</sup> Mold, Fryer, & Roberts (2004)

<sup>2</sup> Pereira & Pearson (2003)

<sup>3</sup> Sorbero, et al. (2003)

<sup>4</sup> Sorbero, et al. (2003)

<sup>5</sup> Sorbero, et al. (2003)

<sup>6</sup> Safran, Montgomery, Chang, Murphy, & Rogers (2001a)

<sup>7</sup> Mold, et al. (2004)

<sup>8</sup> Sorbero, et al. (2003)

## SWITCH PRIMARY CARE PHYSICIANS (US) continued

## B. RESEARCH RESULTS continued

## 3. Detailed results continued

iii. *Input messages*

In a survey-based study, researchers found that about one-third of respondents expressed a willingness to switch from a current PCP if they were to receive information suggesting that another PCP has a higher quality rating from a “panel of medical experts” or from a “patient advocacy organization”.<sup>1</sup>

iv. *Get input*

There is no known research specifically about this behavior parameter.

v. *Experience*

Researchers have discovered that the following facets of an individual’s experience (stored in the individual’s memory) are associated with variations in this behavior.

- **Strength of patient-PCP relationship.** In a longitudinal survey study, researchers found that the strength of the patient-physician relationship—as indicated by patients’ trust in their PCPs, their assessments of how well the PCP knows them, and the quality of communications and interpersonal treatment—is the factor most strongly associated with patients’ loyalty to their PCPs. Patients with the poorest-quality patient-PCP relationships were three times more likely to leave their PCP’s practice in the next three years than those with the highest-quality relationships.<sup>2</sup> An earlier cross-sectional study found that the interpersonal quality of care is significantly associated with voluntary PCP switching.<sup>3</sup>

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<sup>1</sup> Harris (2003)

<sup>2</sup> Safran, et al. (2001a)

<sup>3</sup> Kasteler, Kane, Olsen, & Thetford (1976)

SWITCH PRIMARY CARE PHYSICIANS (US) *continued*B. RESEARCH RESULTS *continued*3. Detailed results *continued*v. *Experience continued*

- **Strength of patient-PCP relationship continued.** Other studies have shown that a patient's general satisfaction with a PCP (defined in one study as a patient's belief that the PCP will act in the patient's best interest and will provide appropriate treatment and medical care) is associated with the patient's loyalty to the PCP.<sup>1</sup> Another study showed that a patient's trust in the PCP is strongly associated with the patient's loyalty to the PCP during the next six months.<sup>2</sup>
- **Frequency of care.** In a longitudinal survey study, researchers found that frequency of care (how often a patient sees the PCP, rather than an assistant or partner, for routine check-ups and visits when sick) was strongly associated with patients' loyalty to their PCPs.<sup>3</sup>
- **Access to care.** In a longitudinal survey study, researchers found that access to care (a patient's ability to get through to the PCP's office by telephone, to get an appointment when sick, convenience of office location, and convenience of office hours) is strongly associated with a patient's loyalty to a PCP.<sup>4</sup>
- **Coordination of care.** In a longitudinal survey study, researchers found that coordination of care (the PCP's role in coordinating and synthesizing care received from specialists) is strongly associated with a patient's loyalty to a PCP.<sup>5</sup>

vi. *Rules*

There is no known research specifically about this behavior parameter.

vii. *Context*

Capitation payment arrangements are associated with a higher propensity to switch PCPs.<sup>6</sup>

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<sup>1</sup> Marquis, Davies, & Ware (1983) and Platonova, Kennedy, & Shewchuk (2008)

<sup>2</sup> Thom, Ribisl, & Stewart (1999)

<sup>3</sup> Safran, et al. (2001a)

<sup>4</sup> Safran, et al. (2001a)

<sup>5</sup> Safran, et al. (2001a)

<sup>6</sup> Sorbero, et al. (2003)

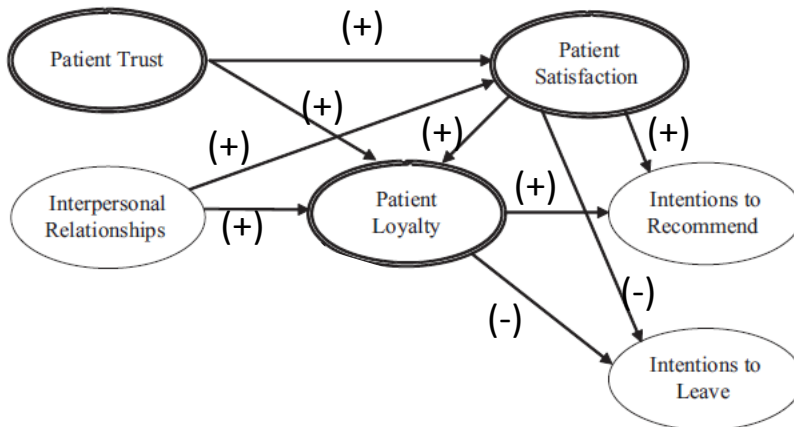
## SWITCH PRIMARY CARE PHYSICIANS (US) continued

## B. RESEARCH RESULTS continued

## 3. Detailed results continued

viii. *Produce output*

Platonova et al. Based on a survey and on examination of prior research results, Platonova et al developed a hypothesis about patient loyalty illustrated by the figure below.<sup>1</sup>



Trust in a PCP increases patient loyalty.

Trust in a PCP increases patient satisfaction with the PCP.

- A better patient rating for a PCP about patient-PCP interpersonal relationships increases the patient's loyalty.
- A better patient rating for a PCP about patient-PCP interpersonal relationships increases the patient's satisfaction.
- Greater patient loyalty to a PCP increases the patient's intention to recommend the PCP to other people.
- Greater patient loyalty to a PCP decreases the patient's intention to leave the PCP.
- Greater patient satisfaction with a PCP increases the patient's intention to recommend the PCP to other people.
- Greater patient satisfaction with a PCP decreases the patient's intention to leave the PCP.

<sup>1</sup> Platonova, et al. (2008)



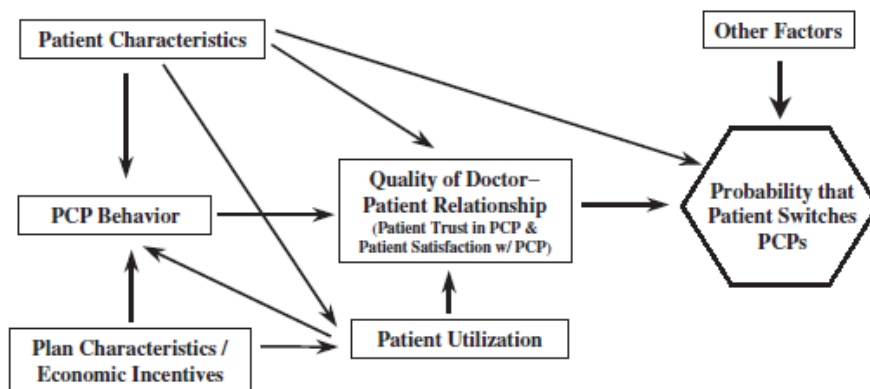
## SWITCH PRIMARY CARE PHYSICIANS (US) continued

## B. RESEARCH RESULTS continued

## 3. Detailed results continued

viii. *Produce output*

**Sorbero et al.** Based on an analysis of administrative enrollment and claims data from four physician organizations, Sorbero et al developed a hypothesis about the probability that a patient will switch PCPs, illustrated in the figure below.<sup>1</sup>



The hypothesis postulates that a patient's characteristics (attributes) and level of utilization, together with the patient's health insurance plan characteristics (particularly, whether the plan involves capitation) influence PCP behavior toward the patient, the quality of the patient-PCP relationship, and the probability that the patient will switch PCPs.

ix. *Send output*

There is no known research specifically about this behavior parameter.

x. *Output messages*

The primary output message for this behavior is "New PCP selection". There is no known research specifically about this behavior parameter.

## 4. Conflicting results

There appears to be no research result that conflicts significantly with the results presented above.

<sup>1</sup> Sorbero, et al. (2003)

**SWITCH PRIMARY CARE PHYSICIANS (US)** continued

**B. RESEARCH RESULTS** continued

**5. Limitations**

Most studies of this behavior are survey-based. They have the following limitations:

- **Biased.** Most of the studies have a relatively small number of respondents that are biased toward particular segments of the US population. For example, the study by Safran et al was limited to adults living in Massachusetts who were employed and covered by health insurance.<sup>1</sup>
- **Insufficient recognition of actual behavior.** People often do not actually behave in the way that survey responses indicate.

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<sup>1</sup> Safran, Montgomery, Chang, Murphy, & Rogers (2001b)

**SWITCH PRIMARY CARE PHYSICIANS (US)** *continued*

**C. RESEARCH GAPS**

There are several gaps in the research about this health behavior:

- **Lack of experiments.** The existing research is primarily based on statistical correlation analysis of survey results and administrative data. It appears that no experiment in a real-life situation has been performed to determine how an individual switches PCPs.<sup>1</sup>
- **Missing behavior components.** Little or no research has been performed to elucidate the “goal”, “input messages”, “get input”, “rules”, “send output”, “output messages”, or—most importantly—the “produce output” components of this behavior.

**D. SIMULATION MODELS**

There is no known simulation model that incorporates this behavior.

**E. CROSS REFERENCES**

Related behaviors:

A1.1.01:G1.1:B0011.001: Select a primary care physician (US)

A1.1.01:G1.3:B003.001: Assess the quality of physician performance (US)

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<sup>1</sup> Victoor, et al. (2012)

A1.1.01:G1.1:B101.001

UPDATED: FEBRUARY 26, 2013

**ENROLL IN A WORKPLACE WELLNESS PROGRAM (US)**

An individual enrolls in a US workplace wellness program.

**A. TERMINOLOGY**

**Workplace wellness program:** An activity or policy that an employer provides to promote healthy behavior among employees, in order to improve their health outcomes and productivity. A workplace wellness program might include health fairs, health education, medical screening, health coaching, a health risk assessment, on-site fitness classes and facilities, as well as flex-time for exercise, healthy food options in the cafeteria and vending machines, healthy workplace environmental changes, and financial incentives for employees to participate. There is no consensus about the definition of a workplace wellness program, and different employers define their programs differently.<sup>1</sup> Synonymous terms: “health promotion program”, “health management program”.

**B. RESEARCH RESULTS****1. Introduction**

More than 90 percent of employers with 200 or more employees have reported offering a workplace wellness program. However, employee participation in such programs is limited. Even though there is no nationally representative data about participation, a 2010 survey suggests that typically fewer than 20 percent of eligible employees enroll in workplace wellness programs.<sup>3</sup>

Because researchers have found that high rates of program enrollment are associated with successful workplace wellness programs, program directors usually want as many employees as possible to enroll in the program.<sup>4</sup> (see the sidebar)

This section describes what we know about the behavior of employees related to enrolling in workplace wellness programs.

**Behavior components**

|                              |  |
|------------------------------|--|
| <b>Acting agent role:</b>    | A1.1.01 Individual person                        |
| i. <b>Goals:</b>             | G1.1 Enhance health                              |
| ii. <b>Attributes:</b>       | Any  |
| iii. <b>Input messages:</b>  | Any  |
| iv. <b>Get input:</b>        | Any  |
| v. <b>Experience:</b>        | Any  |
| vi. <b>Rules:</b>            | Any  |
| vii. <b>Context:</b>         | US health system                                 |
| viii. <b>Produce output:</b> | Any  |
| ix. <b>Send output:</b>      | Any  |
| x. <b>Output messages:</b>   | Completion of enrollment in the wellness program |

**The importance of understanding**

In her 2012 doctoral dissertation about participation in workplace wellness programs, Joanna Edwards wrote, “an individual’s decision to participate in a health promotion activity is ultimately their own. Therefore, understanding the individual factors related to participation is of considerable importance and can support managers in deciding which activities would best complement the demographic make-up of their workforce.”<sup>2</sup>

<sup>1</sup> Mattke, Schnyer, & Van Busum (2012)

<sup>2</sup> Edwards (2012)

<sup>3</sup> Mattke, et al. (2012)

<sup>4</sup> Goetzel et al. (2007); Musich, Adams, DeWolf, & Edington (2001)

**ENROLL IN A WORKPLACE WELLNESS PROGRAM (US)** continued**B. RESEARCH RESULTS** continued**2. Summary**

Following is a summary of the research available about this behavior, by behavior component.

- i. **Goals.** None known.
- ii. **Attributes.** White-collar employees and employees with higher perceived health status were found to be more likely to enroll.
- iii. **Input messages.** None known.
- iv. **Get input.** None known.
- v. **Experience.** Employees who suffered a serious health episode in the previous year were found to be more likely to enroll, as were employees who had better knowledge about and understanding of the benefits of good health practices, and employees who had a practice of exercising prior to the program's inception.
- vi. **Rules.** Employees who had a positive attitude about the benefits of exercise were more likely to enroll.
- vii. **Context.** The following context factors were found to enhance the likelihood that employees would enroll: an employee's social interaction with workplace peers and colleagues, co-worker competitiveness, trade union support, management support, and job flexibility.
- viii. **Produce output.** None known.
- ix. **Send output.** None known.
- x. **Output messages.** None known.

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**ENROLL IN A WORKPLACE WELLNESS PROGRAM (US)** *continued***B. RESEARCH RESULTS** *continued***3. Detailed results**

Following are detailed research results about this behavior, organized by behavior component.

**i. *Goals***

The primary goal for this behavior is to “enhance health”. However, there is no known research specifically about this behavior parameter.

**ii. *Attributes***

Researchers have found that the following attributes are associated with variation in this behavior.

- **Health status.** Researchers for several studies found that employees with higher perceived health status are more attracted to workplace wellness programs and are more likely to enroll.<sup>1</sup>
- **Job type.** Researchers found that white-collar workers are more likely to enroll than blue-collar workers.<sup>2</sup>

Research results about age and gender are equivocal.<sup>3</sup>

**iii. *Input messages***

There is no known research specifically about this behavior parameter.

**iv. *Get input***

There is no known research specifically about this behavior parameter.

**v. *Experience***

Researchers have discovered that the following facets of an individual’s experience (stored in the individual’s memory) are associated with variations in this behavior.

- **Serious health episode.** In a survey-based study that focused on respondents’ intentions about enrolling in a workplace wellness program, researchers found that employees who suffered a serious health episode in the previous year were more likely to intend to enroll.<sup>4</sup>

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<sup>1</sup> Conrad (1987), Strange et al. (1991)

<sup>2</sup> W. R. Morris, Conrad, Marcantonio, Marks, & Ribisl (1999)

<sup>3</sup> Edwards (2012)

<sup>4</sup> Zavela, Davis, Cottrell, & Smith (1988)

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**ENROLL IN A WORKPLACE WELLNESS PROGRAM (US)** continued**B. RESEARCH RESULTS** continued**3. Detailed results** continued**v. *Experience*** continued

- **Knowledge.** Researchers found that individuals with better knowledge about and understanding of the benefits of good health practices were more likely to enroll.<sup>1</sup>
- **Previous exercise behavior.** Researchers found that employees who had a practice of exercising prior to the program's inception were more likely to enroll.<sup>2</sup>

Research results about the impact of job satisfaction are equivocal.<sup>3</sup>

**vi. *Rules***

Researchers have found that the following factors are associated with variations in this behavior.

- **Attitude about exercise benefits.** Researchers have found that employees who had a positive attitude about the benefits of exercise were more likely to enroll.<sup>4</sup>

**vii. *Context***

Researchers have found that the following context factors are associated with variation in this behavior.

- **Social interaction.** Researchers found that social interaction with peers and colleagues in the workplace increased the likelihood that an employee would enroll.<sup>5</sup>
- **Co-worker competitiveness.** Researchers found that informal competitiveness among colleagues and co-workers was associated with higher enrollment rates.<sup>6</sup>
- **Trade union support.** Supportive trade unions were found to positively influence employees' decisions to enroll.<sup>7</sup>

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<sup>1</sup> Edwards (2012)

<sup>2</sup> Abraham, Feldman, Nyman, & Barleen (2011)

<sup>3</sup> Edwards (2012)

<sup>4</sup> Abraham, et al. (2011)

<sup>5</sup> Edwards (2012)

<sup>6</sup> Edwards (2012)

<sup>7</sup> Yassi (2005)

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**ENROLL IN A WORKPLACE WELLNESS PROGRAM (US)** *continued***B. RESEARCH RESULTS** *continued***3. Detailed results** *continued***vii. Context** *continued*

- **Management support.** Researchers found that employees are more likely to enroll in a program when they perceive that management is supportive of it.<sup>1</sup>
- **Job flexibility.** Employees with greater job flexibility have been found to be more likely to enroll.<sup>2</sup>

**viii. Produce output**

There is no known research specifically about this behavior parameter.

**ix. Send output**

There is no known research specifically about this behavior parameter.

**x. Output messages**

The primary output message for this behavior is “Completion of enrollment in the wellness program”. There is no known research specifically about this behavior parameter.

**4. Conflicting results**

There appears to be no research result that conflicts significantly with the results presented above. However, as noted, research results about the impact of age, gender, and job satisfaction on enrollment are equivocal.

**5. Limitations**

Research about this behavior has the following limitations.

- **Imprecise terminology.** In many studies, it is difficult to determine whether the focus of study is enrollment in a wellness program or participation in a particular wellness program activity.
- **Limited and dated.** There are relatively few studies about this behavior, and many of these are now dated.

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<sup>1</sup> Goetzel & Ozminkowski (2008)

<sup>2</sup> Palank (1991)



## ENROLL IN A WORKPLACE WELLNESS PROGRAM (US) continued

### C. RESEARCH GAPS

There are several gaps in the research about this health behavior:

- **Lack of experiments.** The existing research is primarily based on survey results analyzed by statistical correlation. It appears that no experiment in a real-life situation has been performed to determine how an individual decides to enroll.
- **Interactions.** Researchers have not yet systematically explored interactions among the factors associated with enrollment. This issue may be crucial to understanding why and how people decide to enroll.
- **Lack of “produce output” research.** There is inadequate research about the “produce output” behavior parameter. This parameter is particularly important, because it ties together all the other parameters.
- **Missing behavior components.** Little or no research has been performed to elucidate the “goals”, “input messages”, “get input”, “send output”, “output messages”, or—most importantly—the “produce output” components of this behavior.

### D. SIMULATION MODELS

There is no known simulation model that specifically incorporates this behavior.

### E. CROSS REFERENCES

Related behaviors:

A1.1.01:G1.1:B108.001: Start an employer-provided exercise program (US)

A1.1.01:G1.1:B109.001: Maintain an employer-provided exercise program (US)

A1.1.01:G1.1:B102.001

UPDATED: FEBRUARY 26, 2013

**COMPLETE AN EMPLOYER-PROVIDED HEALTH RISK ASSESSMENT (US)**

An individual in a US workplace wellness program completes a health risk assessment that the employer provides for the program.

**A. TERMINOLOGY**

**Health risk factor:** A variable associated with an increased risk of disease, infection, or other poor health condition. Health risk factors are correlated with increased risk of poor health. Synonymous term: “health risk determinant”.

**Health risk assessment:** A questionnaire that helps individuals to determine, evaluate, and mitigate their health risk factors. Synonymous terms: “HRA”, “health risk appraisal”.

**Workplace wellness program:** An activity or policy that an employer provides to promote healthy behavior among employees, in order to improve their health outcomes and productivity. A workplace wellness program might include health fairs, health education, medical screening, health coaching, a health risk assessment, on-site fitness classes and facilities, as well as flex-time for exercise, healthy food options in the cafeteria and vending machines, healthy workplace environmental changes, and financial incentives for employees to participate. There is no consensus about the definition of a workplace wellness program.<sup>1</sup> Synonymous terms: “health promotion program”, “health management program”.

**B. RESEARCH RESULTS****1. Introduction**

A health risk assessment (HRA) is often a key component of a workplace wellness program. A 2007 survey of 573 US employers found that 72 percent offered their employees HRAs.<sup>2</sup> Because researchers have found that high rates of HRA participation are associated with successful workplace wellness programs, program directors usually want as many employees as possible to complete the program’s HRA.<sup>3</sup> This section describes what we know about the behavior of employees related to completing HRAs.

**Behavior components**

|                                     |  |
|-------------------------------------|--|
| <b>Acting agent role:</b>           | A1.1.01 Individual person                |
| <b>i. <i>Goals:</i></b>             | G1.1 Enhance health                      |
| <b>ii. <i>Attributes:</i></b>       | Any                                      |
| <b>iii. <i>Input messages:</i></b>  | Any                                      |
| <b>iv. <i>Get input:</i></b>        | Any                                      |
| <b>v. <i>Experience:</i></b>        | Any                                      |
| <b>vi. <i>Rules:</i></b>            | Any                                      |
| <b>vii. <i>Context:</i></b>         | US health system                         |
| <b>viii. <i>Produce output:</i></b> | Any                                      |
| <b>ix. <i>Send output:</i></b>      | Any                                      |
| <b>x. <i>Output messages:</i></b>   | Completion of the health risk assessment |

<sup>1</sup> Mattke, et al. (2012)

<sup>2</sup> Okie (2007)

<sup>3</sup> Goetzel, et al. (2007); Musich, et al. (2001)

**COMPLETE AN EMPLOYER-PROVIDED HEALTH RISK ASSESSMENT** continued**B. RESEARCH RESULTS** continued**2. Summary**

Following is a summary of the research available about this behavior, by behavior component.

- i. **Goals.** None known
- ii. **Attributes.** Researchers found that women were more likely to complete the HRA at the start of a wellness program, but that men were more likely to complete it 10 years later.
- iii. **Input messages.** Variations in this behavior were associated with how comprehensive an employer's wellness communication strategy was, how effective the employer's general wellness communications were, and how incentives were communicated to employees. Higher incentive amounts were associated with greater HRA participation.
- iv. **Get input.** None known.
- v. **Experience.** Variation in HRA participation was associated with how satisfied employees were with the safety of the workplace, with coworkers, with how supervisors and department directors treat employees, and with how freely employees can express their job grievances.
- vi. **Rules.** None known.
- vii. **Context.** Some researchers found that organizational commitment to a wellness program was associated with greater HRA participation. But other researchers found that a supportive worksite culture did not appear to play a significant role in HRA participation.
- viii. **Produce output.** None known.
- ix. **Send output.** None known.
- x. **Output messages.** None known.

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**COMPLETE AN EMPLOYER-PROVIDED HEALTH RISK ASSESSMENT** continued**B. RESEARCH RESULTS** continued**3. Detailed results**

Following are detailed research results about this behavior, organized by behavior component.

**i. *Goals***

The primary goal for this behavior is to “enhance health”. However, there is no known research specifically about this behavior parameter.

**ii. *Attributes***

Researchers found that the following attributes are associated with variations in this behavior.

- **Gender.** Researchers studying the worksite wellness program of a medium-sized company (about 2,000 employees) found that women were more likely than men to complete the HRA.<sup>1</sup> In another study of a larger employer’s wellness program, researchers found that women were more likely to complete the HRA at the start of the program, but that men were more likely to complete the HRA 10 years later.<sup>2</sup>
- **Health status.** Researchers studying the worksite wellness program of a medium-sized company (about 2,000 employees) found that employees with low health risks were more likely than employees with high health risks to complete the HRA.<sup>3</sup>

The authors of one research paper noted that “Participation is a complex issue influenced by many factors including gender, personality, health status, and environment.”<sup>4</sup>

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<sup>1</sup> R. J. Lewis, Huebner, & Yarborough (1996)

<sup>2</sup> Musich, et al. (2001)

<sup>3</sup> R. J. Lewis, et al. (1996)

<sup>4</sup> Musich, et al. (2001)

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**COMPLETE AN EMPLOYER-PROVIDED HEALTH RISK ASSESSMENT** *continued***B. RESEARCH RESULTS** *continued***3. Detailed results** *continued***iii. *Input messages***

Researchers who studied the worksite wellness programs of 36 large private and public-sector employers found that a comprehensive wellness communications strategy increased HRA participation. These researchers also found that the type and value of incentives appeared to play a role in initial HRA participation.<sup>1</sup>

Researchers who studied the worksite wellness programs of 124 employers found that effective health communications (subjectively assessed by wellness consultants) were associated with greater HRA participation. They also found that higher incentive amounts were associated with greater HRA participation.<sup>2</sup> Researchers found that the effectiveness of a participation incentive depended on how it was communicated to employees.<sup>3</sup>

**iv. *Get input***

There is no known research specifically about this behavior parameter.

**v. *Experience***

Researchers have discovered the following about the experience component of this behavior.

- **Job satisfaction.** Researchers for a survey study of a medical center found that the following categories of employees were more likely to complete an HRA: those who were more satisfied with the safety of their workplace, those who liked their coworkers, those who felt that their supervisor and department director cared about them, and those who felt they can express their job grievances openly.<sup>4</sup>

**vi. *Rules***

There is no known research specifically about this behavior parameter.

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<sup>1</sup> Seaverson, Grossmeier, Miller, & Anderson (2009)

<sup>2</sup> Taitel, Haufle, Heck, Loeppeke, & Fetterolf (2008)

<sup>3</sup> Haisley, Volpp, Pellathy, & Loewenstein (2012)

<sup>4</sup> McLellan et al. (2009)

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**COMPLETE AN EMPLOYER-PROVIDED HEALTH RISK ASSESSMENT** continued**B. RESEARCH RESULTS** continued**3. Detailed results** continued**vii. Context**

Researchers who studied the worksite wellness programs of 36 large private and public-sector employers found that a supportive worksite culture did not appear to play a significant role in HRA completion rates.<sup>1</sup> By contrast, researchers who studied the worksite wellness programs of 124 employers found that organizational commitment to a wellness program (subjectively assessed by wellness consultants) was associated with greater HRA completion rates.<sup>2</sup>

**viii. Produce output**

There is no known research specifically about this behavior parameter.

**ix. Send output**

There is no known research specifically about this behavior parameter.

**x. Output messages**

The primary output message for this behavior is “Completion of the health risk assessment”. There is no known research specifically about this behavior parameter.

**4. Conflicting results**

Researchers have obtained conflicting results for both the “Attributes (gender)” and the “Context” behavior components.

**5. Limitations**

Research about this behavior has the following limitations.

- **Narrow focus.** Several studies of this behavior were focused on the experience of only one company. The results may not generalize to other companies with different employee demographics and different economic environments.<sup>3</sup>

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<sup>1</sup> Seaverson, et al. (2009)

<sup>2</sup> Taitel, et al. (2008)

<sup>3</sup> Musich, et al. (2001)

## COMPLETE AN EMPLOYER-PROVIDED HEALTH RISK ASSESSMENT continued

### C. RESEARCH GAPS

There are several gaps in the research about this health behavior:

- **Lack of experiments.** The existing research is primarily based on statistical correlation analyses. It appears that few if any experiments in a real-life situation have been performed to determine how an individual decides whether or not to complete an HRA.
- **Lack of “produce output” research.** There does not appear to be any research about the “produce output” behavior parameter. This parameter is particularly important, because it ties together all the other parameters.
- **Missing behavior components.** Little or no research has been performed to elucidate the “goal”, “get input”, “rules”, “send output”, “output messages”, or—most importantly—the “produce output” components of this behavior.

### D. SIMULATION MODELS

There is no known simulation model that incorporates this behavior.

### E. CROSS REFERENCES

Related behaviors:

A1.1.01:G1.1:B101.001: Join a workplace wellness program (US)

A1.1.01:G1.1:B103.001

UPDATED: FEBRUARY 10, 2013

**OBTAIN BIOMETRIC MEASUREMENTS FOR A WORKPLACE WELLNESS PROGRAM (US)**

An individual in a US workplace wellness program obtains biometric measurements for the program.

**A. TERMINOLOGY**

**Biometric measurement:** A measurement of a person's body that is related to the person's health status. Common biometric measurements are cholesterol and glucose in the blood, blood pressure, weight, and height. Biometric measurements are often obtained for employees participating in a workplace wellness program in a process called a "biometric screening".

**Workplace wellness program:** An activity or policy that an employer provides to promote healthy behavior among employees, in order to improve their health outcomes and productivity. A workplace wellness program might include health fairs, health education, medical screening, health coaching, a health risk assessment, on-site fitness classes and facilities, as well as flex-time for exercise, healthy food options in the cafeteria and vending machines, healthy workplace environmental changes, and financial incentives for employees to participate. There is no consensus about the definition of a workplace wellness program.<sup>1</sup> Synonymous terms: "health promotion program", "health management program".

**B. RESEARCH RESULTS****1. Introduction**

Biometric measurement is often a key component of a workplace wellness program. A 2010 survey of US employers found that 49 percent offered their employees biometric measurement screenings.<sup>2</sup> Although there is some question about the efficacy of biometric screening<sup>3</sup>, many workplace wellness program directors want as many employees as possible to participate in the program's biometric screening. This section describes what we know about the behavior of employees related to obtaining biometric measurements for workplace wellness programs.

**Behavior components**

|                                     |  |
|-------------------------------------|--|
| <b>Acting agent role:</b>           | A1.1.01 Individual person                          |
| <b>i. <i>Goals:</i></b>             | G1.1 Enhance health                                |
| <b>ii. <i>Attributes:</i></b>       | Any  |
| <b>iii. <i>Input messages:</i></b>  | Any  |
| <b>iv. <i>Get input:</i></b>        | Any  |
| <b>v. <i>Experience:</i></b>        | Any  |
| <b>vi. <i>Rules:</i></b>            | Any  |
| <b>vii. <i>Context:</i></b>         | US health system                                   |
| <b>viii. <i>Produce output:</i></b> | Any  |
| <b>ix. <i>Send output:</i></b>      | Any  |
| <b>x. <i>Output messages:</i></b>   | Completion of obtaining the biometric measurements |

<sup>1</sup> Mattke, et al. (2012)

<sup>2</sup> Mario, Stavinsky, & Patel (2010)

<sup>3</sup> Chapman (2003)



**OBTAIN BIOMETRIC MEASUREMENTS FOR A WORKPLACE WELLNESS PROGRAM** continued**B. RESEARCH RESULTS** continued**2. Summary**

Following is a summary of the research available about this behavior, by behavior component.

- i. *Goals*. None known.
- ii. *Attributes*. Non-professional employees were more likely than professionals to participate in biometric screening.
- iii. *Input messages*. Higher cash incentives were associated with higher screening participation.
- iv. *Get input*. None known.
- v. *Experience*. The following categories of medical center employees were more likely to participate in biometric screening: those who believed that their pay was fair, and those who would recommend that their family and friends receive medical care from their medical center.
- vi. *Rules*. None known.
- vii. *Context*. None known.
- viii. *Produce output*. None known.
- ix. *Send output*. None known.
- x. *Output messages*. None known.

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**OBTAIN BIOMETRIC MEASUREMENTS FOR A WORKPLACE WELLNESS PROGRAM** continued**B. RESEARCH RESULTS** continued**3. Detailed results**

Following are detailed research results about this behavior, organized by behavior component.

**i. *Goals***

The primary goal for this behavior is to “enhance health”. However, there is no known research specifically about this behavior parameter.

**ii. *Attributes***

Researchers found that the following attributes were associated with variations in this behavior.

- **Job type.** Researchers for a survey study of a medical center found that non-professional employees were more likely than professionals to participate in biometric screening.<sup>1</sup>

**iii. *Input messages***

In a small study that was not published in a peer-reviewed journal, researchers found that higher cash incentives were associated with higher screening participation.<sup>2</sup>

**iv. *Get input***

There is no known research specifically about this behavior parameter.

**v. *Experience***

Researchers have discovered the following about the experience component of this behavior.

- **Job satisfaction.** Researchers for a survey study of a medical center found that the following categories of employees were more likely to participate in biometric screening: those who believed that their pay was fair, and those who would recommend that their family and friends receive medical care from their medical center.<sup>3</sup>

**vi. *Rules***

There is no known research specifically about this behavior parameter.

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<sup>1</sup> McLellan, et al. (2009)

<sup>2</sup> Montalto (2010)

<sup>3</sup> McLellan, et al. (2009)

**OBTAIN BIOMETRIC MEASUREMENTS FOR A WORKPLACE WELLNESS PROGRAM** *continued*

**B. RESEARCH RESULTS** *continued*

**3. Detailed results** *continued*

**vii. Context**

There is no known research specifically about this behavior parameter.

**viii. Produce output**

There is no known research specifically about this behavior parameter.

**ix. Send output**

There is no known research specifically about this behavior parameter.

**x. Output messages**

The primary output message for this behavior is “Completion of obtaining the biometric measurements”. There is no known research specifically about this behavior parameter.

**4. Conflicting results**

There appears to be no research result that conflicts significantly with the results presented above.

**5. Limitations**

Research about this behavior has the following limitations.

- **Narrow focus.** The few studies of this behavior are focused either on the experience of only one company, or a very small data set. The results may not generalize to companies with different employee demographics and different economic environments.

**OBTAIN BIOMETRIC MEASUREMENTS FOR A WORKPLACE WELLNESS PROGRAM** continued

**C. RESEARCH GAPS**

There are several gaps in the research about this health behavior:

- **Lack of studies.** There is a marked lack of studies about this behavior.
- **Lack of experiments.** The existing research is primarily based on statistical correlation analyses. It appears that few if any experiments in a real-life situation have been performed to elucidate this behavior.
- **Lack of “produce output” research.** There does not appear to be any research about the “produce output” behavior parameter. This parameter is particularly important, because it ties together all the other parameters.
- **Missing behavior components.** Little or no research has been performed to elucidate the “goal”, “get input”, “rules”, “send output”, “output messages”, or—most importantly—the “produce output” components of this behavior.

**D. SIMULATION MODELS**

There is no known simulation model that incorporates this behavior.

**E. CROSS REFERENCES**

Related behaviors:

A1.1.01:G1.1:B101.001: Join a workplace wellness program (US)

A1.1.01:G1.1:B102.001: Complete an employer-provided health risk assessment (US)

A1.1.01:G1.1:B104.001

UPDATED: FEBRUARY 10, 2013

**READ EMPLOYER-PROVIDED EDUCATIONAL MATERIAL ABOUT IMPROVING EXERCISE (US)**

An individual in a US workplace wellness program reads employer-provided educational material about improving exercise habits.

**A. TERMINOLOGY**

**Workplace wellness program:** An activity or policy that an employer provides to promote healthy behavior among employees, in order to improve their health outcomes and productivity. A workplace wellness program might include health fairs, health education, medical screening, health coaching, a health risk assessment, on-site fitness classes and facilities, as well as flex-time for exercise, healthy food options in the cafeteria and vending machines, healthy workplace environmental changes, and financial incentives for employees to participate. There is no consensus about the definition of a workplace wellness program, and different employers define their programs differently.<sup>1</sup> Synonymous terms: “health promotion program”, “health management program”.

**Tailored educational material:** Educational material in which information about an individual is used to determine the material’s content, the context or frame surrounding the content, and how the content will be delivered.

**B. RESEARCH RESULTS****1. Introduction**

Educational material for employees to read is a common component of workplace wellness programs. A 2010 meta-analysis of such programs found that 42 percent of employers offered their employees self-help educational material to read.<sup>2</sup> Workplace wellness program directors usually want as many employees as possible to read and absorb such material.

This section describes what we know about the behavior of employees related to reading such material.

**Behavior components**

|                                     |  |
|-------------------------------------|--|
| <b>Acting agent role:</b>           | A1.1.01 Individual person                      |
| <b>i. <i>Goals:</i></b>             | G1.1 Enhance health                            |
| <b>ii. <i>Attributes:</i></b>       | Any  |
| <b>iii. <i>Input messages:</i></b>  | Any  |
| <b>iv. <i>Get input:</i></b>        | Any  |
| <b>v. <i>Experience:</i></b>        | Any  |
| <b>vi. <i>Rules:</i></b>            | Any  |
| <b>vii. <i>Context:</i></b>         | US health system                               |
| <b>viii. <i>Produce output:</i></b> | Any  |
| <b>ix. <i>Send output:</i></b>      | Any  |
| <b>x. <i>Output messages:</i></b>   | Completion of reading the educational material |

<sup>1</sup> Mattke, et al. (2012)

<sup>2</sup> Baicker, Cutler, & Song (2010)

READ EMPLOYER-PROVIDED EDUCATIONAL MATERIAL ABOUT IMPROVING EXERCISE (US) *continued*B. RESEARCH RESULTS *continued*

## 2. Summary

Following is a summary of the research available about this behavior, by behavior component.

- i. *Goals*. None known.
- ii. *Attributes*. None known.
- iii. *Input messages*. An individual is more likely to make permanent behavioral changes when the educational material is tailored to the individual. Further an individual is more likely to pay attention to educational material, to like it, and to understand it when the individual perceives it to be attractive, informative, encouraging, new, and useful.
- iv. *Get input*. None known.
- v. *Experience*. None known.
- vi. *Rules*. Individuals who feel that they are in control of their weight (through exercising and other behavior) respond more favorably to tailored than to non-tailored educational material.
- vii. *Context*. None known.
- viii. *Produce output*. The way that individuals respond to written educational material about losing weight (through improving exercise) is consistent with two theories of communications:
  - McGuire's input/output model: The model describes five types of input variables that affect communication effectiveness, and twelve sequential behavioral outcomes. The model proposes that progression through the behavioral outcome steps is dependent on successful completion of previous steps.
  - The Elaboration Likelihood Model (ELM): If individuals perceive information to be personally relevant, they will actively process the information and are more likely to make behavioral changes.
- ix. *Send output*. None known.
- x. *Output messages*. None known.

## READ EMPLOYER-PROVIDED EDUCATIONAL MATERIAL ABOUT IMPROVING EXERCISE (US) continued

## B. RESEARCH RESULTS continued

## 3. Detailed results

Following are detailed research results about this behavior, organized by behavior component.

i. *Goals*

The primary goal for this behavior is to “enhance health”. However, there is no known research specifically about this behavior parameter.

ii. *Attributes*

There is no known research specifically about this behavior parameter.

iii. *Input messages*

Researchers found that when the educational material is tailored to the individual, the individual pays greater attention to it, comprehends it more easily, is more likely to discuss it with other people, retains the information longer, and is more likely to make permanent behavioral changes.<sup>2</sup> (see the sidebar)

Researchers found that the extent to which individuals paid attention to, liked, and understood educational material was correlated with how much they perceived the material to be attractive, informative, encouraging, new, and useful. Further, how much individuals understood, recalled, and applied the material was correlated with how much they perceived the material as relevant to their life.<sup>3</sup>

iv. *Get input*

There is no known research specifically about this behavior parameter.

v. *Experience*

There is no known research specifically about this behavior parameter.

**Tailoring vs. non-tailoring**

In 1999, 198 overweight men and women randomly received weight-loss educational material that was either tailored or non-tailored. Prior to receiving the material, participants had completed a survey about their weight-related goals, beliefs, and behaviors.

Each person received one of three types of material:

- Material tailored specifically to the person’s survey responses.
- A generic pre-printed weight-loss brochure.
- Material with the same content as the pre-printed brochure, but formatted in a customized manner.

In a follow-up survey, participants listed ideas and thoughts they had when reading their material and rated each idea and thought as “positive”, “neutral”, or “negative”. Also, the participant coded each idea and thought for whether it involved a personal connection to the material, self-evaluation, self-efficacy (the person’s confidence in ability to lose weight), or behavioral intention. A second follow-up survey assessed changes in the participant’s weight-related behavior.

The results: Participants who received the tailored material had significantly more positive thoughts about the material, made more positive personal connections to the material, had more positive self-assessment thoughts, had more positive thoughts indicating intention to try to lose weight, and then changed weight-related behavior. Also, tailored material was more effective for participants who felt they were in control of their weight.<sup>1</sup>

<sup>1</sup> Kreuter, Oswald, Bull, & Clark (2000); Holt, Clark, Kreuter, & Scharff (2000)

<sup>2</sup> Kreuter & Holt (2001)

<sup>3</sup> Bull, Holt, Kreuter, Clark, & Scharff (2001)

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**READ EMPLOYER-PROVIDED EDUCATIONAL MATERIAL ABOUT IMPROVING EXERCISE (US)** *continued***B. RESEARCH RESULTS** *continued***3. Detailed results** *continued***vi. Rules**

In a survey-based experiment, researchers found that individuals who felt they were in control of their weight (through exercising and other behavior) responded more favorably to tailored than to non-tailored materials. Similarly, individuals who felt that their weight was determined by factors external to themselves (such as luck or genetics) responded more negatively to tailored material.<sup>1</sup>

**vii. Context**

There is no known research specifically about this behavior parameter.

**viii. Produce output**

Much of contemporary research about persuasive communication is based on McGuire's "input/output" model. This model describes five types of input variables (source, message, channel, receiver, and destination) that affect communication effectiveness, and twelve possible outcomes from communications: message exposure, attention, liking, comprehension, skill acquisition, yielding, memory storage and agreement, information search and retrieval, deciding, behaving, reinforcement, and post-behavioral consolidation. These outcomes are organized sequentially from affective and cognitive outcomes to behavioral outcomes. The model proposes that progression through the steps is dependent on successful completion of previous steps.<sup>2</sup>

Researchers studied the effectiveness of different features (inputs) of printed weight-loss educational material on the affective, cognitive, and behavioral responses (outputs) of 198 overweight adults, according to McGuire's input/output theory. They found that the results were consistent with McGuire's theory.<sup>3</sup>

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<sup>1</sup> Kreuter, et al. (2000)

<sup>2</sup> McGuire (1976)

<sup>3</sup> Bull, et al. (2001)



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**READ EMPLOYER-PROVIDED EDUCATIONAL MATERIAL ABOUT IMPROVING EXERCISE (US)** *continued***B. RESEARCH RESULTS** *continued***3. Detailed results** *continued***viii. Produce output** *continued*

Another relevant model is the Elaboration Likelihood Model (ELM). According to this model, if individuals perceive information to be personally relevant, they will actively process the information: they will consider messages carefully, relate them to other information, and compare them with their own experiences. When an individual processes (or elaborates) messages in this way, the individual pays greater attention to the information, comprehends it more easily, is more likely to discuss it with other people, retains the information longer, and is more likely to make permanent behavioral changes.<sup>1</sup> Researchers found that individuals who receive tailored educational material are more likely to behave in accordance with ELM. They also wrote, “But this is not the only viable explanation for tailoring’s persuasive effects. For example, it may be that tailored information draws the receiver’s attention toward certain valued expectations that are featured in the communication and away from expectations that are less valued. This might change the balance of factors influencing the receiver’s decisions and actions.”<sup>2</sup>

**ix. Send output**

There is no known research specifically about this behavior parameter.

**x. Output messages**

The primary output message for this behavior is “Completion of reading the educational material”. There is no known research specifically about this behavior parameter.

**4. Conflicting results**

There appears to be no research result that conflicts significantly with the results presented above.

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<sup>1</sup> Kreuter & Holt (2001)

<sup>2</sup> Kreuter & Holt (2001)

READ EMPLOYER-PROVIDED EDUCATIONAL MATERIAL ABOUT IMPROVING EXERCISE (US) continued

B. RESEARCH RESULTS continued

5. Limitations

Research about this behavior has the following limitations.

- **Survey based.** Most of the studies about this behavior are survey-based, and thus have the potential biases associated with surveys.

**READ EMPLOYER-PROVIDED EDUCATIONAL MATERIAL ABOUT IMPROVING EXERCISE (US)** continued

**C. RESEARCH GAPS**

There are several gaps in the research about this health behavior:

- **Missing behavior components.** Little or no research has been performed to elucidate the “attributes”, “goals”, “get input”, “experience”, “context”, “send output”, or “output messages” components of this behavior.

**D. SIMULATION MODELS**

There is no known simulation model that incorporates this behavior.

**E. CROSS REFERENCES**

None.

A1.1.01:G1.1:B105.001

UPDATED: FEBRUARY 10, 2013

**WATCH AN EMPLOYER-PROVIDED VIDEO ABOUT IMPROVING EXERCISE (US)**

An individual in a US workplace wellness program watches an employer-provided video about improving exercise habits.

**A. TERMINOLOGY**

**Workplace wellness program:** An activity or policy that an employer provides to promote healthy behavior among employees, in order to improve their health outcomes and productivity. A workplace wellness program might include health fairs, health education, medical screening, health coaching, a health risk assessment, on-site fitness classes and facilities, as well as flex-time for exercise, healthy food options in the cafeteria and vending machines, healthy workplace environmental changes, and financial incentives for employees to participate. There is no consensus about the definition of a workplace wellness program, and different employers define their programs differently.<sup>1</sup> Synonymous terms: “health promotion program”, “health management program”.

**B. RESEARCH RESULTS****1. Introduction**

Educational videos for employees to watch are becoming a more common component of workplace wellness programs.

This section describes what we know about the behavior of employees related to watching such material.

**Behavior components**

|                              |                                   |
|------------------------------|-----------------------------------|
| <b>Acting agent role:</b>    | A1.1.01 Individual person         |
| i. <b>Goals:</b>             | G1.1 Enhance health               |
| ii. <b>Attributes:</b>       | Any                               |
| iii. <b>Input messages:</b>  | Any                               |
| iv. <b>Get input:</b>        | Any                               |
| v. <b>Experience:</b>        | Any                               |
| vi. <b>Rules:</b>            | Any                               |
| vii. <b>Context:</b>         | US health system                  |
| viii. <b>Produce output:</b> | Any                               |
| ix. <b>Send output:</b>      | Any                               |
| x. <b>Output messages:</b>   | Completion of watching the video. |

<sup>1</sup> Mattke, et al. (2012)

**WATCH AN EMPLOYER-PROVIDED VIDEO ABOUT IMPROVING EXERCISE (US)** continued

**B. RESEARCH RESULTS** continued

**2. Summary**

Following is a summary of the research available about this behavior, by behavior component.

- i. *Goals*. None known.
- ii. *Attributes*. None known.
- iii. *Input messages*. None known.
- iv. *Get input*. None known.
- v. *Experience*. None known.
- vi. *Rules*. None known.
- vii. *Context*. None known.
- viii. *Produce output*. None known.
- ix. *Send output*. None known.
- x. *Output messages*. None known.

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**WATCH AN EMPLOYER-PROVIDED VIDEO ABOUT IMPROVING EXERCISE (US)** continued**B. RESEARCH RESULTS** continued**3. Detailed results**

Following are detailed research results about this behavior, organized by behavior component.

**i. *Goals***

The primary goal for this behavior is to “enhance health”. However, there is no known research specifically about this behavior parameter.

**ii. *Attributes***

There is no known research specifically about this behavior parameter.

**iii. *Input messages***

There is no known research specifically about this behavior parameter.

**iv. *Get input***

There is no known research specifically about this behavior parameter.

**v. *Experience***

There is no known research specifically about this behavior parameter.

**vi. *Rules***

There is no known research specifically about this behavior parameter.

**vii. *Context***

There is no known research specifically about this behavior parameter.

**viii. *Produce output***

There is no known research specifically about this behavior parameter.

**ix. *Send output***

There is no known research specifically about this behavior parameter.

**x. *Output messages***

The primary output message for this behavior is “Completion of watching the video”. There is no known research specifically about this behavior parameter.

**WATCH AN EMPLOYER-PROVIDED VIDEO ABOUT IMPROVING EXERCISE (US)** continued

**B. RESEARCH RESULTS** continued

**4. Conflicting results**

It appears that there has been no research specifically about this behavior.

**5. Limitations**

It appears that there has been no research specifically about this behavior.

**C. RESEARCH GAPS**

It appears that there has been no research specifically about this behavior.

**D. SIMULATION MODELS**

There is no known simulation model that incorporates this behavior.

**E. CROSS REFERENCES**

Related behaviors:

A1.1.01:G1.1:B104.001: Read employer-provided educational material about improving exercise (US)

A1.1.01:G1.1:B106.001

UPDATED: FEBRUARY 10, 2013

**PLAY AN EMPLOYER-PROVIDED COMPUTER GAME ABOUT IMPROVING EXERCISE (US)**

An individual in a US workplace wellness program plays an employer-provided computer game about improving exercise habits.

**A. TERMINOLOGY**

**Workplace wellness program:** An activity or policy that an employer provides to promote healthy behavior among employees, in order to improve their health outcomes and productivity. A workplace wellness program might include health fairs, health education, medical screening, health coaching, a health risk assessment, on-site fitness classes and facilities, as well as flex-time for exercise, healthy food options in the cafeteria and vending machines, healthy workplace environmental changes, and financial incentives for employees to participate. There is no consensus about the definition of a workplace wellness program.<sup>1</sup> Synonymous terms: “health promotion program”, “health management program”.

**B. RESEARCH RESULTS****1. Introduction**

Computer games are the fastest growing form of human recreation<sup>2</sup>. In recent years, innovative workplace wellness programs have introduced individual or social computer games to motivate employees to exercise. Several authors maintain that computer games can be more enjoyable, more interesting, and more effective than traditional types of educational material, because they have several advantages over traditional media:

- They support multi-sensory, active, problem-based learning
- They encourage use of prior knowledge to solve problems
- They provide immediate feedback
- They provide an enjoyable mechanism for self-assessment
- They can provide a social environment for learning<sup>3</sup>

Workplace wellness program directors usually want as many employees as possible to play and benefit from such games. This section describes what we know about the behavior of employees related to playing such games.

**Behavior components**

|                                     |                                 |
|-------------------------------------|---------------------------------|
| <b>Acting agent role:</b>           | A1.1.01 Individual person       |
| <b>i. <i>Goals:</i></b>             | G1.1 Enhance health             |
| <b>ii. <i>Attributes:</i></b>       | Any                             |
| <b>iii. <i>Input messages:</i></b>  | Any                             |
| <b>iv. <i>Get input:</i></b>        | Any                             |
| <b>v. <i>Experience:</i></b>        | Any                             |
| <b>vi. <i>Rules:</i></b>            | Any                             |
| <b>vii. <i>Context:</i></b>         | US health system                |
| <b>viii. <i>Produce output:</i></b> | Any                             |
| <b>ix. <i>Send output:</i></b>      | Any                             |
| <b>x. <i>Output messages:</i></b>   | Completion of the computer game |

<sup>1</sup> Mattke, et al. (2012)

<sup>2</sup> Richard M. Ryan, Rigby, & Przybylski (2006)

<sup>3</sup> Papastergiou (2009)



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**PLAY AN EMPLOYER-PROVIDED COMPUTER GAME ABOUT IMPROVING EXERCISE (US)** continued**B. RESEARCH RESULTS** continued**2. Summary**

Following is a summary of the research available about this behavior, by behavior component.

- i. **Goals.** None known.
- ii. **Attributes.** Younger people are more likely to play computer games.
- iii. **Input messages.** According to Cognitive Evaluation Theory, events and conditions that enhance a person's sense of autonomy and competence make it more likely that a person will play a computer game.
- iv. **Get input.** None known.
- v. **Experience.** None known.
- vi. **Rules.** Young people who are reluctant to exercise are likely to be attracted to computer games.
- vii. **Context.** Because of their lack of experience with computer games, older people may be reluctant to include computer games as part of a wellness program.
- viii. **Produce output.** None known.
- ix. **Send output.** None known.
- x. **Output messages.** None known.

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**PLAY AN EMPLOYER-PROVIDED COMPUTER GAME ABOUT IMPROVING EXERCISE (US)** *continued***B. RESEARCH RESULTS** *continued***3. Detailed results**

Following are detailed research results about this behavior, organized by behavior component.

**i. *Goals***

The primary goal for this behavior is to “enhance health”. However, there is no known research specifically about this behavior parameter.

**ii. *Attributes***

Researchers have found that the following attributes are associated with variations in this behavior.

- **Age.** The researcher for a meta-study of the exercise game literature concluded that exercise games are excellent vehicles to engage children, adolescents, and young people about exercising.<sup>1</sup>

**iii. *Input messages***

Cognitive Evaluation Theory (CET) is a theory of motivation that has been applied to participation in computer games. It proposes that events and conditions that enhance a person’s sense of autonomy and competence support intrinsic motivation, whereas factors that diminish perceived autonomy or competence undermine intrinsic motivation.

When one feels controlled either in pursuing an activity or in how one accomplishes it, one’s sense of autonomy is diminished and motivation wanes. Game designs differ in the autonomy they provide, such as the degree of choice one has over the sequence of actions, tasks, and goals.

CET proposes that factors that enhance the experience of competence—such as opportunities to acquire new skills or abilities, to be optimally challenged, and to receive positive feedback—increase intrinsic motivation to participate in a computer game.<sup>2</sup>

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<sup>1</sup> Papastergiou (2009)

<sup>2</sup> Richard M. Ryan, et al. (2006), R. M. Ryan & Deci (2000)

**PLAY AN EMPLOYER-PROVIDED COMPUTER GAME ABOUT IMPROVING EXERCISE (US)** *continued***B. RESEARCH RESULTS** *continued***3. Detailed results** *continued***iv. *Get input***

There is no known research specifically about this behavior parameter.

**v. *Experience***

There is no known research specifically about this behavior parameter.

**vi. *Rules***

The researcher for a meta-study of the exercise game literature concluded that exercise games are especially excellent vehicles to engage children, adolescents, and young people who are reluctant to exercise.<sup>1</sup>

**vii. *Context***

In a study that examined educators' perceptions and attitudes about computer games, researchers found that older teachers lacked knowledge and experience regarding exercise games and that they did not anticipate using such games.<sup>2</sup> These findings suggest that although exercise games promise to engage and educate younger people about exercise, older people—because of their lack of experience with computer games—may be reluctant to include computers games as part of a wellness program.<sup>3</sup>

**viii. *Produce output***

There is no known research specifically about this behavior parameter.

**ix. *Send output***

There is no known research specifically about this behavior parameter.

**x. *Output messages***

The primary output message for this behavior is “Completion of the computer game”. There is no known research specifically about this behavior parameter.

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<sup>1</sup> Papastergiou (2009)

<sup>2</sup> Russell (2007)

<sup>3</sup> Papastergiou (2009)

## PLAY AN EMPLOYER-PROVIDED COMPUTER GAME ABOUT IMPROVING EXERCISE (US) continued

### B. RESEARCH RESULTS continued

#### 4. Conflicting results

There appears to be no research result that conflicts significantly with the results presented above.

#### 5. Limitations

The research about this behavior is very young and sparse.

### C. RESEARCH GAPS

There are several gaps in the research about this health behavior:

- **Lack of studies.** There is a marked lack of studies about this behavior.
- **Lack of “produce output” research.** There does not appear to be any research about the “produce output” behavior parameter. This parameter is particularly important, because it ties together all the other parameters.
- **Missing behavior components.** Little or no research has been performed to elucidate the “goals”, “get input”, “experience”, “send output”, “output messages”, or—most importantly—the “produce output” components of this behavior.

### D. SIMULATION MODELS

There is no known simulation model that incorporates this behavior.

### E. CROSS REFERENCES

Related behaviors:

A1.1.01:G1.1:B104.001: Read employer-provided educational material about improving exercise (US)

A1.1.01:G1.1:B105.001: Watch an employer-provided video about improving exercise (US)

A1.1.01:G1.1:B107.001

UPDATED: FEBRUARY 26, 2013

## PARTICIPATE IN AN EMPLOYER-PROVIDED INTERACTIVE COMPUTER INTERVENTION ABOUT IMPROVING EXERCISE (US)

An individual in a US workplace wellness program participates in an employer-provided interactive computer intervention about improving exercise habits.

### A. TERMINOLOGY

**Wellness intervention:** A component of a wellness program that encourages individuals to engage in a specific behavior to promote their health.

**Workplace wellness program:** An activity or policy that an employer provides to promote healthy behavior among employees, in order to improve their health outcomes and productivity. A workplace wellness program might include health fairs, health education, medical screening, health coaching, a health risk assessment, on-site fitness classes and facilities, as well as flex-time for exercise, healthy food options in the cafeteria and vending machines, healthy workplace environmental changes, and financial incentives for employees to participate. There is no consensus about the definition of a workplace wellness program, and different employers define their programs differently.<sup>1</sup> Synonymous terms: “health promotion program”, “health management program”.

### B. RESEARCH RESULTS

#### 1. Introduction

As the number of people who have access to computers and the Internet increases, workplace wellness programs are using computers more frequently to deliver interactive exercise intervention programs. For delivering such programs, computers have several advantages over face-to-face interventions: large numbers of people can be reached at lower cost, the program delivery time can be at the convenience of each person, and the program can be tailored to each person.<sup>2</sup>

This section describes what we know about the behavior of employees related to participating in employer-provided interactive computer interventions about improving exercise.

#### Behavior components

|                              |  |
|------------------------------|--|
| <b>Acting agent role:</b>    | A1.1.01 Individual person                                |
| i. <b>Goals:</b>             | G1.1 Enhance health                                      |
| ii. <b>Attributes:</b>       | Any  |
| iii. <b>Input messages:</b>  | Any  |
| iv. <b>Get input:</b>        | Any  |
| v. <b>Experience:</b>        | Any  |
| vi. <b>Rules:</b>            | Any  |
| vii. <b>Context:</b>         | US health system   |
| viii. <b>Produce output:</b> | Any  |
| ix. <b>Send output:</b>      | Any  |
| x. <b>Output messages:</b>   | Completion of participation in the computer intervention |

<sup>1</sup> Mattke, et al. (2012)

<sup>2</sup> van den Berg, Schoones, & Vliet Vlieland (2007)

**PARTICIPATE IN AN EMPLOYER-PROVIDED INTERACTIVE COMPUTER INTERVENTION ABOUT IMPROVING EXERCISE (US)** *continued***B. RESEARCH RESULTS** *continued***2. Summary**

Following is a summary of the research available about this behavior, by behavior component.

- i. *Goals*. None known.
- ii. *Attributes*. Employees who were ready to become active and employees at the “action” or “maintenance” stages of change categories were more likely to participate in the computer intervention and to find it useful.
- iii. *Input messages*. People were more likely to participate in interactive computer interventions if the interventions were tailored to their characteristics and needs.
- iv. *Get input*. None known.
- v. *Experience*. None known.
- vi. *Rules*. None known.
- vii. *Context*. None known.
- viii. *Produce output*. None known.
- ix. *Send output*. None known.
- x. *Output messages*. None known.

## PARTICIPATE IN AN EMPLOYER-PROVIDED INTERACTIVE COMPUTER INTERVENTION ABOUT IMPROVING EXERCISE (US) *continued*

### B. RESEARCH RESULTS *continued*

#### 3. Detailed results

Following are detailed research results about this behavior, organized by behavior component.

##### i. *Goals*

The primary goal for this behavior is to “enhance health”. However, there is no known research specifically about this behavior parameter.

##### ii. *Attributes*

Researchers have found that the following attributes are associated with variations in this behavior.

- **Readiness to become active.** Researchers found that patterns of use and perceived utility of a computer intervention varied by the readiness of individuals to become active. Those who were more ready participated more frequently and found the intervention to be more useful.<sup>2</sup> Researchers also found that employees in the “action” or “maintenance” stage of change categories regarding exercise were more likely to use the computer intervention.<sup>3</sup> (see sidebar)

##### iii. *Input messages*

Researchers in a randomized controlled physical activity trial found that people participated more frequently in interactive computer interventions if the interventions were tailored to their characteristics and needs. Participants in the study found that goal setting and self-monitoring were the most useful intervention components.<sup>4</sup>

##### iv. *Get input*

There is no known research specifically about this behavior parameter.

##### v. *Experience*

There is no known research specifically about this behavior parameter.

#### Stages of change model

The stages of change model (also called the transtheoretical model) has been used to understand how people change behavior.

The model suggests that individuals engaging in a new behavior move through a series of five stages of change:

- **pre-contemplation:** not intending to make changes
- **contemplation:** considering a change
- **preparation:** making small changes
- **action:** actively engaging in behavior change
- **maintenance:** sustaining the change over time.<sup>1</sup>

<sup>1</sup> Prochaska & DiClemente (1983)

<sup>2</sup> Sciamanna et al. (2002)

<sup>3</sup> Leslie, Marshall, Owen, & Bauman (2005)

<sup>4</sup> B. Lewis et al. (2008)

**PARTICIPATE IN AN EMPLOYER-PROVIDED INTERACTIVE COMPUTER INTERVENTION ABOUT IMPROVING EXERCISE (US)** *continued*

**B. RESEARCH RESULTS** *continued*

**3. Detailed results** *continued*

**vi. Rules**

There is no known research specifically about this behavior parameter.

**vii. Context**

There is no known research specifically about this behavior parameter.

**viii. Produce output**

There is no known research specifically about this behavior parameter.

**ix. Send output**

There is no known research specifically about this behavior parameter.

**x. Output messages**

The primary output message for this behavior is “Completion of participation in the computer intervention”. There is no known research specifically about this behavior parameter.

**4. Conflicting results**

There appears to be no research result that conflicts significantly with the results presented above.



**PARTICIPATE IN AN EMPLOYER-PROVIDED INTERACTIVE COMPUTER INTERVENTION ABOUT IMPROVING EXERCISE (US)** continued

**B. RESEARCH RESULTS** continued

**5. Limitations**

Research about this behavior has the following limitations.

- **Lack of research.** There is a general lack of research about the behavior.
- **Methodological quality.** The methodological quality of studies varies significantly. Lack of information about blinding of the person assessing outcomes, no description of sample size calculation, lack of an intention-to-treat analysis, and insufficient description of the randomization and concealment method were the most important reasons for low methodological quality.<sup>1</sup>
- **Unstandardized outcome measures.** Several studies used too few outcome measures, and these were often unstandardized measures.<sup>2</sup>
- **Small study groups.** Most studies have been based on small groups of people.<sup>3</sup>
- **Lack of interaction effects.** Researchers have not explored interactions among factors associated with participating in computer interventions.

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<sup>1</sup> van den Berg, et al. (2007)

<sup>2</sup> van den Berg, et al. (2007)

<sup>3</sup> van den Berg, et al. (2007)

**PARTICIPATE IN AN EMPLOYER-PROVIDED INTERACTIVE COMPUTER INTERVENTION ABOUT IMPROVING EXERCISE (US)** *continued*

**C. RESEARCH GAPS**

There are several gaps in the research about this health behavior:

- **Lack of studies.** There is a marked lack of studies about this behavior.<sup>1</sup>
- **Lack of “produce output” research.** There does not appear to be any research about the “produce output” behavior parameter. This parameter is particularly important, because it ties together all the other parameters.
- **Missing behavior components.** Little or no research has been performed to elucidate the “goals”, “get input”, “experience”, “rules”, “context”, “send output”, “output messages”, or—most importantly—the “produce output” components of this behavior.

**D. SIMULATION MODELS**

There is no known simulation model that incorporates this behavior.

**E. CROSS REFERENCES**

Related behaviors:

A1.1.01:G1.1:B106.001: Play an employer-provided computer game about improving exercise (US)

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<sup>1</sup> Marcus, Ciccolo, & Sciamanna (2009)

## START AN EMPLOYER-PROVIDED EXERCISE PROGRAM (US)

An individual in a US workplace wellness program starts a recommended exercise improvement program.

### A. TERMINOLOGY

**Workplace wellness program:** An activity or policy that an employer provides to promote healthy behavior among employees, in order to improve their health outcomes and productivity. A workplace wellness program might include health fairs, health education, medical screening, health coaching, a health risk assessment, on-site fitness classes and facilities, as well as flex-time for exercise, healthy food options in the cafeteria and vending machines, healthy workplace environmental changes, and financial incentives for employees to participate. There is no consensus about the definition of a workplace wellness program, and different employers define their programs differently.<sup>1</sup> Synonymous terms: “health promotion program”, “health management program”.

### B. RESEARCH RESULTS

#### 1. Introduction

More than 90 percent of employers with 200 or more employees have reported offering a workplace wellness program, and more than 60 percent of these employers offer programs that address exercise.<sup>2</sup>

Because researchers have found that high rates of program participation are associated with successful workplace wellness programs, program directors usually want as many employees as possible to participate.<sup>3</sup>

This section describes what we know about the behavior of employees related to starting an employer-provided exercise program.

#### Behavior components

|                                     |                           |
|-------------------------------------|---------------------------|
| <b>Acting agent role:</b>           | A1.1.01 Individual person |
| <b>i. <i>Goals:</i></b>             | G1.1 Enhance health       |
| <b>ii. <i>Attributes:</i></b>       | Any                       |
| <b>iii. <i>Input messages:</i></b>  | Any                       |
| <b>iv. <i>Get input:</i></b>        | Any                       |
| <b>v. <i>Experience:</i></b>        | Any                       |
| <b>vi. <i>Rules:</i></b>            | Any                       |
| <b>vii. <i>Context:</i></b>         | US health system          |
| <b>viii. <i>Produce output:</i></b> | Any                       |
| <b>ix. <i>Send output:</i></b>      | Any                       |
| <b>x. <i>Output messages:</i></b>   | Start an exercise program |

<sup>1</sup> Mattke, et al. (2012)

<sup>2</sup> Mattke, et al. (2012)

<sup>3</sup> Goetzel, et al. (2007); Musich, et al. (2001)

**START AN EMPLOYER-PROVIDED EXERCISE PROGRAM** continued**B. RESEARCH RESULTS** continued**2. Summary**

Following is a summary of the research available about this behavior, by behavior component.

- i. **Goals.** None known.
- ii. **Attributes.** People who are more likely to start an exercise program are younger, have knowledge about their health status, do not have children, and are at an action stage of change.
- iii. **Input messages.** None known.
- iv. **Get input.** None known.
- v. **Experience.** People who perceive satisfaction with past exercise experiences are more likely to start an exercise program, as are people who have a history of successfully engaging in physical activity.
- vi. **Rules.** People who have high self-efficacy are more likely to start an exercise program, as are people who have self-regulatory skills such as goal setting, self-reinforcement, and self-monitoring.
- vii. **Context.** People in an environment with the following factors are more likely to start an exercise program: home access to exercise facilities, cues prompting to exercise, convenient exercise facilities, and information about exercise.
- viii. **Produce output.** None known.
- ix. **Send output.** None known.
- x. **Output messages.** None known.

START AN EMPLOYER-PROVIDED EXERCISE PROGRAM *continued*B. RESEARCH RESULTS *continued*

## 3. Detailed results

Following are detailed research results about this behavior, organized by behavior component. Because research about this behavior is sparse, ancillary research results about closely related behaviors are also cited. For example, ancillary research about starting an exercise program may be cited, even though the program is not an employer-provided program. In the description of such ancillary research, and in the footnotes citing it, such research is denoted by the symbol “(Δ)”.

i. *Goals*

The primary goal for this behavior is to “enhance health”. However, there is no known research specifically about this behavior parameter.

ii. *Attributes*

Researchers have found that the following attributes are associated with variations in this behavior.

- **Age.** The adoption of an exercise program has consistently been found to decrease with age after late adolescence or early adulthood.<sup>2</sup> (Δ) This decline accelerates after age 50.<sup>3</sup> (Δ)
- **Gender.** Men are more likely to start an exercise program that is team oriented, while women are more likely to start an exercise program that is individually oriented (such as yoga or walking).<sup>4</sup>
- **Health status.** Knowledge of one’s health status is associated with adoption of an exercise program.<sup>5</sup> (Δ)
- **Children.** Researchers found that having children is a significant barrier for women to start an exercise program.<sup>6</sup> (Δ)
- **Stage of change.** Researchers demonstrated that the stages of change model (see the sidebar) can be applied to the study of adoption of exercise behavior.<sup>7</sup> (Δ) Researchers also found that only about 10 percent of the non-exercising population is in an action stage of change to start an exercise program.<sup>8</sup> (Δ)

## Stages of change model

The stages of change model (also called the transtheoretical model) has been used to understand how people change behavior.

The model suggests that individuals engaging in a new behavior move through a series of five stages of change:

- **pre-contemplation:** not intending to make changes
- **contemplation:** considering a change
- **preparation:** making small changes
- **action:** actively engaging in behavior change
- **maintenance:** sustaining the change over time.<sup>1</sup>

<sup>1</sup> Prochaska & DiClemente (1983)

<sup>2</sup> Schoenborn (1986) (Δ)

<sup>3</sup> Caspersen (1991) (Δ)

<sup>4</sup> Edwards (2012)

<sup>5</sup> Godin, Desharnais, Jobin, & Cook (1987) (Δ)

<sup>6</sup> Sallis, Hovell, & Hofstetter (1992) (Δ)

<sup>7</sup> Marcus, Rossi, Selby, Niaura, & Abrams (1992) (Δ)

<sup>8</sup> Marcus, et al. (1992) (Δ)

**START AN EMPLOYER-PROVIDED EXERCISE PROGRAM** continued**B. RESEARCH RESULTS** continued**3. Detailed results** continued**iii. *Input messages***

There is no known research specifically about this behavior parameter.

**iv. *Get input***

There is no known research specifically about this behavior parameter.

**v. *Experience***

Researchers have discovered the following about the experience component of this behavior.

- **Perceived satisfaction.** Researchers in a study that compared psychosocial predictors of physical activity maintenance among 205 initially sedentary adults enrolled in a physical activity promotion trial found that perceived satisfaction with past exercise experiences was predictive of exercise program adoption.<sup>1</sup> (Δ)
- **History of exercise.** Researchers found that a history of successfully engaging in physical activity was associated with participating in an exercise program.<sup>2</sup> (Δ)

**vi. *Rules***

Researchers have found that the following factors are associated with variations in this behavior.

- **Self-efficacy.** Researchers in a study that compared psychosocial predictors of physical activity among 205 initially sedentary adults enrolled in a physical activity promotion trial found that self-efficacy was predictive of exercise program adoption.<sup>3</sup> (Δ)
- **Self-regulatory skills.** Researchers have found that self-regulatory skills such as goal setting, self-reinforcement, and self-monitoring were associated with starting an exercise program.<sup>4</sup> (Δ)

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<sup>1</sup> Williams et al. (2008) (Δ)

<sup>2</sup> R. K. Dishman, Sallis, & Orenstein (1985) (Δ), Martin & Dubbert (1982) (Δ)

<sup>3</sup> Williams, et al. (2008) (Δ)

<sup>4</sup> R. K. Dishman, et al. (1985) (Δ), Martin & Dubbert (1982) (Δ)

**START AN EMPLOYER-PROVIDED EXERCISE PROGRAM** continued**B. RESEARCH RESULTS** continued**3. Detailed results** continued**vii. Context**

Researchers have found that the following context factors are associated with variations in this behavior.

- **Home access to equipment.** Researchers in a study that compared psychosocial predictors of physical activity adoption among 205 initially sedentary adults enrolled in a physical activity promotion trial found that home access to exercise equipment was associated with exercise program adoption.<sup>1</sup> (Δ)
- **Environmental cues.** Researchers found that environmental cues such as colorful signs indicating stairs were associated with exercise program adoption.<sup>2</sup> (Δ)
- **Convenient facilities.** Researchers found that convenient access to exercise facilities is associated with greater likelihood of starting an exercise program.<sup>3</sup> (Δ) Worksite-based exercise facilities are associated with greater likelihood of starting an exercise program.<sup>4</sup>
- **Information.** Researchers found that limited access to training and information about exercise can pose a barrier to starting an exercise program.<sup>5</sup> (Δ)

**viii. Produce output**

There is no known research specifically about this behavior parameter.

**ix. Send output**

There is no known research specifically about this behavior parameter.

**x. Output messages**

The primary output message for this behavior is “Start an exercise program”. There is no known research specifically about this behavior parameter.

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<sup>1</sup> Williams, et al. (2008) (Δ)

<sup>2</sup> Brownell, Stunkard, & Albaum (1980) (Δ)

<sup>3</sup> Sallis et al. (1989) (Δ)

<sup>4</sup> Rod K. Dishman (1988) see “Exercise adherence in corporate settings” by R. J. Shephard.

<sup>5</sup> Brownell, et al. (1980) (Δ)

**START AN EMPLOYER-PROVIDED EXERCISE PROGRAM** continued

**B. RESEARCH RESULTS** continued

**4. Conflicting results**

There appears to be no research result that conflicts significantly with the results presented above.

**5. Limitations**

The primary limitation of the research cited is that it is nearly all ancillary research, not specifically referring to employer-provided exercise programs.



## START AN EMPLOYER-PROVIDED EXERCISE PROGRAM continued

### C. RESEARCH GAPS

There are several gaps in the research about this health behavior:

- **Lack of studies.** There is a marked lack of studies specifically about this behavior.
- **Lack of “produce output” research.** There does not appear to be any research about the “produce output” behavior parameter. This parameter is particularly important, because it ties together all the other parameters.
- **Missing behavior components.** Little or no research has been performed to elucidate the “goals”, “input messages”, “get input”, “send output”, “output messages”, or—most importantly—the “produce output” components of this behavior.

### D. SIMULATION MODELS

There is no known simulation model that incorporates this behavior.

### E. CROSS REFERENCES

Related behaviors:

A1.1.01:G1.1:B109.001: Maintain an employer-provided exercise program (US)

A1.1.01:G1.1:B110.001: Stop an employer-provided exercise program (US)

A1.1.01:G1.1:B109.001

UPDATED: FEBRUARY 10, 2013

**MAINTAIN AN EMPLOYER-PROVIDED EXERCISE PROGRAM (US)**

An individual in a US workplace wellness program maintains a recommended exercise program.

**A. TERMINOLOGY**

**Workplace wellness program:** An activity or policy that an employer provides to promote healthy behavior among employees, in order to improve their health outcomes and productivity. A workplace wellness program might include health fairs, health education, medical screening, health coaching, a health risk assessment, on-site fitness classes and facilities, as well as flex-time for exercise, healthy food options in the cafeteria and vending machines, healthy workplace environmental changes, and financial incentives for employees to participate. There is no consensus about the definition of a workplace wellness program, and different employers define their programs differently.<sup>1</sup> Synonymous terms: “health promotion program”, “health management program”.

**B. RESEARCH RESULTS****1. Introduction**

More than 90 percent of employers with 200 or more employees have reported offering a workplace wellness program, and more than 60 percent of these employers offer programs that address exercise.<sup>2</sup> However, among adults who take up an exercise program, 50 percent are likely to drop out within six months.<sup>3</sup>

This section describes what we know about the behavior of employees related to maintaining an employer-provided exercise program.

**Behavior components**

|                                     |                              |
|-------------------------------------|------------------------------|
| <b>Acting agent role:</b>           | A1.1.01 Individual person    |
| <b>i. <i>Goals:</i></b>             | G1.1 Enhance health          |
| <b>ii. <i>Attributes:</i></b>       | Any                          |
| <b>iii. <i>Input messages:</i></b>  | Any                          |
| <b>iv. <i>Get input:</i></b>        | Any                          |
| <b>v. <i>Experience:</i></b>        | Any                          |
| <b>vi. <i>Rules:</i></b>            | Any                          |
| <b>vii. <i>Context:</i></b>         | US health system             |
| <b>viii. <i>Produce output:</i></b> | Any                          |
| <b>ix. <i>Send output:</i></b>      | Any                          |
| <b>x. <i>Output messages:</i></b>   | Continue an exercise program |

<sup>1</sup> Mattke, et al. (2012)

<sup>2</sup> Mattke, et al. (2012)

<sup>3</sup> Bouchard (1990) see “Determinants of participation in physical activity” by R. K. Dishman

**MAINTAIN AN EMPLOYER-PROVIDED EXERCISE PROGRAM (US)** continued**B. RESEARCH RESULTS** continued**2. Summary**

Following is a summary of the research available about this behavior, by behavior component.

- i. **Goals.** None known.
- ii. **Attributes.** Those who are more likely to maintain an exercise program are younger, male, better educated, more affluent, white collar, white, and lower weight.
- iii. **Input messages.** Individuals are more likely to maintain moderate-intensity exercise programs than high-intensity programs.
- iv. **Get input.** None known.
- v. **Experience.** None known.
- vi. **Rules.** Those who are more likely to maintain an exercise program have higher self-efficacy and high self-motivation. They are also more likely to think of more pros than cons to exercising and more likely to think that exercise confers positive benefits and does not require too much time or discipline. People who plan their exercise are more likely to maintain an exercise program, as are those who have positive feelings about an exercise program.
- vii. **Context.** Social support, especially for women, is associated with maintaining an exercise program. Also, married individuals who exercise with their spouse are more likely to maintain an exercise program.
- viii. **Produce output.** None known.
- ix. **Send output.** None known.
- x. **Output messages.** None known.

**MAINTAIN AN EMPLOYER-PROVIDED EXERCISE PROGRAM (US)** continued**B. RESEARCH RESULTS** continued**3. Detailed results**

Following are detailed research results about this behavior, organized by behavior component. Because research about this specific behavior is sparse, ancillary research results about closely related behaviors are also cited. For example, ancillary research about maintenance of an exercise program may be cited, even though the program is not an employer-provided program. In both the description of such ancillary research, and in the footnotes citing it, such research is denoted by the symbol “(Δ)”.

**i. Goals**

The primary goal for this behavior is to “enhance health”. However, there is no known research specifically about this behavior parameter.

**ii. Attributes**

Researchers have found that the following attributes are associated with variations in this behavior.

- **Age.** Younger people are more likely to maintain an exercise program.<sup>1</sup> (Δ)
- **Gender.** Males are more likely to maintain an exercise program.<sup>2</sup> (Δ)
- **Education.** Better educated people are more likely to maintain an exercise program.<sup>3</sup> (Δ)
- **Income level.** More affluent people are more likely to maintain an exercise program.<sup>4</sup> (Δ)
- **Job type.** White collar workers are more likely than blue collar workers to maintain an exercise program.<sup>5</sup> (Δ)
- **Ethnicity.** White people are more likely than black people to maintain an exercise program.<sup>6</sup> (Δ)
- **Weight.** People with lower weight are more likely to maintain an exercise program.<sup>7</sup> (Δ)

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<sup>1</sup> A. C. King et al. (1992) (Δ)

<sup>2</sup> A. C. King, et al. (1992) (Δ), Sallis et al. (1986) (Δ)

<sup>3</sup> A. C. King, et al. (1992) (Δ)

<sup>4</sup> A. C. King, et al. (1992) (Δ)

<sup>5</sup> A. C. King, Carl, Birkel, & Haskell (1988) (Δ)

<sup>6</sup> S. Shea, Basch, Lantigua, & Wechsler (1992) (Δ)

<sup>7</sup> R. Dishman & Gettman (1980) (Δ)

**MAINTAIN AN EMPLOYER-PROVIDED EXERCISE PROGRAM (US)** continued**B. RESEARCH RESULTS** continued**3. Detailed results** continued**iii. *Input messages***

Researchers have discovered the following about the input messages component of this behavior.

- **Program intensity.** Individuals are more likely to maintain moderate-intensity exercise programs than high-intensity programs.<sup>2</sup> (Δ)

**iv. *Get input***

There is no known research specifically about this behavior parameter.

**v. *Experience***

There is no known research specifically about this behavior parameter.

**vi. *Rules***

Researchers have found that the following factors are associated with variations in this behavior.

- **Self-efficacy.** Researchers have found that high self-efficacy and self-motivation are associated with maintenance of an exercise program.<sup>3</sup> (Δ)

**Beliefs.** In a cross-sectional study examining the differences in attitude between joggers and non-joggers, the non-joggers reported beliefs that exercise required too much discipline and too much time, and that jogging did not confer positive benefits.<sup>4</sup>

(Δ) Researchers have found that individuals in the “maintenance” stage of change (see the sidebar) could think of more pros than cons to exercising.<sup>5</sup> (Δ)

**Stages of change model**

The stages of change model (also called the transtheoretical model) has been used to understand how people change behavior.

The model suggests that individuals engaging in a new behavior move through a series of five stages of change:

- **pre-contemplation:** not intending to make changes
- **contemplation:** considering a change
- **preparation:** making small changes
- **action:** actively engaging in behavior change
- **maintenance:** sustaining the change over time.<sup>1</sup>

<sup>1</sup> Prochaska & DiClemente (1983)

<sup>2</sup> Sallis, et al. (1986) (Δ)

<sup>3</sup> R. Dishman & Gettman (1980), Sallis, et al. (1986) (Δ)

<sup>4</sup> Riddle (1980) (Δ)

<sup>5</sup> Cropley & Purvis (2003)

**MAINTAIN AN EMPLOYER-PROVIDED EXERCISE PROGRAM (US)** *continued***B. RESEARCH RESULTS** *continued***3. Detailed results** *continued***vi. Rules** *continued*

- **Planning.** Research has shown that people who plan their exercise are more likely to maintain an exercise program.<sup>1</sup> (Δ)
- **Affect.** Researchers carried out a meta-analysis and concluded that positive feelings about exercise such as pleasure, enjoyment, and happiness are associated with maintenance of an exercise program.<sup>2</sup> (Δ)

**vii. Context**

Researchers have found that the following context factors are associated with variations in this behavior.

- **Social support.** Researchers have determined that social support, especially for women, is associated with maintaining an exercise program.<sup>3</sup> (Δ) Individuals who exercise with their spouse are more likely to maintain an exercise program than those who exercise alone.<sup>4</sup> (Δ)

**viii. Produce output**

There is no known research specifically about this behavior parameter.

**ix. Send output**

There is no known research specifically about this behavior parameter.

**x. Output messages**

The primary output message for this behavior is “Continue an exercise program”. There is no known research specifically about this behavior parameter.

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<sup>1</sup> Scholz, Schuz, Ziegelmann, Lippke, & Schwarzer (2008), Molloy, Dixon, Hamer, & Snichotta (2010) (Δ)

<sup>2</sup> Hardeman, Kinmonth, Michie, & Sutton (2011) (Δ)

<sup>3</sup> Beck, Gillison, & Standage (2010), (Δ) Molloy, et al. (2010) (Δ)

<sup>4</sup> Raglin & Wallace (1993) (Δ)

**MAINTAIN AN EMPLOYER-PROVIDED EXERCISE PROGRAM (US)** continued

**B. RESEARCH RESULTS** continued

**4. Conflicting results**

There appears to be no research result that conflicts significantly with the results presented above.

**5. Limitations**

The primary limitation of the research cited is that it is not specifically about this behavior.

## MAINTAIN AN EMPLOYER-PROVIDED EXERCISE PROGRAM (US) continued

### C. RESEARCH GAPS

There are several gaps in the research about this health behavior:

- **Lack of studies.** There is a marked lack of studies specifically about this behavior.
- **Lack of “produce output” research.** There does not appear to be any research about the “produce output” behavior parameter. This parameter is particularly important, because it ties together all the other parameters.
- **Missing behavior components.** Little or no research has been performed to elucidate the “goals”, “get input”, “experience”, “send output”, “output messages”, or—most importantly—the “produce output” components of this behavior.

### D. SIMULATION MODELS

There is no known simulation model that incorporates this behavior.

### E. CROSS REFERENCES

Related behaviors:

A1.1.01:G1.1:B108.001: Start an employer-provided exercise program (US)

A1.1.01:G1.1:B110.001: Stop an employer-provided exercise program (US)



A1.1.01:G1.2:B001.001

UPDATED: MARCH 10, 2013

**PURCHASE AN INDIVIDUAL HEALTH INSURANCE POLICY FROM AN EXCHANGE (US)**

An individual in the US health system selects and purchases an individual health insurance policy from a state-provided Health Insurance Exchange.

**A. TERMINOLOGY**

**Adverse selection:** Adverse selection is when individuals who have higher exposure to health risks buy insurance policies with more coverage or higher expected payments. In adverse selection, the true health risk of an individual is private information, and is unknown to the health insurer.

**Behavioral economics:** Using methods and insights from behavioral psychology, behavioral economics identifies important deviations from rational economic behavior.

**Health Insurance Exchange:** Health Insurance Exchanges are generally state-based entities established by the Patient Protection and Affordability Care Act (ACA - see below) that provide individual and business consumers with a centralized way to purchase standardized health insurance offered by a variety of health insurers.

The Exchange offers insurance in four tiers, from lowest actuarial value to highest: bronze, silver, gold, and platinum.

Introducing Exchanges, President Barack Obama said they should be, "... a market where Americans can one-stop shop for a health care plan, compare benefits and prices, and choose the plan that's best for them."

Exchanges also carry out other tasks: they certify health insurance plans, provide outreach to consumers, determine consumer eligibility, describe health plan choices, and enroll beneficiaries.

For most states, Health Insurance Exchanges will first become operational in 2014. Synonymous terms: "Exchange", "Health Benefits Exchange".<sup>1</sup>

**Behavior components**

|                                     |  |
|-------------------------------------|--|
| <b>Acting agent role:</b>           | A1.1.01 Individual person                    |
| <b>i. <i>Goals:</i></b>             | G1.2 Decrease health risk                    |
| <b>ii. <i>Attributes:</i></b>       | Any  |
| <b>iii. <i>Input messages:</i></b>  | Any  |
| <b>iv. <i>Get input:</i></b>        | Any  |
| <b>v. <i>Experience:</i></b>        | Any  |
| <b>vi. <i>Rules:</i></b>            | Any  |
| <b>vii. <i>Context:</i></b>         | US health system                             |
| <b>viii. <i>Produce output:</i></b> | Any  |
| <b>ix. <i>Send output:</i></b>      | Any  |
| <b>x. <i>Output messages:</i></b>   | Individual health insurance policy purchased |

<sup>1</sup> From a letter President Obama wrote to Senators Edward Kennedy and Max Baucus.

**PURCHASE AN INDIVIDUAL HEALTH INSURANCE POLICY FROM AN EXCHANGE (US)** continued**A. TERMINOLOGY** continued

**Massachusetts Connector:** In 2006, Massachusetts legislation created a Health Insurance Exchange called the Connector, which offers health insurance to individuals, families, and small employers. The Connector offers two programs. The first is Commonwealth Choice, which offers unsubsidized commercial health insurance with three tiers of coverage (Gold, Silver, and Bronze) as well as Young Adult insurance for people ages 18–26. The second program is Commonwealth Care, which offers subsidized health insurance from Medicaid for families whose incomes are no more than 300 percent of the federal poverty level.<sup>1</sup>

**Patient Protection and Affordability Care Act (PPACA or ACA):** A federal statute signed into law on March 23, 2010 that overhauled the US healthcare system. The ACA's primary purpose was to increase the number of Americans covered by health insurance.

**B. RESEARCH RESULTS****1. Introduction**

By 2020 twenty-five million people are expected to purchase health insurance from Health Insurance Exchanges. Thus it is important to understand how people seek information and make decisions about purchasing health insurance from an Exchange.

Although evidence about such purchasing behavior is scant, we do know that such behavior is not rational in the neo-classical economic sense. (see the sidebar)

This section describes what we know about the behavior of individuals purchasing individual health insurance from an Exchange.

**One of the hardest things**

According to three studies conducted by the Consumers Union, the image of a careful shopper who is capable of weighing the myriad costs and benefits associated with their health insurance options must be abandoned. ...

According to these studies, consumers dread shopping for health insurance. ... one participant became so anxious that he almost left upon hearing that the focus group session related to health insurance. One focus group participant stated "I think medical insurance is probably one of the hardest things for me that I shop for. And I think it's one of the hardest things to figure out what's covered".

Another finding from the research is that many consumers doubt the value, or question the purpose of, health insurance.<sup>2</sup>

<sup>1</sup> Commonwealth Health Insurance Connector Authority (2010), Massachusetts Division of Health Care Finance and Policy (2011)

<sup>2</sup> Quincy (2012)

PURCHASE AN INDIVIDUAL HEALTH INSURANCE POLICY FROM AN EXCHANGE (US) continuedB. RESEARCH RESULTS continued

## 2. Summary

Following is a summary of the research available about this behavior, by behavior component.

- i. **Goals.** None known.
- ii. **Attributes. Health:** There is some evidence for adverse selection associated with this behavior, but the results are conflicting. **Age:** Older people used sub-optimal decision heuristics and made worse decisions. **Cognitive capacity:** Seniors with greater cognitive capacity were more likely to purchase.
- iii. **Input messages.** Premium reductions increased the number of people purchasing health insurance, but even high subsidies did not induce all people to purchase. Younger adults were more price sensitive than older adults. And people gravitated to the cheapest alternative.

When people were given more options, they were less likely to make a purchase, and the probability of purchasing optimal health insurance declined. When people faced difficult choices, they were more likely to avoid choosing altogether.

When provided with information about the quality of health plan performance, consumers tended to choose policies from health plans that performed better. Responses to information about quality differed significantly across population subgroups.

Consumers found that scenarios about the cost of medical care were helpful in choosing health insurance policies.

Because people are loss-averse, the usual framing of health insurance purchase options encouraged individuals to take risks and forego purchasing insurance.

PURCHASE AN INDIVIDUAL HEALTH INSURANCE POLICY FROM AN EXCHANGE (US) continuedB. RESEARCH RESULTS continued2. Summary continued

- iv. *Get input.* Most people used the Internet to obtain information about Exchange plans. Also, if information about health insurance was not from a trusted source, people would not use it. People did not consider health insurers to be a trusted source.

People had considerable confusion about health insurance and medical terminology. And many people found information about health insurance plans described on an Exchange to be difficult to understand.

- v. *Experience.* People who did not have experience with health insurance used concepts from experience they had with other insurance types, often erroneously.

People dreaded shopping for health insurance. They doubted its value and purpose.

People were not always self-interested. They also cared about the welfare of others, fairness, and social norms.

- vi. *Rules.* If the anticipated annual out-of-pocket expenses for health care were less than the cost of health insurance premiums plus deductibles, consumers often felt that the insurance was not a good value.

In purchasing health insurance, consumers valued the scope of services covered, the share of costs paid by insurance, and the quality of a plan's providers. They did not focus solely on cost. In the absence of other information, people were likely to equate high-cost health insurance with high quality.

Hypothetical insurance purchases were sensitive to perceptions of risk, but people's perception of risk was often erroneous. People preferred to stick with what they had.

**PURCHASE AN INDIVIDUAL HEALTH INSURANCE POLICY FROM AN EXCHANGE (US)** continued

**B. RESEARCH RESULTS** continued

**2. Summary** continued

- vii. *Context*. None known.
  
- viii. *Produce output*. The utility maximization model from neoclassical economics underlies much of the research about this behavior. But behavioral economics has shown that this model is flawed.
  
- ix. *Send output*. People postponed activities with immediate costs, even if doing so reduced their welfare. If there were significant “hassle costs”, people were less likely to act.
  
- x. *Output messages*. None known.

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**PURCHASE AN INDIVIDUAL HEALTH INSURANCE POLICY FROM AN EXCHANGE (US)** continued**B. RESEARCH RESULTS** continued**3. Detailed results**

Following are detailed research results about this behavior, organized by behavior component. Because research about this specific behavior is sparse, ancillary research results about closely related behaviors are also cited. In both the description of such ancillary research, and in the footnotes citing it, such research is denoted by the symbol “(Δ)”.

**i. Goals**

The primary goal for this behavior is to “decrease health risk”. However, there is no known research specifically about this behavior parameter.

**ii. Attributes**

Researchers have found that the following attributes are associated with variations in this behavior.

- **Health status.** In a correlation study of data from the large Medical Expenditure Panel Survey (MEPS), researchers found no systematic relationship between the illness of individuals and the type of insurance policy they chose. Other researchers have found that drug coverage may be more susceptible than medical coverage to variation in consumer selection due to health status. However, in other studies, researchers have found that there is evidence for adverse selection of medical coverage. <sup>1</sup> (Δ)

Researchers found that individuals with mental illness are more likely than others to adversely select health insurance, that is, to obtain health insurance with better benefits. <sup>2</sup> (Δ)

- **Age.** Using controlled experiments, researchers found that older people relied more on sub-optimal decision heuristics to select health insurance than did younger people, and consequently made worse decisions. <sup>3</sup> (Δ)

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<sup>1</sup> Di Novi (2008) (Δ)

<sup>2</sup> Frank (2000) (Δ)

<sup>3</sup> Besedes, Deck, Sarangi, & Shor (2012) (Δ)

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**PURCHASE AN INDIVIDUAL HEALTH INSURANCE POLICY FROM AN EXCHANGE (US)** continued**B. RESEARCH RESULTS** continued**3. Detailed results** continuedii. *Attributes continued*

- **Cognitive capacity.** Researchers found that seniors with greater cognitive capacity were more likely to sign up for Medicare Part D.<sup>1</sup> (Δ)

iii. *Input messages*

Researchers have discovered the following about the input messages component of this behavior.

- **Premium level.** Based on surveys of small employers, researchers found that although premium reductions increased the number of people who purchased health insurance, even large subsidies did not induce all people to purchase. High subsidies achieved only modest increases in coverage.<sup>2</sup> (Δ)

Researchers who analyzed results from the Massachusetts Connector found that younger individuals were more than twice as price sensitive as older individuals.<sup>3</sup>

Researchers who analyzed results from the Massachusetts Connector found that consumers gravitate toward the cheapest health insurance alternative. A majority of enrollees (60 percent) chose a bronze tier plan, the lowest level of coverage; about 30 percent chose the silver tier, and only 10 percent chose the gold tier. About 20 percent of enrollees chose the cheapest plan available to them.<sup>4</sup>

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<sup>1</sup> Baicker, Congdon, & Mullainathan (2012) (Δ)

<sup>2</sup> M. Chernew, Frick, & McLaughlin (1997) (Δ)

<sup>3</sup> Ericson & Starc (2012a)

<sup>4</sup> Starc & Kolstad (2012)

## PURCHASE AN INDIVIDUAL HEALTH INSURANCE POLICY FROM AN EXCHANGE (US) continued

## B. RESEARCH RESULTS continued

## 3. Detailed results continued

iii. *Input messages continued*

- **Number of choices.** In focus group studies, researchers found that individuals did not want an unlimited number of choices. Consumer testing for the Massachusetts Connector led it to reduce the number of choices from 27 to 9.<sup>1</sup> In a survey study of participants in the Massachusetts Connector, researchers found that about one quarter of participants would have preferred fewer choices.<sup>2</sup>

Experiments in which individuals are given more choices show that they are less likely to make a purchase. For example, the more options that employers offer for retirement plans, the less likely that employees will participate.<sup>3</sup> (Δ)

Using controlled experiments, researchers found that the probability of a person selecting an optimal health insurance option declines as the number of options increases, with the decline being more pronounced for older subjects.<sup>4</sup> (Δ)

- **Difficult choices.** Psychology researchers found that when individuals were faced with difficult choices, they often avoided choosing altogether.<sup>5</sup> (Δ)
- **Health plan performance.** Through a literature review, researchers evaluated the state of knowledge about the relationship between information provided about health plan performance quality and consumer policy choice. (Here, a “health plan” is the organization providing health insurance policies.) They found that consumers tend to choose policies from health plans that perform better.<sup>6</sup> (Δ)

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<sup>1</sup> Quincy (2012)

<sup>2</sup> Sinaiko, Ross-Degnan, Soumerai, Lieu, & Galbraith (2013)

<sup>3</sup> Baicker, et al. (2012) (Δ)

<sup>4</sup> Besedes, et al. (2012) (Δ)

<sup>5</sup> Baicker, et al. (2012) (Δ)

<sup>6</sup> Kolstad & Chernew (2009) (Δ)



PURCHASE AN INDIVIDUAL HEALTH INSURANCE POLICY FROM AN EXCHANGE (US) *continued*B. RESEARCH RESULTS *continued*3. Detailed results *continued*iii. *Input messages continued*

- **Information quality.** Through a literature review, researchers evaluated the state of knowledge about the relationship between the quality of information provided about health plan performance quality and consumer policy choice. (Here, a “health plan” is the organization providing health insurance policies.) They found that the response to information about quality differed significantly among consumers and across population subgroups. For example, it appears that women valued quality information about preventive screening services more than men, consumers with a chronic disease were more sensitive to information quality, and more highly educated consumers were more sensitive to information quality.<sup>1</sup> (Δ)

In an experiment involving about 1,500 employees, researchers found that presenting cost data alongside easy-to-interpret quality information and highlighting high-value options improved the likelihood that consumers would choose high-value options.<sup>2</sup> (Δ)

- **Response to questions.** In a survey study of participants in the Massachusetts Connector, researchers found that about one fifth of participants did not feel that their questions about the insurance plans offered on the Connector had been answered.<sup>3</sup>
- **Scenarios.** In focus group studies, researchers discovered that consumers found scenarios to be very informative. Because many study subjects had no idea how much medical care costs, they found scenarios giving sample plan payments to be helpful.<sup>4</sup>

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<sup>1</sup> Kolstad & Chernew (2009) (Δ)

<sup>2</sup> Hibbard, Greene, Sofaer, Firminger, & Hirsh (2012) (Δ)

<sup>3</sup> Sinaiko, et al. (2013)

<sup>4</sup> Quincy (2012)

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**PURCHASE AN INDIVIDUAL HEALTH INSURANCE POLICY FROM AN EXCHANGE (US)** continued**B. RESEARCH RESULTS** continued**3. Detailed results** continued**iii. *Input messages*** continued

- **Framing.** Psychology researchers found that individuals are loss-averse (they are more motivated to avoid losses than to secure gains). The usual framing for health insurance—a certain loss of premium traded for an uncertain gain from coverage—may encourage individuals to take risks and forego purchasing insurance.<sup>1</sup> (Δ)

**iv. *Get input***

Researchers have discovered the following about the get input component of this behavior.

- **Information source.** In a survey study of participants in the Massachusetts Connector, researchers found that about 80 percent of participants used the Internet to obtain information about Connector plans, about 20 percent used a telephone help line, about 15 percent obtained information from friends or family members, about 10 percent obtained information from print materials, and the remainder obtained information from a broker, agent, or employer.<sup>2</sup>
- **Filtering trusted sources.** In focus group studies, researchers found that if information about health insurance was not provided from a trusted source, consumers would not use it. They found that the level of consumer trust in health insurers was very low. Even when consumers had a good grasp of information, if the information was provided by health insurers they did not trust their analyses, because they worried about the “fine print”, and because they felt that insurers are “tricky”.<sup>3</sup>

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<sup>1</sup> Baicker, et al. (2012) (Δ)

<sup>2</sup> Sinaiko, et al. (2013)

<sup>3</sup> Quincy (2012)

## PURCHASE AN INDIVIDUAL HEALTH INSURANCE POLICY FROM AN EXCHANGE (US) continued

## B. RESEARCH RESULTS continued

## 3. Detailed results continued

iv. *Get input continued*

- **Misunderstanding terminology.** In focus group studies, researchers found that consumers had considerable confusion about health insurance and medical terminology. Consumers might have heard the term “deductible”, but many did not know what it means. Individuals did not fully understand the difference between “primary care” and “preventive care”, or between “diagnostic tests” and “screening tests”.<sup>1</sup>
- **Misunderstanding information.** In a survey study of participants in the Massachusetts Connector, researchers found that about half of participants found the information about Connector plans difficult to understand.<sup>2</sup>

Many researchers, from many domains, have found that individuals misunderstand complex price schedules.<sup>3</sup> (Δ)

v. *Experience*

Researchers have discovered the following about the experience component of this behavior.

- **Experience with other insurance.** In focus group studies, researchers found that individuals who did not have experience with health insurance used concepts from experience they had with other types of insurance. For example, because automobile insurance requires a deductible to be paid every time an insured car is repaired, some testing participants assumed that health insurance deductibles work the same way: that they had to be paid for each illness, rather than once a year.<sup>4</sup>

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<sup>1</sup> Quincy (2012)

<sup>2</sup> Sinaiko, et al. (2013)

<sup>3</sup> Baicker, et al. (2012) (Δ)

<sup>4</sup> Quincy (2012)

PURCHASE AN INDIVIDUAL HEALTH INSURANCE POLICY FROM AN EXCHANGE (US) *continued*B. RESEARCH RESULTS *continued*3. Detailed results *continued*v. *Experience continued*

- **Emotions.** In focus group studies, researchers found that consumers dreaded shopping for health insurance. Another finding from this research is that consumers doubted the value and purpose of health insurance.<sup>1</sup>
- **Values.** Behavioral economics researchers found that people were not always solely self-interested. They also cared about the welfare of others, fairness, and social norms. Perceptions of fairness and social norms can influence behavior. For example, by making social norms salient, such as by comparing the behavior of individuals with that of their neighbors, their pro-social behavior can be increased.<sup>2</sup> (Δ)

vi. *Rules*

Researchers have discovered the following about the rules component of this behavior.

- **Value determination.** In focus group studies, researchers found that many consumers viewed health insurance as prepaid health care rather than as health insurance. If the anticipated annual out-of-pocket expenses for health care were less than the cost of insurance premiums and the plan deductible, consumers often felt that insurance was not a good value. Many consumers did not understand the basic principle of insurance.<sup>3</sup> In the same studies, researchers found that the consumers' notions of value was sophisticated, and encompassed the scope of services covered, the share of cost paid by the plan, and the quality of the plan's providers. Consumers did not focus solely on the lowest-cost plan; rather, they wanted the highest-value plan.

In an experiment involving about 1,500 employees, researchers found that, in the absence of other information, individuals were likely to equate high-cost health insurance with high quality.<sup>4</sup> (Δ)

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<sup>1</sup> Quincy (2012)

<sup>2</sup> Baicker, et al. (2012) (Δ)

<sup>3</sup> Quincy (2012)

<sup>4</sup> Hibbard, et al. (2012) (Δ)

## PURCHASE AN INDIVIDUAL HEALTH INSURANCE POLICY FROM AN EXCHANGE (US) continued

## B. RESEARCH RESULTS continued

## 3. Detailed results continued

vi. *Rules continued*

- **Risk assessment.** In experiments, researchers have found that hypothetical insurance purchase decisions are sensitive to perceptions of risk. However, one of the most robust findings from behavioral economics is that people have difficulty evaluating probabilities and risk. For example, they tend to give too much weight to low probabilities and too little weight to high probabilities. Individuals also hold self-promoting biases about risk assessment. For example, evidence shows that people tend to be overly optimistic and discount the likelihood of adverse outcomes. People also tend to give too much weight to losses and gains in the present versus similar losses and gains in the future.<sup>2</sup> (Δ)
- **Status quo bias.** Behavioral economics researchers found that people overwhelmingly preferred to stick with what they had.<sup>3</sup> (Δ)

vii. *Context*

With implementation of the ACA, the context of individual health insurance purchasing will change dramatically. However, there is no known research specifically about how this change will affect behavior.

viii. *Produce output*

Following are models that are employed for this behavior parameter.

- **Neoclassical utility maximization.** The utility maximization model from neoclassical economics underlies much of the research about consumer selection and purchase of health insurance policies. According to this model, individuals rationally determine the amount of health insurance that is best for them, based on available information. They base their decisions on their

**Difficulty implementing optimal choices**

“But while prices and information are undeniably key factors for understanding and achieving socially optimal health insurance coverage, they alone seem insufficient to explain observed patterns of coverage. There is mounting evidence that a third factor, the psychology of individual decision making, plays a central role in driving coverage outcomes. The standard approach adopts, albeit often implicitly, the usual assumption that decisions to purchase or take up health insurance simply reflect a rational calculation by perfectly optimizing individual agents.

But findings from behavioral economics and psychology indicate that individuals may have difficulty implementing the optimal choices that would be in their private interest (even if they did not differ from broader social goals). . . .

Behavioral factors might interact with traditional economic forces such as prices and information to complicate both their implementation and the ultimate effects. For example, decision-making errors that are correlated with health status might affect the extent of adverse selection and therefore affect the level and distribution of coverage . . .”<sup>1</sup>

<sup>1</sup> Quincy (2012)

<sup>2</sup> Baicker, et al. (2012) (Δ)

<sup>3</sup> Baicker, et al. (2012) (Δ)

preferences for the attributes of each option, and on a comparison of marginal costs and benefits.<sup>1</sup> (however, see the sidebar)

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<sup>1</sup> Kolstad & Chernew (2009), Feldstein (2012) chapter 7

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**PURCHASE AN INDIVIDUAL HEALTH INSURANCE POLICY FROM AN EXCHANGE (US)** continued**B. RESEARCH RESULTS** continued**3. Detailed results** continued**ix. *Send output***

Researchers have discovered the following:

- **Delay.** Behavioral economics researchers found that people sometimes postponed activities with immediate costs, even if doing so reduced their welfare in the long run.<sup>1</sup> (Δ)
- **Hassle costs.** Behavioral economics researchers found that small, seemingly insignificant costs, sometimes referred to as “hassle costs”, can have a major impact on decision implementation. The more difficult it is for a person to carry out a decision, the less likely that the person will act.<sup>2</sup> (Δ)

**x. *Output messages***

There is no known research specifically about this behavior parameter.

**4. Conflicting results**

- **Adverse selection.** There is considerable conflicting evidence about the strength of adverse selection for selection and purchase of health insurance.<sup>3</sup> (Δ)

**5. Limitations**

Research about this behavior has the following limitations.

- **Lack of research.** There is a general lack of research specifically about this behavior, because there are few existing Exchanges.
- **Narrow focus.** The available research is primarily from the Massachusetts Connector. The results of this research may not apply to Exchanges in other states, because: certain characteristics of the study population—such as the generally high level of their education—may be unique to Massachusetts; health insurers in Massachusetts may be different from health insurers in other states; and the Connector’s design may differ widely from the design of Exchanges in other states.

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<sup>1</sup> Baicker, et al. (2012) (Δ)

<sup>2</sup> Baicker, et al. (2012) (Δ)

<sup>3</sup> Di Novi (2008), Bolhaar, Lindeboom, & Bas (2010) (Δ)

**PURCHASE AN INDIVIDUAL HEALTH INSURANCE POLICY FROM AN EXCHANGE (US)** continued

**C. RESEARCH GAPS**

There are several gaps in the research about this health behavior:

- **Lack of studies.** There is a marked lack of studies about the behavior.
- **Lack of experiments.** The existing research is primarily based on survey results analyzed by statistical correlation. It appears that no experiments in real-life situations have been performed to determine how an individual purchases individual health insurance from an Exchange.
- **Lack of “produce output” research.** There is inadequate research about the “produce output” behavior parameter. Most of the research has been based on the neoclassical model of rational economic behavior, and this model has been shown to be flawed. This parameter is particularly important, because it ties together all the other parameters.
- **Missing behavior components.** Little or no research has been performed to elucidate the “acting agent role”, “goal”, “context”, or “output messages” components of this behavior.

**D. SIMULATION MODELS**

The Urban Institute’s Health Insurance Policy Simulation Model simulates how individuals and employers select and purchase health insurance in an Exchange environment, under a variety of conditions. It provides estimates of government and private healthcare expenditures, premium levels, rates of employer health insurance coverage, and overall health insurance coverage.<sup>1</sup>

**E. CROSS REFERENCES**

Related behaviors:

None

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<sup>1</sup> Blavin, Blumberg, Buettgens, Holahan, & McMorrow (2012)



A1.1.01:G1.3:B001.001

UPDATED: OCTOBER 29, 2012

**REQUEST TREATMENT FROM A PRIMARY CARE PHYSICIAN (US)**

An individual in the US health system requests medical treatment from a primary care physician.

**A. TERMINOLOGY**

**Primary care physician (PCP):** A physician who takes care of the general medical needs of an individual, and who refers the individual to “secondary care” for specialized medical services. PCPs are also called “family practice physicians” and “general practice physicians”.

**B. RESEARCH RESULTS****1. Introduction**

To understand how the US health system works, it is surely critical to understand why and how a person in the system decides to seek medical care. However, it appears that little research has been done in the US to elucidate this behavior. More research has been done in other countries, particularly the UK and Australia.

Monthly, about three-quarters of the adults in the US experience symptoms that they recognize as due to illness or injury, and for which they take some specific action, yet only about a quarter of them consult a physician (either a PCP or a specialist) about their symptoms. Although people experience a symptom every six days on average, they visit a physician only once every four months. And people who visit physicians are not necessarily sicker on average than those who do not: a large proportion of those who do not visit physicians have medical abnormalities, and many people who visit the doctor are not sick.

Thus, it is important to explore this behavior more deeply.

**Behavior components**

|                                     |   |
|-------------------------------------|---|
| <b>Acting agent role:</b>           | A1.1.01 Individual person               |
| <b>i. <i>Goals:</i></b>             | G1.3 Eliminate unwanted sign or symptom |
| <b>ii. <i>Attributes:</i></b>       | Any                                     |
| <b>iii. <i>Input messages:</i></b>  | Any                                     |
| <b>iv. <i>Get input:</i></b>        | Any                                     |
| <b>v. <i>Experience:</i></b>        | Any                                     |
| <b>vi. <i>Rules:</i></b>            | Any                                     |
| <b>vii. <i>Context:</i></b>         | US health system                        |
| <b>viii. <i>Produce output:</i></b> | Any                                     |
| <b>ix. <i>Send output:</i></b>      | Any                                     |
| <b>x. <i>Output messages:</i></b>   | Treatment request                       |

## REQUEST TREATMENT FROM A PRIMARY CARE PHYSICIAN (US) continued

## B. RESEARCH RESULTS continued

## 2. Summary

Following is a summary of the research that is available about this behavior, by behavior component.

- i. **Goals.** Common goals associated with this behavior are to reduce physical symptoms, to reduce mental symptoms, and to seek information.
- ii. **Attributes.** Researchers have found that variations in PCP care seeking behavior are associated with an individual's physical symptoms, mental symptoms, age, and gender.
- iii. **Input messages.** None known.
- iv. **Get input.** None known.
- v. **Experience.** Variations in this behavior are associated with a person's prior healthcare outcomes.
- vi. **Rules.** Variations in this behavior are associated with a person's beliefs about health care.
- vii. **Context.** Variations in this behavior are associated with the availability of community and personal support resources.
- viii. **Produce output.** There have been several attempts to develop a model about how an individual requests treatment.
- ix. **Send output.** None known.
- x. **Output messages.** None known.

There is a lack of experimental studies for this behavior.

There is no known simulation model that incorporates this behavior.

**REQUEST TREATMENT FROM A PRIMARY CARE PHYSICIAN (US)** continued**B. RESEARCH RESULTS** continued**3. Detailed results**

Following are detailed research results about this behavior, organized by behavior component.

**i. Goals**

The primary goal for this behavior is to “eliminate unwanted sign or symptom”.

Researchers have found that the following goals are associated with variations in PCP care seeking behavior.

- **Reduce physical symptoms.** When acutely afflicted with severe, disabling, or unusual symptoms, people usually seek medical diagnosis and treatment.<sup>1</sup>
- **Reduce mental symptoms.** Many people visit a PCP to reduce mental symptoms such as life stress, psychiatric disorders, and social isolation.<sup>2</sup>
- **Seek information.** People distressed by physical symptoms often visit physicians more for information about their symptoms than for treatment of them.<sup>3</sup> For example, a study of patients suffering from pain showed that they wanted information about the pain’s etiology even more than they wanted to alleviate the pain.<sup>4</sup>

**i. Attributes**

Researchers have found that the following attributes are associated with variations in PCP care seeking behavior.

- **Physical symptoms.** When acutely afflicted with severe, disabling, or unusual symptoms, people usually seek medical diagnosis and treatment. However, when their symptoms are mild, chronic, or common (the most prevalent type of symptoms), other non-biomedical goals and factors can influence a person’s decision to visit a PCP.<sup>5</sup> Many people who are sick do not visit a doctor<sup>6</sup>, and many who visit a PCP are not sick<sup>7</sup>.

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<sup>1</sup> A. J. Barsky, Wyshak, & Klerman (1986)

<sup>2</sup> A. J. Barsky, 3rd (1981)

<sup>3</sup> Barsky 55-58

<sup>4</sup> Barsky 59

<sup>5</sup> A. J. Barsky, et al. (1986)

<sup>6</sup> A. J. Barsky, et al. (1986)

<sup>7</sup> A. J. Barsky, et al. (1986)

## REQUEST TREATMENT FROM A PRIMARY CARE PHYSICIAN (US) continued

## B. RESEARCH RESULTS continued

## 3. Detailed results continued

ii. *Attributes continued*

- **Mental symptoms.** Many people visit a PCP to reduce suffering associated with life stress, psychiatric disorders, and social isolation.<sup>1</sup>
- **Age.** Older adults are more likely to seek treatment from a PCP.<sup>2</sup>
- **Gender.** Female adults are more likely to seek treatment from a PCP.<sup>3</sup>

iii. *Input messages*

There is no known research specifically about this behavior parameter.

iv. *Get input*

There is no known research specifically about this behavior parameter.

v. *Experience*

Researchers have discovered that the following facets of an individual's experience (stored in the individual's memory) are associated with variations in this behavior.

- **Prior outcomes.** A person's prior outcomes with health care affects whether that person will again seek treatment.<sup>4</sup>

vi. *Rules*

Researchers have discovered the following about an individual's rules that are associated with variations in this behavior.

- **Beliefs.** Beliefs that people hold about disease and treatment seeking are associated with variation in treatment requests.<sup>5</sup>

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<sup>1</sup> A. J. Barsky, 3rd (1981)

<sup>2</sup> Hulka & Wheat (1985)

<sup>3</sup> Hulka & Wheat (1985)

<sup>4</sup> R. M. Andersen (1995)

<sup>5</sup> R. M. Andersen (1995)

## REQUEST TREATMENT FROM A PRIMARY CARE PHYSICIAN (US) continued

## B. RESEARCH RESULTS continued

## 3. Detailed results continued

vii. *Context*

Researchers have discovered the following about the context component of this behavior.

- **Enabling resources.** For treatment seeking behavior to take place, community and personal support resources must be present. Health personnel and facilities must be available where people live and work, and people must have adequate income, health insurance, and transportation to make use of the resources.<sup>1</sup>

viii. *Produce output*

In 1968 David Mechanic wrote, “If we are to make progress in the study of illness behavior, it becomes necessary to move beyond gross cultural and social differences in illness behavior patterns towards the development of a social psychological model, which gives a clearer conception of the process involved when someone seeks help.”<sup>2</sup>

There have been several attempts to develop such a model:

- **Suchman.** In 1965, Edward Suchman found demographic factors (such as age, gender, and social class) and social group structure to be significantly related to an individual’s “medical orientation”, which includes the individual’s knowledge about disease, skepticism about medical care, and dependency in illness. Medical orientation was in turn related to the type of medical care an individual sought.<sup>3</sup>
- **Wirick.** In 1966, Grover Wirick developed a multiple equation model with five factors having an effect on health care demand: an individual’s physiological need, the individual’s realization of this need, the individual’s financial resources, the motivation to obtain care, and the availability of health care services.<sup>4</sup>

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<sup>1</sup> R. M. Andersen (1995)

<sup>2</sup> Mechanic (1968), page 129

<sup>3</sup> Suchman (1965)

<sup>4</sup> Wirick (1966)

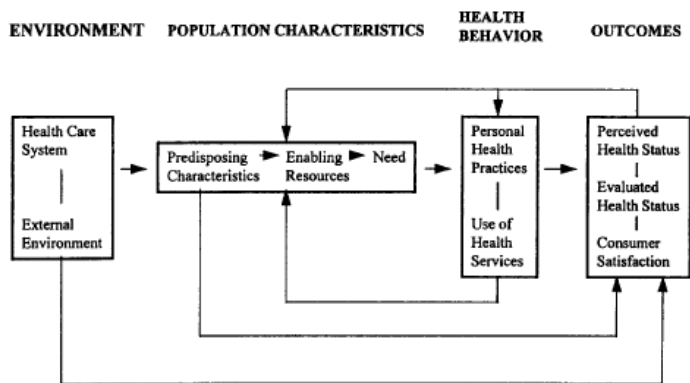
## REQUEST TREATMENT FROM A PRIMARY CARE PHYSICIAN (US) continued

## B. RESEARCH RESULTS continued

## 3. Detailed results continued

viii. *Produce output continued*

- **Anderson.** In 1973, Anderson and Bartkus developed a more general behavioral model of health services utilization. The model includes the following factors: an individual's perception of medical symptoms, the individual's orientation toward action, the individual's appraisal of the adequacy of care provided by various providers of health services, the individual's perception of friends' appraisal, the individual's need for care, the individual's ability to pay for medical services, availability of health services, socio-demographic factors (age, gender, education, race, income, and marital status), and the individual's type of health insurance coverage.<sup>1</sup>
- **Andersen.** Over more than 25 years, from 1968 through 1995, Ronald Andersen developed a model of an individual's use of health services that contained three major components: predisposing, enabling, and need factors. Among the predisposing factors, he included family composition, social structure, and health beliefs. Enabling factors included family and community resources, and need factors included illness and the individual's response to illness. These components combined with attributes of the healthcare system and the external environment to produce an individual's health behavior and subsequent outcomes. (see the figure below)<sup>2</sup>



<sup>1</sup> R. Andersen (1968)

<sup>2</sup> R. Andersen (1968) and R. M. Andersen (1995)

**REQUEST TREATMENT FROM A PRIMARY CARE PHYSICIAN (US)** *continued*

**B. RESEARCH RESULTS** *continued*

**3. Detailed results** *continued*

x. *Send output*

There is no known research specifically about this behavior parameter.

x. *Output messages*

The primary output message for this behavior is “Treatment request”.  
There is no known research specifically about this behavior parameter.

**4. Conflicting results**

There appears to be no research result that conflicts significantly with the results presented above.

**5. Limitations**

Following are limitations of this behavior’s research.

- **Limited and dated.** There are relatively few studies about this behavior, and most of these are now dated.

**REQUEST TREATMENT FROM A PRIMARY CARE PHYSICIAN (US)** continued

**C. RESEARCH GAPS**

There are several gaps in the research about this health behavior:

- **Lack of experiments.** The existing research is primarily based on statistical correlation analysis of survey results and administrative data. It appears that no experiment in a real-life situation has been performed to determine how an individual requests treatment from a PCP.<sup>1</sup>
- **Missing behavior components.** Little or no research has been performed to elucidate the “input messages”, “get input”, “rules”, “send output”, or “output messages” components of this behavior.

**D. SIMULATION MODELS**

There is no known simulation model that incorporates this behavior.

**E. CROSS REFERENCES**

None.

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<sup>1</sup> Victoor, et al. (2012)



A1.1.01:G1.3:B002.001

UPDATED: OCTOBER 29, 2012

**COMPLY WITH TREATMENT RECOMMENDATIONS (US)**

An individual in the US health system complies with a physician's treatment recommendations.

**A. TERMINOLOGY**

**Compliance:** The extent to which a patient's behavior (taking medication, following a diet, executing life-style changes, etc.) coincides with treatment recommendations from healthcare practitioners. (Note that this definition is not used consistently in the research about this behavior.) Alternative terms, with slightly different meanings, are "concordance", and "adherence".

**Non-compliance:** The types of non-compliance include: non-participation in screening programs, delay in seeking care, breaking appointments, failure to follow physician instructions, not filling a prescription, taking an incorrect dose, taking medication at the wrong time, and stopping treatment too soon.

**B. RESEARCH RESULTS****1. Introduction**

Although compliance with treatment recommendations is a key link between medical care and health outcomes<sup>2</sup>, research shows that non-compliance is a major public health problem that give rise to significant financial burdens on modern health systems<sup>3</sup>. In the US, this burden has been estimated at \$100 billion annually.<sup>4</sup> Non-compliance is also an ongoing source of frustration for physicians.<sup>5</sup> The rate of non-compliance for short-term therapies is 20-30 percent, for long-term therapies 50-60 percent, and for lifestyle changes 70-80 percent.<sup>6</sup>

Even though it is important to understand compliance, our knowledge of this behavior is still far from complete. (see the sidebar)

**Behavior components**

|                                     |  |
|-------------------------------------|--|
| <b>Acting agent role:</b>           | A1.1.01 Individual person                |
| <b>i. <i>Goals:</i></b>             | G1.3 Eliminate unwanted sign or symptom  |
| <b>ii. <i>Attributes:</i></b>       | Any                                      |
| <b>iii. <i>Input messages:</i></b>  | Any                                      |
| <b>iv. <i>Get input:</i></b>        | Any                                      |
| <b>v. <i>Experience:</i></b>        | Any                                      |
| <b>vi. <i>Rules:</i></b>            | Any                                      |
| <b>vii. <i>Context:</i></b>         | US health system                         |
| <b>viii. <i>Produce output:</i></b> | Any                                      |
| <b>ix. <i>Send output:</i></b>      | Any                                      |
| <b>x. <i>Output messages:</i></b>   | Compliance with treatment recommendation |

**Few insights**

In 2001, Vermeire et al wrote, "By the end of the 1970s, it was clear that determinants of compliance were complex and poorly understood. Despite continuing research, few improvements or new insights have emerged since the 1980s. ... One of the most striking reasons for the lack of progress in compliance research is the absence of a crucial factor: the patient's perspective."

Although in the intervening years a few studies have added more information, their statement is still largely true.<sup>1</sup>

<sup>1</sup> Vermeire, Hearnshaw, Van Royen, & Denekens (2001)

<sup>2</sup> Urquhart (1996)

<sup>3</sup> L. S. Morris & Schulz (1992) and Donovan (1995)

<sup>4</sup> Donovan & Blake (1992)

<sup>5</sup> Melnikow & Kiefe (1994)

<sup>6</sup> Jin, Sklar, Min Sen Oh, & Chuen Li (2008)

**COMPLY WITH TREATMENT RECOMMENDATIONS (US)** continued**B. RESEARCH RESULTS** continued**2. Summary**

Following is a summary of the research available about this behavior, by behavior component.

- i. *Goals*. None known.
- ii. *Attributes*. Researchers have found that variations in how individuals comply with treatment recommendations are associated with age, ethnicity, health literacy, health knowledge, smoking and alcohol intake, and type of illness.
- iii. *Input messages*. None known.
- iv. *Get input*. None known.
- v. *Experience*. Variations in this behavior are associated with the strength of the patient-physician relationship.
- vi. *Rules*. Variations in this behavior are associated with an individual's beliefs about the causes and meaning of illness.
- vii. *Context*. Variations in this behavior are associated with the ease of treatment administration, treatment side effects, the strength of an individual's social support, and attributes of the health system such as accessibility.
- viii. *Produce output*. None known.
- ix. *Send output*. None known.
- x. *Output messages*. None known.

Researchers have not yet systematically explored interactions among the factors associated with treatment non-compliance. Also, there is a lack of experimental studies for this behavior, and a lack of research about its "produce output" parameter.

There is no known simulation model that incorporates this behavior.

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**COMPLY WITH TREATMENT RECOMMENDATIONS (US)** continued**B. RESEARCH RESULTS** continued**3. Detailed results**

Following are detailed research results about this behavior, organized by behavior component.

**i. *Goals***

The primary goal for this behavior is to “eliminate unwanted sign or symptom”. However, there is no known research specifically about this behavior parameter.

**ii. *Attributes***

Researchers have found that the following attributes are associated with variations in this behavior.

- **Age.** Several studies show that age is associated with variation in compliance. Most studies show that the elderly have higher rates of compliance. Middle-aged and younger patients are less likely to be compliant.<sup>1</sup>
- **Ethnicity.** Caucasians have been found to have better compliance than African-Americans, Hispanics, and other minorities.<sup>2</sup>
- **Health literacy.** Higher health literacy (an ability to read, understand, and remember therapy instructions) is associated with higher compliance.<sup>3</sup>
- **Health knowledge.** Better patient’s knowledge about the patient’s disease and treatment are associated with higher compliance.<sup>4</sup>
- **Smoking and alcohol intake.** Several studies show that patients who smoke and drink alcohol are more likely to be non-compliant.<sup>5</sup>
- **Illness type.** Acute illnesses are associated with higher compliance than chronic illnesses.<sup>6</sup> Also, patients who have illnesses for which the severity of symptoms fluctuates are likely to have lower compliance.<sup>7</sup>

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<sup>1</sup> Jin, et al. (2008)

<sup>2</sup> Jin, et al. (2008)

<sup>3</sup> Jin, et al. (2008)

<sup>4</sup> Jin, et al. (2008)

<sup>5</sup> Jin, et al. (2008)

<sup>6</sup> Gascon, Sanchez-Ortuno, Llor, Skidmore, & Saturno (2004)

<sup>7</sup> Jin, et al. (2008)

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**COMPLY WITH TREATMENT RECOMMENDATIONS (US)** *continued***B. RESEARCH RESULTS** *continued***3. Detailed results** *continued***ii. *Attributes*** *continued*

Although researchers have investigated associations between this behavior and the attributes of marital status, education, and gender, the results have been ambiguous.

**iii. *Input messages***

There is no known research specifically about this behavior parameter.

**iv. *Get input***

There is no known research specifically about this behavior parameter.

**v. *Experience***

Researchers have discovered that the following facets of an individual's experience (stored in the individual's memory) are associated with variations in this behavior.

- **Relationship with physician.** Strong positive relationships with physicians are associated with higher compliance. <sup>1</sup>

**vi. *Rules***

Researchers have discovered the following about an individual's rules that are associated with variations in this behavior.

- **Beliefs.** Researchers found that patient beliefs about the causes and meaning of illness were strongly related to compliance. Positive beliefs about the efficacy of therapy were associated with higher compliance, while misconceptions and erroneous beliefs about the efficacy of therapy were associated with lower compliance. <sup>2</sup>

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<sup>1</sup> Jin, et al. (2008)

<sup>2</sup> Jin, et al. (2008)

**COMPLY WITH TREATMENT RECOMMENDATIONS (US)** *continued***B. RESEARCH RESULTS** *continued***3. Detailed results** *continued***vii. Context**

Researchers have found the following relationships between context and variations in this behavior.

- **Ease of administration.** Therapies that are easy to administer are associated with higher compliance.<sup>1</sup>
- **Side effects.** Therapeutic side effects are associated with lower compliance.<sup>2</sup>
- **Social support.** Patients with emotional support and help from family, friends, or healthcare practitioners are more likely to be compliant.<sup>3</sup>
- **Health system.** Lack of accessibility to health care, long waiting times for clinic visits, and difficulty getting prescriptions filled are associated with lower compliance.<sup>4</sup>

**viii. Produce output**

There is no known research specifically about this behavior parameter.

**ix. Send output**

There is no known research specifically about this behavior parameter.

**x. Output messages**

The primary output message for this behavior is “Compliance with treatment recommendation”. There is no known research specifically about this behavior parameter.

**4. Conflicting results**

For this behavior, there are major inconsistencies among the research results. For example, some researchers found that female patients have better compliance, others have found that female patients have worse compliance, and still others found that gender is not associated with compliance variation. Similarly, the effect of marital status and educational level on compliance was equivocal.<sup>5</sup>

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<sup>1</sup> Jin, et al. (2008)

<sup>2</sup> Jin, et al. (2008)

<sup>3</sup> Jin, et al. (2008)

<sup>4</sup> Jin, et al. (2008)

<sup>5</sup> Jin, et al. (2008)

**COMPLY WITH TREATMENT RECOMMENDATIONS (US)** continued

**B. RESEARCH RESULTS** continued

**5. Limitations**

Research about this behavior has the following limitations.

- **Definition of compliance.** The research employs various definitions of compliance, some of which are significantly different from one another.<sup>1</sup>
- **Lack of interaction effects.** Researchers have not explored interactions among factors associated with compliance variation. For example, although ethnicity is thought to be associated with such variation, factors such as income and language may confound the results.<sup>2</sup>

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<sup>1</sup> Jin, et al. (2008)

<sup>2</sup> Jin, et al. (2008)

## COMPLY WITH TREATMENT RECOMMENDATIONS (US) *continued*

### C. RESEARCH GAPS

Following are gaps in the research about this health behavior:

- **Interactions.** Researchers have not yet systematically explored interactions among the factors associated with treatment non-compliance. This issue may be crucial to understanding non-compliance.<sup>1</sup>
- **Lack of experiments.** The existing research is primarily based on survey results analyzed by statistical correlation. It appears that no experiment in a real-life situation has been performed to determine how an individual complies with treatment.
- **Lack of “produce output” research.** There is inadequate research about the “produce output” behavior parameter. This parameter is particularly important, because it ties together all the other parameters.
- **Missing behavior components.** Little or no research has been performed to elucidate the “input messages”, “get input”, “send output”, “output messages”, or—most importantly—the “produce output” components of this behavior.

### D. SIMULATION MODELS

There is no known simulation model that incorporates this behavior.

### E. CROSS REFERENCES

None.

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<sup>1</sup> Jin, et al. (2008)

A1.1.01:G1.3:B003.001

UPDATED: OCTOBER 29, 2012

**ASSESS THE QUALITY OF PHYSICIAN PERFORMANCE (US)**

An individual in the US health system assesses the quality of a physician's performance.

**A. TERMINOLOGY**

**Quality:** A person assesses a physician's quality across a number of dimensions, including:

- **Patient-centered care:** meeting the patient's physical and emotional needs; providing individualized care; involving the patient in decision making; listening to the patient; protecting patient privacy; and involving family and friends in the patient's care.
- **Access.** Being accessible to the patient; providing access to specialists; providing care that is affordable; having convenient places and times for visits; helping to navigate the health system.
- **Courtesy** and emotional support. Showing sensitivity and kindness; expressing compassion and sympathy for the patient.
- **Efficiency.** Effectively coordinating care among the many individuals and organizations involved in a patient's care; billing accurately; referring to specialists efficiently and appropriately.
- **Technical quality.** Being knowledgeable, competent, and experienced; providing accurate diagnoses; providing diligent and efficient services; and being professional.<sup>2</sup>

**B. RESEARCH RESULTS****1. Introduction**

Individual consumer assessment of physician performance is an important aspect of health system behavior. Individuals employ such assessments to guide their selection of healthcare practitioners; health insurance companies use such assessments to monitor consumer satisfaction and the performance of physician networks; clinicians use such assessments to monitor their performance and to improve patient satisfaction and compliance; and employers use such assessments to guide their selection of health insurance plans.<sup>3</sup> (see the sidebar)

**Behavior components**

|                                     |   |
|-------------------------------------|---|
| <b>Acting agent role:</b>           | A1.1.01 Individual person               |
| <b>i. <i>Goals:</i></b>             | G1.3 Eliminate unwanted sign or symptom |
| <b>ii. <i>Attributes:</i></b>       | Any                                     |
| <b>iii. <i>Input messages:</i></b>  | Any                                     |
| <b>iv. <i>Get input:</i></b>        | Any                                     |
| <b>v. <i>Experience:</i></b>        | Any                                     |
| <b>vi. <i>Rules:</i></b>            | Any                                     |
| <b>vii. <i>Context:</i></b>         | US health system                        |
| <b>viii. <i>Produce output:</i></b> | Any                                     |
| <b>ix. <i>Send output:</i></b>      | Any                                     |
| <b>x. <i>Output messages:</i></b>   | Assessment of physician performance     |

**Powerful drivers of outcomes**

In 2005, Sofaer and Firminger wrote, "Why are patient perceptions of quality important? There are two perspectives one can take in answering this question. First, one can be normative and say that patient perceptions of quality are inherently meaningful and should be a primary focus of attention within the health care system. Second, one can take the position that we have to pay attention to patient perceptions because they are powerful drivers of outcomes important to various other stakeholders, outcomes such as patient choice of plan or provider, patient adherence to medical advice, patient complaints, grievances, the level and seriousness of malpractice claims, or, perhaps most important, actual health and functional status outcomes."<sup>1</sup>

<sup>1</sup> Sofaer & Firminger (2005)

<sup>2</sup> Sofaer & Firminger (2005)

<sup>3</sup> Borders, Rohrer, Xu, & Smith (2004)



**ASSESS THE QUALITY OF PHYSICIAN PERFORMANCE (US)** continued**B. RESEARCH RESULTS** continued**2. Summary**

Following is a summary of the research available about this behavior, by behavior component.

- i. **Goals.** None known.
- ii. **Attributes.** Researchers have found that variations in this behavior are associated with an individual's health status and age.
- iii. **Input messages.** None known.
- iv. **Get input.** None known.
- v. **Experience.** Variations in this behavior are associated with the duration of visits with a physician.
- vi. **Rules.** Variations in this behavior are associated with an individual's health attitudes.
- vii. **Context.** None known.
- viii. **Produce output.** There are two hypotheses about this behavior parameter. One is a holistic approach that incorporates a wide range of determinants of satisfaction and emphasizes feedback loops between expectations and experiences. The other identifies several factors that influence patient expectations, and shows how expectations are related to an individual's assessment behavior.
- ix. **Send output.** None known.
- x. **Output messages.** None known.

Most of the research about this behavior is based on surveys, and most of the surveys are biased toward a particular segment of the US population. Moreover, as several studies highlight, people do not actually behave in the way their survey responses indicate.

There is inadequate research about the "produce output" behavior parameter. This parameter is particularly important, because it ties together all the other parameters.

There is no known simulation model that incorporates this behavior.

**ASSESS THE QUALITY OF PHYSICIAN PERFORMANCE (US)** continued

**B. RESEARCH RESULTS** continued

**3. Detailed results**

Following are detailed research results about this behavior, organized by behavior component.

**i. *Goals***

The primary goal for this behavior is to “eliminate unwanted sign or symptom”. However, there is no known research specifically about this behavior parameter.

**ii. *Attributes***

Researchers have found that the following attributes are associated with variations in this behavior.

- **Health status.** People in poorer health tend to rate physician performance lower.<sup>1</sup>

**iii. *Input messages***

There is no known research specifically about this behavior parameter.

**iv. *Get input***

There is no known research specifically about this behavior parameter.

**v. *Experience***

Researchers have discovered that the following facets of an individual’s experience (stored in the individual’s memory) are associated with variations in this behavior.

- **Visit duration.** Longer duration visits with a physician are associated with higher quality ratings.<sup>2</sup>

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<sup>1</sup> Zaslavsky et al. (2001), Lee & Kasper (1998), Shadmi et al. (2006), and Sofaer & Firminger (2005)

<sup>2</sup> Lin et al. (2001)

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**ASSESS THE QUALITY OF PHYSICIAN PERFORMANCE (US)** continued**B. RESEARCH RESULTS** continued**3. Detailed results** continued**vi. Rules**

Researchers have discovered the following about an individual's rules that are associated with variations in this behavior.

- **Health attitudes.** People who are skeptical about prescription drugs relative to home remedies, who feel that they understand their health better than most doctors, and who worry about their health tend to rate physician performance lower.<sup>1</sup> identifies several factors that influence patient expectations,

**vii. Context**

There is no known research specifically about this behavior parameter.

**viii. Produce output**

Researchers have proposed the following hypotheses to describe this behavior:

- **Strasser et al.** Strasser et al developed a holistic hypothesis about this behavior that incorporates a wide range of determinants of satisfaction and emphasizes feedback loops between expectations and experiences.<sup>2</sup>
- **Sofaer and Firminger.** In this hypothesis, patient perceptions of quality result from the interaction of the patient's expectations and experiences. As patients apply their definitions and criteria regarding quality (which are rarely consciously articulated) their perceptions of the quality of care crystallize.<sup>3</sup>

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<sup>1</sup> Borders, et al. (2004)

<sup>2</sup> Strasser, Aharony, & Greenberger (1993)

<sup>3</sup> Sofaer & Firminger (2005)

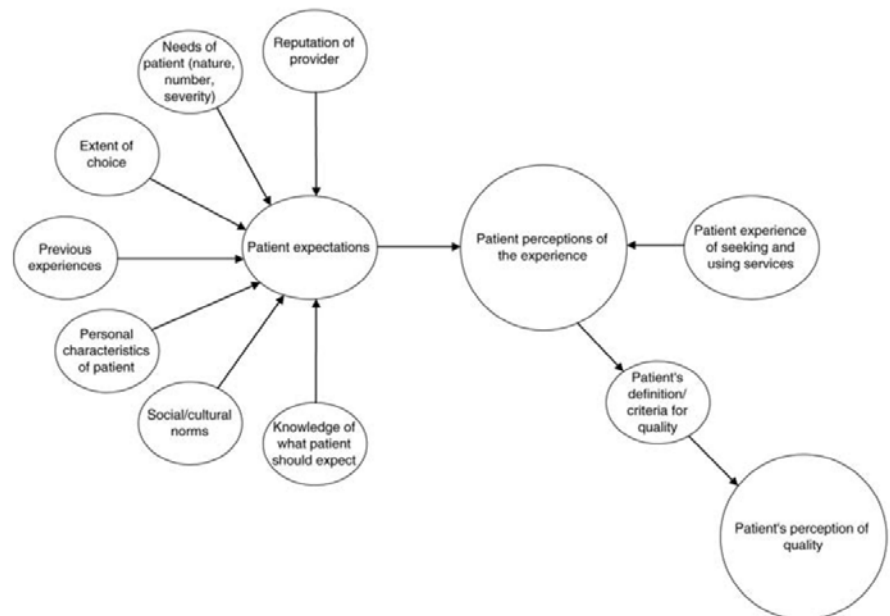
## ASSESS THE QUALITY OF PHYSICIAN PERFORMANCE (US) continued

## B. RESEARCH RESULTS continued

## 3. Detailed results continued

viii. *Produce output continued*

As shown in the figure below, the hypothesis identifies several factors that influence patient expectations, including: the physician's reputation; the nature, number, and seriousness of the patient's healthcare needs; the extent of choice available; the patient's previous experiences; social and cultural norms that are both general (such as whether it is appropriate or acceptable to be critical of those with greater education or authority) and health specific (such as whether it is appropriate or acceptable for lay people to be critical of medical professionals; patient attitudes; patient demographics; and the extent to which the patient has knowledge of what the patient should expect.<sup>1</sup>

ix. *Send output*

There is no known research specif

x. *Output messages*

The primary output message for this behavior is “Assessment of physician performance”. There is no known research specifically about this behavior parameter.

<sup>1</sup> Sofaer & Firminger (2005)

**ASSESS THE QUALITY OF PHYSICIAN PERFORMANCE (US)** continued

**B. RESEARCH RESULTS** continued

**4. Conflicting results**

There appears to be no research result that conflicts significantly with the results presented above.

**5. Limitations**

Research about this behavior has the following limitations.

- **Lack of multi-dimensionality.** Most researchers studying this behavior have attempted to identify how various factors (such as demographic or health status factors) influence patient perceptions about physician quality. Such an approach is inherently limited, because it does not address whether differences in quality ratings reflect a patient's expectations, perceptions, definitions, or other aspect of this behavior.<sup>1</sup>

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<sup>1</sup> Sofaer & Firminger (2005)

**ASSESS THE QUALITY OF PHYSICIAN PERFORMANCE (US)** continued**C. RESEARCH GAPS**

There are several gaps in the research about this health behavior:

- **Stability of perceptions.** Researchers have not paid much attention to the stability of patient perceptions about the quality of physician performance.<sup>2</sup>
- **Patient definition of quality.** There has been little research exploring how patients define and perceive the quality of a physician's care.<sup>3</sup>
- **Expectations.** Patient expectations about quality of physician performance have not been adequately studied.<sup>4</sup>
- **Cultural norms.** The impact of cultural norms on this behavior has not been adequately studied.<sup>5</sup>
- **Lack of experiments.** The existing research is primarily based on survey results analyzed by statistical correlation. It appears that no experiment in a real-life situation has been performed about this behavior.
- **Lack of "produce output" research.** There is inadequate research about the "produce output" behavior parameter. This parameter is particularly important, because it ties together all the other parameters.
- **Missing behavior components.** Little or no research has been performed to elucidate the "input messages", "get input", "rules", "send output", "output messages", or—most importantly—the "produce output" components of this behavior.

**D. SIMULATION MODELS**

There is no known simulation model that incorporates this behavior.

**E. CROSS REFERENCES**

Related behaviors:

A1.1.01:G1.1:B001.001: Select a primary care physician (US)

A1.1.01:G1.1:B002.001: Switch primary care physicians (US)

A2.3.01:G2.2:B001.001: Assess the quality of physician performance (US)

**The patient's voice**

In 2005, Sofaer and Firminger wrote, "The growing attention to patient experience as a source of information on the quality of health care services is gratifying. However, it is clearly not enough merely to collect the data, or even to report it publicly. Ultimately, what is most critical is that we use information about patient experiences of care, whether drawn from rigorous surveys or from a one-on-one conversation between a physician and a patient, as both a goad and a guide to improve quality. ... If we are truly to achieve a health care system that is patient-centered, we must continue to search for creative ways to elicit, and heed, the voice of the patient. ."<sup>1</sup>

<sup>1</sup> Sofaer & Firminger (2005)

<sup>2</sup> Sofaer & Firminger (2005)

<sup>3</sup> Sofaer & Firminger (2005)

<sup>4</sup> Sofaer & Firminger (2005)

<sup>5</sup> Sofaer & Firminger (2005)

A1.1.01:G2.1:B001.001

UPDATED: FEBRUARY 20, 2013

**PAY A PENALTY TAX (US)**

An individual in the US health system rejects purchasing individual health insurance, and consequently pays a penalty tax.

**A. TERMINOLOGY**

**Adverse selection:** Adverse selection is when individuals who have higher exposure to health risks buy insurance policies with more coverage or higher expected payments. In adverse selection, the true health risk of an individual is private information, and is unknown to the health insurer.

**Individual mandate:** A legal requirement that certain individuals must obtain health insurance, or else pay a penalty.

**Massachusetts Connector:** In 2006, Massachusetts legislation created a Health Insurance Exchange called the Connector, which offers health insurance to individuals, families, and small employers. The Connector offers two programs. The first is Commonwealth Choice, which offers unsubsidized commercial health insurance with three tiers of coverage (Gold, Silver, and Bronze) as well as Young Adult insurance for people ages 18–26. The second program is Commonwealth Care, which offers subsidized health insurance from Medicaid for families whose incomes are no more than 300 percent of the federal poverty level.<sup>1</sup>

**Patient Protection and Affordability Care Act (PPACA or ACA):** A federal statute signed into law on March 23, 2010 that overhauled the US healthcare system. The ACA's primary purpose was to increase the number of Americans covered by health insurance.

**B. RESEARCH RESULTS****1. Introduction**

One of the most controversial provisions of ACA is the individual mandate, requiring most US residents to obtain health insurance or pay a penalty tax. This section describes what we know about the behavior of individuals who reject purchasing individual insurance, and instead pay a penalty tax.

**Behavior components**

|                              |                            |
|------------------------------|----------------------------|
| <b>Acting agent role:</b>    | A1.1.01 Individual person  |
| <b>i. Goals:</b>             | G2.1 Decrease expenditures |
| <b>ii. Attributes:</b>       | Any                        |
| <b>iii. Input messages:</b>  | Any                        |
| <b>iv. Get input:</b>        | Any                        |
| <b>v. Experience:</b>        | Any                        |
| <b>vi. Rules:</b>            | Any                        |
| <b>vii. Context:</b>         | US health system           |
| <b>viii. Produce output:</b> | Any                        |
| <b>ix. Send output:</b>      | Any                        |
| <b>x. Output messages:</b>   | Penalty tax payment        |

<sup>1</sup> Commonwealth Health Insurance Connector Authority (2010), Massachusetts Division of Health Care Finance and Policy (2011)

## PAY A PENALTY TAX (US) continued

## B. RESEARCH RESULTS continued

## 2. Summary

Following is a summary of the research available about this behavior, by behavior component.

- i. *Goals*. None known.
- ii. *Attributes*. **Health**: Healthy individuals were more likely to act sooner to obtain health insurance. **Income level**: People with lower income levels were more likely to forgo obtaining insurance and instead pay the penalty tax. **Country of birth**: People of foreign birth were more likely to forgo obtaining health insurance and instead pay the penalty tax.
- iii. *Input messages*. None known.
- iv. *Get input*. None known.
- v. *Experience*. None known.
- vi. *Rules*. None known.
- vii. *Context*. None known.
- viii. *Produce output*. None known.
- ix. *Send output*. None known.
- x. *Output messages*. None known.



---

**PAY A PENALTY TAX (US)** continued**B. RESEARCH RESULTS** continued**3. Detailed results**

Following are detailed research results about this behavior, organized by behavior component.

**i. *Goals***

The primary goal for this behavior is to “decrease expenditures”. However, there is no known research specifically about this behavior parameter.

**ii. *Attributes***

Researchers have found that the following attributes are associated with variations in this behavior.

- **Health status.** Based on analysis of Massachusetts Connector experience, researchers found that healthy individuals were more likely to act sooner to obtain health insurance through the Connector and avoid penalty taxes.<sup>1</sup>
- **Income level.** Based on analysis of Massachusetts Connector experience, researchers found that people at lower income levels were more likely to forgo obtaining health insurance and instead pay the penalty tax.<sup>2</sup>
- **Country of birth.** Based on analysis of Massachusetts Connector experience, researchers found that people of foreign birth were more likely to forgo obtaining health insurance and instead pay the penalty tax.<sup>3</sup>

**iii. *Input messages***

There is no known research specifically about this behavior parameter.

**iv. *Get input***

There is no known research specifically about this behavior parameter.

---

<sup>1</sup> Chandra, Gruber, & McKnight (2011)

<sup>2</sup> Nardin, Sayah, Lokko, Woolhandler, & McCormick (2012)

<sup>3</sup> Nardin, et al. (2012)

**PAY A PENALTY TAX (US)** *continued*

**B. RESEARCH RESULTS** *continued*

**3. Detailed results** *continued*

v. *Experience*

There is no known research specifically about this behavior parameter.

vi. *Rules*

There is no known research specifically about this behavior parameter.

vii. *Context*

With implementation of the ACA, the context of individual health insurance purchasing and penalty payment will change dramatically, However, there is no known research specifically about how this change will affect behavior.

viii. *Produce output*

There is no known research specifically about this behavior parameter.

ix. *Send output*

There is no known research specifically about this behavior parameter.

x. *Output messages*

There is no known research specifically about this behavior parameter.

**4. Conflicting results**

There appears to be no research result that conflicts significantly with the results presented above.

**5. Limitations**

- **Lack of research.** There is a marked lack of research about this behavior.
- **Narrow focus.** The available research is primarily from the Massachusetts Connector. The results of this research may not apply to other states, because certain characteristics of the study population—such as the generally high level of their education—may be unique to Massachusetts.

**PAY A PENALTY TAX (US)** *continued*

**C. RESEARCH GAPS**

There are several gaps in the research about this health behavior:

- **Lack of studies.** There is a marked lack of studies about the behavior.
- **Lack of “produce output” research.** There is inadequate research about the “produce output” behavior parameter. This parameter is particularly important, because it ties together all the other parameters.
- **Missing behavior components.** Little or no research has been performed to elucidate the “goals”, “input messages”, “get input”, “experience”, “rules”, “context”, “send output”, “output messages”, or—most importantly—the “produce output” components of this behavior.

**D. SIMULATION MODELS**

There is no known simulation model that incorporates this behavior.

**E. CROSS REFERENCES**

Related behaviors:

None

## A1.2. INDIVIDUAL HEALTHCARE ROLE

### A1.2.1.1 PRIMARY CARE PRACTITIONER

A1.2.1.1:G1.1:B001.001

UPDATED: OCTOBER 29, 2012

**RECOMMEND TREATMENT (US)**

A primary care physician in the US health system recommends a treatment for a patient

**A. TERMINOLOGY**

None

**B. RESEARCH RESULTS****1. Introduction**

Primary care physicians often make different decisions about recommending treatment for similar patients. This is known as the “variations” phenomenon and has policy as well as expenditure implications.

Researchers have demonstrated that primary care physicians practicing in geographic areas with high healthcare expenditures have a greater tendency to recommend interventions (tests, referrals, and treatments) for patients than physicians practicing in areas with lower healthcare expenditures, even though such greater intervention intensity does not improve health outcomes.<sup>1</sup> Thus, it is important to better understand why certain primary care physicians recommend more or more intensive treatments.

Unfortunately, research about the treatment behavior of primary care physicians is relatively sparse.

**Behavior components**

|                                     |   |
|-------------------------------------|---|
| <b>Acting agent role:</b>           | A1.2.1.1 Primary care practitioner      |
| <b>i. <i>Goals:</i></b>             | G1.3 Eliminate unwanted sign or symptom |
| <b>ii. <i>Attributes:</i></b>       | Any                                     |
| <b>iii. <i>Input messages:</i></b>  | Any                                     |
| <b>iv. <i>Get input:</i></b>        | Any                                     |
| <b>v. <i>Experience:</i></b>        | Any                                     |
| <b>vi. <i>Rules:</i></b>            | Any                                     |
| <b>vii. <i>Context:</i></b>         | US health system                        |
| <b>viii. <i>Produce output:</i></b> | Any                                     |
| <b>ix. <i>Send output:</i></b>      | Any                                     |
| <b>x. <i>Output messages:</i></b>   | Treatment recommendation                |

<sup>1</sup> Sirovich, Gottlieb, Welch, & Fisher (2005)

**RECOMMEND TREATMENT (US)** continued**B. RESEARCH RESULTS** continued**2. Summary**

Following is a summary of the research available about this behavior, by behavior component.

- i. *Goals*. None known.
- ii. *Attributes*. Researchers have found that variations in this behavior are associated with the primary care physician's age, practice type, medical school, patient type, and board certification.
- iii. *Input messages*. None known.
- iv. *Get input*. None known.
- v. *Experience*. Researchers have discovered that variations in this behavior are associated with variations in the insured status of patients.
- vi. *Rules*. None known.
- vii. *Context*. None known.
- viii. *Produce output*. A researcher has proposed a three-stage hypothesis about how a PCP produces a treatment recommendation.
- ix. *Send output*. None known.
- x. *Output messages*. None known.

Most of the research about this behavior is based on surveys, and most of the surveys are biased toward a particular segment of the US population. There is a lack of experimental studies for this behavior, and a lack of research about its "produce output" parameter.

There is no known simulation model that incorporates this behavior.

---

**RECOMMEND TREATMENT (US)** *continued***B. RESEARCH RESULTS** *continued***3. Detailed results**

Following are detailed research results about this behavior, organized by behavior component.

**i. *Goals***

The primary goal for this behavior is to “eliminate unwanted sign or symptom”. However, there is no known research specifically about this behavior parameter.

**ii. *Attributes***

Researchers have found that the following attributes are associated with variations in this behavior.

- **Age.** One study shows that older primary care physicians tend to recommend more or more intensive treatments.<sup>1</sup>
- **Practice type.** Solo practitioners tend to recommend more or more intensive treatments.<sup>2</sup>
- **Medical school.** Graduates of foreign medical schools tend to recommend more or more intensive treatments.<sup>3</sup>
- **Board certification.** Physicians who are board certified tend to recommend fewer or less intensive treatments.<sup>4</sup>

The attribute of being a physician in a managed care environment (or not) was not associated with variation in recommended treatments.<sup>5</sup>

**iii. *Input messages***

There is no known research specifically about this behavior parameter.

**iv. *Get input***

There is no known research specifically about this behavior parameter.

---

<sup>1</sup> O'Neill & Kuder (2005)

<sup>2</sup> O'Neill & Kuder (2005)

<sup>3</sup> O'Neill & Kuder (2005)

<sup>4</sup> O'Neill & Kuder (2005)

<sup>5</sup> O'Neill & Kuder (2005)



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**RECOMMEND TREATMENT (US)** *continued***B. RESEARCH RESULTS** *continued***3. Detailed results** *continued***v. Experience**

Researchers have discovered that the following facets of an individual's experience (stored in the individual's memory) are associated with variations in this behavior.

- **Patient insured status.** Primary care physicians are more likely to recommend more or more intensive treatments for insured than for uninsured patients.<sup>1</sup> In addition, physicians who have a larger proportion of Medicaid patients tend to recommend more or more intensive treatments.<sup>2</sup>

**vi. Rules**

There is no known research specifically about this behavior parameter.

**vii. Context**

There is no known research specifically about this behavior parameter.

**viii. Produce output**

Researchers have proposed the following hypotheses to describe this behavior:

- **O'Neill et al.** As shown in the figure below, in this hypothesis, a physician's treatment decision is broken down into three stages. In Stage 1, the physician forms a baseline heuristic, based on cases of the same type. This heuristic is independent of the physician's practice setting and the patient's specific characteristics. It reflects the physician's philosophical perspective, strategic style, and perceived role. For example, some physicians may be more inclined to choose a "watchful waiting" perspective, while others may view the patient's problem as outside their role or expertise. This baseline heuristic largely reflects the physician's medical training, experience, and personal preferences.

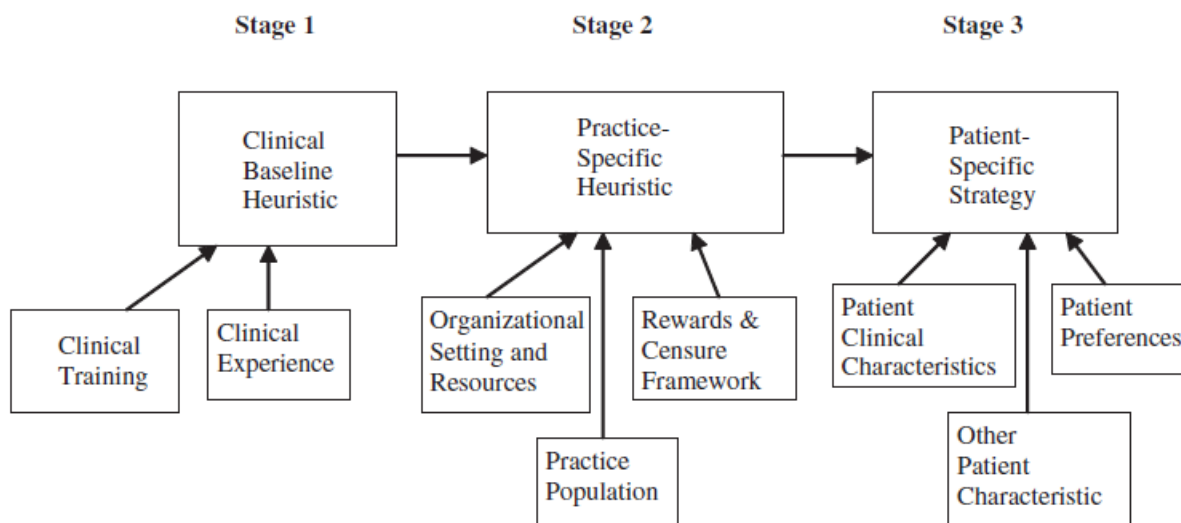
---

<sup>1</sup> Mort, Edwards, Emmons, Convery, & Blumenthal (1996)

<sup>2</sup> O'Neill & Kuder (2005)

RECOMMEND TREATMENT (US) *continued*B. RESEARCH RESULTS *continued*3. Detailed results *continued*viii. *Produce output continued*

In Stage 2, the physician adapts the baseline heuristic to the environment of the physician's practice setting, taking into account the organizational structure and available resources, the practice population, and the physician's payment system. In Stage 3, the physician's decision is influenced by the condition, preferences, and circumstances of the patient. The hypothesis underscores that no one factor determines a physician's treatment decision; rather, it is the interplay of many factors that counts.<sup>1</sup>

ix. *Send output*

There is no known research specifically about this behavior parameter.

x. *Output messages*

The primary output message for this behavior is "Treatment recommendation". There is no known research specifically about this behavior parameter.

<sup>1</sup> O'Neill & Kuder (2005)

**RECOMMEND TREATMENT (US)** *continued*

**B. RESEARCH RESULTS** *continued*

**3. Detailed results** *continued*

viii. *Produce output* *continued*

**4. Conflicting results**

Studies about physicians generally (primary care physicians and specialists) indicate that younger physicians tend to recommend more intensive interventions, in contrast to the findings of O'Neill et al referenced for the “age” attribute.

**5. Limitations**

The primary limitation about the research for this behavior is that it is too sparse.

## RECOMMEND TREATMENT (US) continued

### C. RESEARCH GAPS

Following are gaps in the research about this health behavior:

- **Lack of research.** There is a general lack of research about the behavior.
- **Lack of experiments.** The existing research is primarily based on statistical correlation analysis of survey results and administrative data. It appears that no experiment in a real-life situation has been performed about this behavior.
- **Missing behavior components.** Little or no research has been performed to elucidate the “attributes”, “goals”, “input messages”, “get input”, “experience”, “rules”, “resources”, “context”, “send output”, or “output messages” components of this behavior.

### D. SIMULATION MODELS

There is no known simulation model that incorporates this behavior.

### E. CROSS REFERENCES

Related behaviors:

A1.2.1.1:G1.3:8001.001: Recommend treatment (US)

A1.2.1.1:G1.3:B002.001

UPDATED: OCTOBER 29, 2012

## RECOMMEND A SPECIALIST (US)

A primary care physician in the US health system recommends a specialist practitioner for a patient.

### A. TERMINOLOGY

**Specialist recommendation:** A recommendation made by a primary care physician for a patient to visit a specific specialist physician. The purpose of the specialist recommendation may be to obtain a second opinion, for the patient to have a special medical procedure, for co-management of the patient's condition, or some other appropriate reason.<sup>1</sup>

**Appropriate specialist recommendation:** A specialist recommendation that is reasonable. A PCP's specialist recommendation is reasonable when it conforms to medical guidelines, when the patient's condition is outside the PCP's typical scope of care, or when a requested specialist procedure is one that the PCP does not typically perform. Further, to be appropriate, a specialist recommendation should be made for a specialist who can effectively address the patient's condition, and should be made in a timely manner.

### B. RESEARCH RESULTS

#### 1. Introduction

The specialist recommendation is the first step of a referral process that consists of:<sup>2</sup>

- **Specialist recommendation:** The PCP should make an appropriate specialist recommendation.
- **Referral tracking:** After the PCP has initiated the referral, the PCP should make sure that patient can make an appointment with the specialist, and should coordinate care by tracking the referral and making sure that it is completed.
- **Information transfer to specialist.** The PCP should transfer information about the patient that the specialist will need.
- **Information transfer from specialist:** After evaluating the patient, the specialist transfers findings and recommendations to the PCP.

#### Behavior components

|                              |   |
|------------------------------|---|
| <b>Acting agent role:</b>    | A1.2.1.1 Primary care practitioner      |
| <b>i. Goals:</b>             | G1.3 Eliminate unwanted sign or symptom |
| <b>ii. Attributes:</b>       | Any                                     |
| <b>iii. Input messages:</b>  | Any                                     |
| <b>iv. Get input:</b>        | Any                                     |
| <b>v. Experience:</b>        | Any                                     |
| <b>vi. Rules:</b>            | Any                                     |
| <b>vii. Context:</b>         | US health system                        |
| <b>viii. Produce output:</b> | Any                                     |
| <b>ix. Send output:</b>      | Any                                     |
| <b>x. Output messages:</b>   | Specialist referral recommendation      |

<sup>1</sup> Mehrotra, Forrest, & Lin (2011)

<sup>2</sup> Mehrotra, et al. (2011)

RECOMMEND A SPECIALIST (US) *continued*B. RESEARCH RESULTS *continued*1. Introduction *continued*

- **Care integration:** The PCP and specialist agree about the patient's management plan and the ongoing role of the specialist.

## 2. Summary

Even though there has been considerable research about why and how a PCP recommends a specialist, there is still much that is unknown. (see the sidebar) Following is a summary of the research available about this behavior, by behavior component.

- i. **Goals.** None known.
- ii. **Attributes.** A PCP's propensity to recommend a specialist varies by the PCP's type of medical training, number of years of experience, experience with the condition at hand, degree of risk aversion, and practice environment.
- iii. **Input messages.** Much of the variation in specialist recommendations is associated with the patient attributes such as presenting problem and morbidity burden, and the patient's expectations.
- iv. **Get input.** None known.
- v. **Experience.** In deciding whether to recommend a specialist, a PCP considers several specialist attributes, including the specialist's self-perceived medical skill, availability, and whether the specialist is known to return patients to referring PCPs.
- vi. **Rules.** None known.
- vii. **Context.** Associated with variation in specialist recommendations are attributes of the community in which a PCP practices, such as whether it is urban or rural, and how many physicians there are per capita.
- viii. **Produce output.** A researcher has developed and tested a hypothesis of physician referral behavior based on "social exchange theory".

## How can we know so little?

In 2012, Mitchell Katz wrote in an editorial:

"Barnett et al<sup>1</sup> demonstrate that between 1999 and 2009, the probability of an ambulatory visit resulting in a referral to another physician almost doubled. Given concerns about the tremendous and seemingly unsustainable cost of American health care, as well as the increased risk of fragmented care with multiple physicians involved in the care of a given patient, these findings are troubling. But the real problem is that we have no idea what the data really mean.

Are more patients being referred to another physician because medical care is more complicated than it was a decade ago (eg, more medicines, more procedures available), and none of us can know or do everything? Are more patients referred because as practicing doctors we are asked to do more in less time and so we refer out issues that are not in our core practice? Are our patients demanding more referrals, or are we referring more because of concerns of malpractice? Are all of these factors playing a role? The answer is unclear."<sup>2</sup>

<sup>1</sup> Barnett, Song, & Landon (2012)

<sup>2</sup> Katz (2012)

**RECOMMEND A SPECIALIST (US)** continued

**B. RESEARCH RESULTS** continued

**2. Summary** continued

- ix. *Send output*. None known.
- x. *Output messages*. PCP specialist recommendations are often inappropriate. They can be excessive or inadequate in number, and can be made too late to optimally benefit the patient.

Most of the research about this behavior is based on surveys, and most of the surveys are biased toward a particular segment of the US population. There is a lack of experimental studies for this behavior, and a lack of research about its “produce output” parameter.

There is no known simulation model that incorporates this behavior.

**RECOMMEND A SPECIALIST (US)** continued**B. RESEARCH RESULTS** continued**3. Detailed results**

There is much variation in PCP specialist recommendation behavior, with some PCPs making five times more specialist recommendations per patient than other PCPs.<sup>1</sup> Also, the types of specialists that PCPs recommend varies widely.<sup>2</sup>

**i. Goals**

The primary goal for this behavior is to “eliminate unwanted sign or symptom”. However, there is no known research specifically about this behavior parameter.

**ii. Attributes**

The variation is associated with the following PCP attributes:

- **Type of medical training:** If a PCP had any training as a specialist, a specialist recommendation is more likely.<sup>3</sup>
- **Number of years of experience:** Specialist recommendations decrease with the number of years of PCP practice experience.<sup>4</sup> Residents and interns recommend specialists much more often than do staff physicians.<sup>5</sup>
- **Experience with the condition at hand:** The number of specialist recommendations increases as PCPs have less experience with the patient’s condition.<sup>6</sup>
- **Degree of risk aversion:** Specialist recommendations increase with PCP risk aversion.<sup>7</sup>
- **Practice environment:** Specialist recommendations increase for PCPs who have greater contact with specialists, such as in a hospital environment.<sup>8</sup>

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<sup>1</sup> Chen, Fryer, & Norris (2005) and Franks, Zwanziger, Mooney, & Sorbero (1999).

<sup>2</sup> Forrest, Nutting, Starfield, & von Schrader (2002) and Starfield, Forrest, Nutting, & von Schrader (2002)

<sup>3</sup> Boulis & Long (2002), Bachman & Freeborn (1999)

<sup>4</sup> Bachman & Freeborn (1999)

<sup>5</sup> Fisher (2002)

<sup>6</sup> Forrest & Reid (2001)

<sup>7</sup> Forrest, Nutting, von Schrader, Rohde, & Starfield (2006)

<sup>8</sup> Forrest, et al. (2006)



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**RECOMMEND A SPECIALIST (US)** continued**B. RESEARCH RESULTS** continued**3. Detailed results** continued**iii. *Input messages***

Much of the variation in specialist recommendations is associated with patient attributes and behaviors (which are input messages for the PCP), such as the patient's:<sup>1</sup>

- **Presenting problem:** The more unusual the presenting problem, the more likely the PCP is to recommend a specialist.
- **Morbidity burden:** When a patient has a higher number of comorbidities, the PCP is more likely to recommend a specialist.
- **Expectations:** When the patient expresses a desire to see a specialist, the PCP is more likely to recommend one.

**iv. *Get input***

There is no known research specifically about the “get input” aspect of this behavior.

**v. *Experience***

Certain specialist attributes that the PCP has experienced (stored in the PCPs memory) are associated with variation in the intensity of specialist recommendations, such as the specialist's self-perceived medical skill, the specialist's availability, and whether the specialist is known to return patients to referring PCPs.<sup>2</sup> PCPs generally recommend specialists who are among their “professional network” colleagues, who are easy to communicate with, who share their medical record system. and whom patients can easily access.<sup>3</sup>

**vi. *Rules***

There is no known research specifically about the “rules” aspect of this behavior.

---

<sup>1</sup> Chen, et al. (2005), Forrest, et al. (2006), D. Shea, Stuart, Vasey, & Nag (1999)

<sup>2</sup> Kinchen, Cooper, Levine, Wang, & Powe (2004)

<sup>3</sup> Barnett, Keating, Christakis, O'Malley, & Landon (2011)

**RECOMMEND A SPECIALIST (US)** *continued***B. RESEARCH RESULTS** *continued***3. Detailed results** *continued***vii. Context**

Attributes of the community in which a PCP practices are associated with variation in specialist recommendations:

- **Urban vs. rural:** Specialist recommendations are more frequent for urban PCPs.<sup>1</sup>
- **Physicians per capita:** Specialist recommendations are more frequent for PCPs who live in locations where there are more physicians per capita.<sup>2</sup>

**viii. Produce output**

Stephen Shortell developed and tested a hypothesis of physician referral behavior based on “social exchange theory”. According to Shortell’s application of this theory, rates of specialist recommendation are a function of the costs and rewards that physicians perceive from the referral behavior, as well as the levels of status that physicians occupy within a community:

“The general thesis is that physicians of a given specialty occupying different levels of status within a given medical community perceive different classes of rewards and costs to referring, leading to differences in referral behavior as measured by the rate at which they refer. Specifically, a high status internist finds his principal rewards in receiving good treatment for his patients with a minimum of communication problems. Since he has a well-established practice he is less concerned with the potential practice-building costs of referring such as having a patient “stolen”, loss of income, or failing to receive reciprocal referrals. In contrast, the lower status physician with a less secure position in the local medical community and smaller probability of having an established practice is more concerned with these practice-building or practice-maintaining factors.”<sup>3</sup>

---

<sup>1</sup> Iverson, Coleridge, Fulda, & Licciardone (2005)

<sup>2</sup> D. Shea, et al. (1999)

<sup>3</sup> Shortell (1974)

**RECOMMEND A SPECIALIST (US)** *continued***B. RESEARCH RESULTS** *continued***3. Detailed results** *continued***ix. *Send output***

There is no known research specifically about the “send output” aspect of this behavior.

**x. *Output messages***

The primary output message for this behavior is “Specialist referral recommendation”.

PCP specialist recommendations are often inappropriate in several ways:

- **Excessive recommendations:** PCPs may make specialist recommendations that are unnecessary. For example, one study showed that 65 percent of children with musculoskeletal disorders were inappropriately referred to pediatric orthopedists.<sup>1</sup>
- **Inadequate recommendations:** PCPs may neglect to make a specialist recommendation when one is necessary. For example, one study showed that for 87 percent of patients with diabetes or hypertension, PCPs did not recommend ophthalmologists for retinopathy screening.<sup>2</sup>
- **Tardy recommendations:** PCPs can also recommend specialists too late. One study found that for up to 80 percent of patients with chronic kidney disease, PCPs recommended nephrologists too late.<sup>3</sup>

The foregoing notwithstanding, for a particular PCP, the number of specialist recommendations per patient tends to be stable from year to year and across diagnostic categories.<sup>4</sup>

**4. Conflicting results**

There appears to be no research result that conflicts significantly with the results presented above.

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<sup>1</sup> Reeder, Lyne, Patel, & Cucos (2004)

<sup>2</sup> Ettinger, Schwartz, & Kalet (1993)

<sup>3</sup> Navaneethan, Aloudat, & Singh (2008)

<sup>4</sup> Franks, et al. (1999)

**RECOMMEND A SPECIALIST (US)** continued

**B. RESEARCH RESULTS** continued

**5. Limitations**

Because there have been few studies focusing on whether specialist recommendations are appropriate, results relating to inappropriate specialist recommendations may be subject to significant revision.<sup>1</sup>

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<sup>1</sup> Mehrotra, et al. (2011)

**RECOMMEND A SPECIALIST (US)** continued**C. RESEARCH GAPS**

There are several gaps in the research about this health behavior:

- **Lack of experiments.** The research is primarily based on statistical correlation. No experiments have been performed to elucidate the mechanisms of specialist recommendations.
- **Missing behavior components.** Little or no research has been performed to determine how the PCP filters input messages (the “get input” component of health behavior), how the PCP sends the output message, the rules the PCP uses to provide specialist recommendations, or—most importantly—the process the PCP uses to combine the input message, experience, rules, etc. to produce the output message (the “produce output” component).

**D. SIMULATION MODELS**

There is no known simulation model that incorporates this behavior.

**E. CROSS REFERENCES**

In addition to making a specialist recommendation, the referring PCP will typically alert the specialist about the referral, forward to the specialist the patient’s relevant information, track the referral to make sure the patient carries it out, and confer with the specialist about the patient’s ongoing management. These additional actions are separate behaviors. See:

A1.2.1.1:G1.3:B001.002: Contact specialist about referral (US)

A1.2.1.1:G1.3:B001.003: Forward patient information for referral (US)

A1.2.1.1:G1.3:B001.004: Track specialist referral (US)

A1.2.1.1:G1.3:B001.005: Confer with specialist about ongoing management (US)

## A1.2.1.2: SPECIALIST PRACTITIONER

A1.2.1.2:G1.3:B001.001

UPDATED: OCTOBER 29, 2012

**RECOMMEND TREATMENT (US)**

A specialist physician in the US health system recommends a treatment for a patient.

**A. TERMINOLOGY**

**Term:** Description.

**B. RESEARCH RESULTS****1. Introduction**

In the US health system a major proportion of expenditures is due to treatments that specialists recommend. It is well known that there is wide variation among specialists in the treatments they recommend, and that overutilization is a major problem. (see the sidebar) For example, in McAllen, Texas, between 2001 and 2005, Medicare patients received 20 to 66 percent more gallbladder operations and knee replacements. They also received two to three times as many pacemakers, implantable defibrillators, cardiac-bypass operations, and coronary-artery stents.<sup>2</sup>

Although there has been much effort expended to develop evidence-based guidelines to guide specialists in recommending treatment, most of the time specialists do not apply guidelines, and 20-25 percent of therapeutic choices may be unnecessary and sometimes even harmful.<sup>3</sup>

Thus, it is important to understand how and why specialists recommend treatments.

**Behavior components**

|                                     |   |
|-------------------------------------|---|
| <b>Acting agent role:</b>           | A1.2.1.2 Specialist practitioner        |
| <b>i. <i>Goals:</i></b>             | G1.3 Eliminate unwanted sign or symptom |
| <b>ii. <i>Attributes:</i></b>       | Any                                     |
| <b>iii. <i>Input messages:</i></b>  | Any                                     |
| <b>iv. <i>Get input:</i></b>        | Any                                     |
| <b>v. <i>Experience:</i></b>        | Any                                     |
| <b>vi. <i>Rules:</i></b>            | Any                                     |
| <b>vii. <i>Context:</i></b>         | US health system                        |
| <b>viii. <i>Produce output:</i></b> | Any                                     |
| <b>ix. <i>Send output:</i></b>      | Any                                     |
| <b>x. <i>Output messages:</i></b>   | Treatment recommendation                |

**Overutilization pure and simple**

In 2009, Atul Gawande wrote in The New Yorker about his interview with a general surgeon practicing in McAllen, Texas, a city with one of the highest specialist utilization rates in the US:

“Come on,’ the general surgeon finally said. ‘There is overutilization here, pure and simple.’ Doctors, he said, were racking up charges with extra tests, services, and procedures. The surgeon came to McAllen in the mid-nineties, and since then, he said, ‘the way to practice medicine has changed completely. Before it was about how to do a good job. Now it is about ‘How much will you benefit?’ ...

The surgeon gave me an example. General surgeons are often asked to see patients with pain from gallstones. If there aren’t any complications—and there usually aren’t—the pain goes away on its own or with pain medication. ... But increasingly, I was told, McAllen surgeons simply operate.”<sup>1</sup>

<sup>1</sup> Grol & Grimshaw (2003)

<sup>2</sup> Gawande (2009)

<sup>3</sup> Gawande (2009)

## RECOMMEND TREATMENT (US) continued

## B. RESEARCH RESULTS continued

## 2. Summary

Following is a summary of the research available about this behavior, by behavior component.

- i. *Goals*. None known.
- ii. *Attributes*. Specialist treatment recommendations vary by specialist age and degree of awareness of treatment guidelines. They do not appear to vary by gender.
- iii. *Input messages*. None known.
- iv. *Get input*. None known.
- v. *Experience*. Variation in this behavior appears to be associated with variation in level of patient out-of-pocket costs and the extent of patient co-morbidities.
- vi. *Rules*. Researchers have found that specialist attitudes and habits are associated with variations in this behavior.
- vii. *Context*. Researchers have found that variation in practice setting, peer pressure, group style, and practice support are associated with variations in this behavior.
- viii. *Produce output*. Researchers have proposed many hypotheses to explain the processes that specialists use to develop treatment recommendations, including cognitive theories, behavioral theories, and social theories.
- ix. *Send output*. None known.
- x. *Output messages*. None known.

There is a lack of experimental studies for this behavior. There is no known simulation model that incorporates this behavior.



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**RECOMMEND TREATMENT (US)** *continued***B. RESEARCH RESULTS** *continued***3. Detailed results**

Following are detailed research results about this behavior, organized by behavior component.

**i. *Goals***

The primary goal for this behavior is to “eliminate unwanted sign or symptom”. However, there is no known research specifically about this behavior parameter.

**ii. *Attributes***

Researchers have found that the following attributes are associated with variations in this behavior.

- **Age.** Younger physicians tend to prescribe more ancillary services and shorter lengths of hospital stays. One study showed that differences in physician age explained 5 percent of the variation in the prescription of laboratory tests and 3 percent of the variation in the number of radiographs ordered.<sup>1</sup> Younger physicians are more prone to follow treatment guidelines.<sup>2</sup>
- **Lack of awareness.** A lack of awareness of treatment guidelines is a main reason why physicians fail to follow them in recommending treatment.<sup>3</sup>

Physician gender has not been shown to have a measurable effect on treatments recommended.

**iii. *Input messages***

There is no known research specifically about this behavior parameter.

**iv. *Get input***

There is no known research specifically about this behavior parameter.

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<sup>1</sup> Eisenberg (1985)

<sup>2</sup> Francke, Smit, de Veer, & Mistiaen (2008)

<sup>3</sup> Francke, et al. (2008)

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**RECOMMEND TREATMENT (US)** *continued***B. RESEARCH RESULTS** *continued***3. Detailed results** *continued***v. Experience**

Researchers have discovered the following about the attributes stored in the experience component of this behavior.

- **Patient out-of-pocket costs.** In prescribing tests and drugs, physicians appear to act in order to reduce the patients' out-of-pocket costs.<sup>1</sup>
- **Co-morbidities.** Physicians are less likely to adhere to treatment guidelines when patients have co-morbidities.<sup>2</sup>

**vi. Rules**

Researchers have found that the following rules are associated with variations in this behavior.

- **Attitudes.** Physicians adopt different styles of practice as a result of their attitudes. Wennberg has documented the preferences of surgeons for a particular practice style, and described it as the "surgical signature".<sup>3</sup>
- **Habits.** Specialists are likely to recommend treatments that they have recommended before.<sup>4</sup>

**vii. Context**

Researchers have found that variation in the following contexts are associated with variations in this behavior.

- **Practice setting.** Specialists in hospital settings are more likely to recommend more or more intensive treatments.<sup>5</sup>
- **Peer pressure.** A negative attitude or limited support from "peers" or superiors decreased the likelihood that specialists would follow treatment guidelines.<sup>6</sup>
- **Group style.** Specialists follow the treatment recommendation style of their group of colleagues.<sup>7</sup>

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<sup>1</sup> Eisenberg (1985)

<sup>2</sup> Francke, et al. (2008)

<sup>3</sup> Eisenberg (1985)

<sup>4</sup> Eisenberg (1985)

<sup>5</sup> Eisenberg (1985)

<sup>6</sup> Francke, et al. (2008)

<sup>7</sup> Eisenberg (1985)

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**RECOMMEND TREATMENT (US)** *continued***B. RESEARCH RESULTS** *continued***3. Detailed results** *continued***vii. Context** *continued*

- **Limited resources.** Specialists cite limited time and personnel support as reasons for not following treatment guidelines.<sup>1</sup>

**viii. Produce output**

Researchers have proposed many hypotheses to explain the processes that specialists use to develop treatment recommendations. Among these:

- **Cognitive theories.** Cognitive theories assume that thoughts, feelings and behaviors influence one another. A specialist's adherence to treatment guidelines depends on the specialist's level of knowledge, on accessibility and relevance of guideline information, on the specialist's ways of thinking, and on a personal balancing of costs and benefits.<sup>2</sup>
- **Behavioral theories.** The Theory of Reasoned Behavior and its extension, the Theory of Planned Behavior, have been proposed to model specialist treatment recommendation behavior.<sup>3</sup>
- **Social theories.** Social theories study the mechanisms of behaviors (such as communications and persuasion) and attitudes from an interpersonal point of view.<sup>4</sup>

**ix. Send output**

There is no known research specifically about this behavior parameter.

**x. Output messages**

The primary output message for this behavior is "Treatment recommendation". There is no known research specifically about this behavior parameter.

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<sup>1</sup> Francke, et al. (2008)

<sup>2</sup> Baiardini, Braidò, Vonini, Compalati, & Cnonica (2009)

<sup>3</sup> Perkins et al. (2007)

<sup>4</sup> Baiardini, et al. (2009)

**RECOMMEND TREATMENT (US)** continued

**B. RESEARCH RESULTS** continued

**4. Conflicting results**

There appears to be no research result that conflicts significantly with the results presented above.

**5. Limitations**

Most studies of this behavior are survey-based and involve a relatively small number of respondents.

## RECOMMEND TREATMENT (US) continued

### C. RESEARCH GAPS

There are several gaps in the research about this health behavior:

- **Lack of experiments.** The existing research is primarily based on statistical correlation analysis of survey results and administrative data. It appears that no experiment in a real-life situation has been performed to determine how specialists recommend treatments.
- **Missing behavior components.** Little or no research has been performed to elucidate the “goal”, “input messages”, “get input”, “send output”, or “output messages” components of this behavior.

### D. SIMULATION MODELS

There is no known simulation model that incorporates this behavior.

### E. CROSS REFERENCES

Related behaviors:

A1.2.1.1:G1.3:B001.001: Recommend treatment (US)

## A2.2. GROUP HEALTHCARE ROLE

A2.2.01:G6.01.B001.001

UPDATED: FEBRUARY 20, 2013

**NEGOTIATE FEE SCHEDULE WITH A HEALTH INSURANCE COMPANY (US)**

A medical provider group in the US health system negotiates a medical reimbursement fee schedule with a health insurance company.

**A. TERMINOLOGY**

**Patient Protection and Affordability Care Act (PPACA or ACA):** A federal statute signed into law on March 23, 2010 that overhauled the US healthcare system. The ACA's primary purpose was to increase the number of Americans covered by health insurance.

**B. RESEARCH RESULTS****1. Introduction**

Among private health insurers, there is wide variation in medical reimbursement fee schedules for hospitals and physician groups. For example, some hospitals command almost five times what Medicare pays for inpatient services, and more than seven times what Medicare pays for outpatient care, whereas other provider groups cannot negotiate much more than Medicare rates. In Los Angeles, the range of inpatient reimbursement fees for hospitals was from 80 percent of Medicare rates to more than 400 percent.<sup>1</sup> Such variation suggests that there are differences in how medical provider groups negotiate fee schedules with health insurance companies. Moreover, the negotiation landscape appears to be changing. Whereas in the past health insurers have often had considerable negotiation clout, in many recent showdowns between provider groups and health insurers, provider groups have generally won.<sup>2</sup>

Because the results of such negotiations drive a large portion of national health expenditures, it is important to understand the behavior of the negotiating parties. Unfortunately, health schedule negotiation strategies are not transparent, and little research has been done to learn about this behavior. (see the sidebar)

This section presents what is known about how medical provider groups in the US negotiate medical reimbursement fee schedules with health insurance companies.

**Behavior components**

|                                     |  |
|-------------------------------------|--|
| <b>Acting agent role:</b>           | A2.2.01 Healthcare provider organization |
| <b>i. <i>Goals:</i></b>             | G6.01 Increase agent income              |
| <b>ii. <i>Attributes:</i></b>       | Any                                      |
| <b>iii. <i>Input messages:</i></b>  | Any                                      |
| <b>iv. <i>Get input:</i></b>        | Any                                      |
| <b>v. <i>Experience:</i></b>        | Any                                      |
| <b>vi. <i>Rules:</i></b>            | Any                                      |
| <b>vii. <i>Context:</i></b>         | US health system                         |
| <b>viii. <i>Produce output:</i></b> | Any                                      |
| <b>ix. <i>Send output:</i></b>      | Any                                      |
| <b>x. <i>Output messages:</i></b>   | Negotiated fee schedule                  |

**A black box**

The following is from an introduction to a forum that the National Health Policy Forum of George Washington University hosted in 2010 to discuss insurer-provider payment negotiations:

“The process by which insurers and providers negotiate payment rates is largely a black box to those not a party to the negotiations. However, these payment negotiations are key in determining health insurance premiums and ultimately overall health care costs.

Hospital and physician groups that seemingly cannot be left out of insurer networks due to location, reputation, or other factors—so called ‘must-have’ providers—can command higher payment rates during negotiations, while providers with less leverage in that market cannot. Prices paid by insurers to must-have providers may or may not be related to quality of service delivered, sickness of the patient population, underlying costs of delivering the service, or other factors. Consumers, employers, and the federal government have a stake in how these negotiations work and how imbalances of market power can increase health care costs.”

<sup>1</sup> Ginsburg (2010)

<sup>2</sup> Strunk, Devers, & Hurley (2001)

NEGOTIATE FEE SCHEDULE WITH A HEALTH INSURANCE COMPANY (US) continuedB. RESEARCH RESULTS continued

## 2. Summary

Following is a summary of the research available about this behavior, by behavior component.

- i. *Goals*. None known.
- ii. *Attributes*. Higher negotiated fees are associated with medical providers that are larger, geographically concentrated, conveniently located, highly-regarded, and that offer important and unique services.
- iii. *Input messages*. The impetus for negotiations is usually a proposal from one party to change the existing contract.
- iv. *Get input*. Most negotiations are made during face-to-face meetings.
- v. *Experience*. None known.
- vi. *Rules*. None known.
- vii. *Context*. The ACA's provisions may affect this behavior.
- viii. *Produce output*. A best practice negotiation process includes the following: developing a strategic plan, calculating weighted reimbursement, calculating weighted average costs, monitoring contracts, developing a negotiation strategy, and negotiating effectively.
- ix. *Send output*. Negotiations are usually communicated during a face-to-face meeting.
- x. *Output messages*. None known.



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**NEGOTIATE FEE SCHEDULE WITH A HEALTH INSURANCE COMPANY (US)** continued**B. RESEARCH RESULTS** continued**3. Detailed results**

Following are detailed research results about this behavior, organized by behavior component.

**i. Goals**

The primary goal for this behavior is to “increase agent income”. However, there is no known research specifically about this behavior parameter.

**ii. Attributes**

Researchers have found that the following attributes are associated with variation in this behavior.

- **Size.** Researchers found that larger hospital and physician groups negotiated higher fees than smaller groups.<sup>1</sup> Interview-based research found that physician group consolidation in California resulted in stronger negotiating power and subsequent higher fees.<sup>2</sup>
- **Geographic concentration.** Researchers found that physician groups that were more geographically concentrated in a market negotiated higher fees than physician groups that were less concentrated.<sup>3</sup>
- **Geographic location.** Researchers found that provider groups that were more conveniently located in a market negotiated higher fees than physician groups that were less conveniently located.<sup>4</sup>
- **Reputation.** Researchers found that in some markets consumers regarded certain hospitals so highly that they viewed any health plan network that excluded them as undesirable. Such hospitals negotiated higher fees. Similarly including such a hospital enabled multi-specialty provider groups to negotiate higher fees.<sup>5</sup>

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<sup>1</sup> Dunn & Shapiro (2012), Town & Vistnes (2001), Capps, Dranove, & Satterthwaite (2003), Keeler, Melnick, & Zwanziger (1999)

<sup>2</sup> Berenson, Ginsburg, & Kemper (2010)

<sup>3</sup> Dunn & Shapiro (2012)

<sup>4</sup> Berenson, Ginsburg, Christianson, & Yee (2012)

<sup>5</sup> Ginsburg (2010), Berenson, et al. (2012)

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**NEGOTIATE FEE SCHEDULE WITH A HEALTH INSURANCE COMPANY (US)** *continued***B. RESEARCH RESULTS** *continued***3. Detailed results** *continued***ii. *Attributes continued***

- **Services.** Researchers found that provider groups that offered important and unique services (such as a children's hospital or a level 1 trauma center) negotiated higher fees than groups that did not have such services.<sup>1</sup>

**iii. *Input messages***

Most fee schedule contracts automatically renew unless one party proposes a modification. Such a proposal is usually the impetus for negotiation.<sup>2</sup>

**iv. *Get input***

Most negotiations are made during face-to-face meetings between representatives of the provider and the insurer.<sup>3</sup>

**v. *Experience***

There is no known research specifically about this behavior parameter.

**vi. *Rules***

There is no known research specifically about this behavior parameter.

**vii. *Context***

Because of the passage of the ACA, it is likely that the federal government, states, and consumers will pay greater attention to this behavior.

Researchers of a survey study found that respondents believed that the ACA's provision giving more authority to state insurance commissioners to review and approve premium increases might result in greater health insurer resolve in negotiations.<sup>4</sup>

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<sup>1</sup> Berenson, et al. (2012)

<sup>2</sup> Gesme & Wiseman (2010), Todd (2009)

<sup>3</sup> Gesme & Wiseman (2010), Todd (2009)

<sup>4</sup> Berenson, et al. (2012)

NEGOTIATE FEE SCHEDULE WITH A HEALTH INSURANCE COMPANY (US) *continued*B. RESEARCH RESULTS *continued*3. Detailed results *continued*viii. *Produce output*

Experts involved in fee schedule negotiations for provider groups describe the following best practice negotiation process:<sup>1</sup>

- **Develop a strategic plan.** Perform a strategic-planning SWOT analysis (an assessment of strengths, weaknesses, opportunities, and threats). In analyzing internal strengths and weaknesses, include data about utilization, revenue, expenses, market share, patient satisfaction, quality, efficiency, and the number of new consultations per physician. Rank referring physicians by frequency and type of referral, and group them by the insurance companies for which they are providers.
- **Calculate weighted average reimbursements.** To compare proposed fee schedules, calculate the weighted average reimbursement payment for each schedule (equal to the proposed payment for each procedure code times the number of times it was billed, divided by total frequency of all codes). This enables a high-level comparison of fee schedules. This comparison should be done by line of business within the provider group.
- **Calculate weighted average costs.** Calculate the weighted average costs of the provider group by adding physician compensation and overhead expenses, and dividing this sum by the total frequency of all procedure codes for all insurers. This is the group's break-even point. It is compared to the weighted average reimbursements calculated previously.
- **Monitor contracts.** Because most fee schedule contracts automatically renew unless one party proposes a modification, they should be constantly monitored to make sure the fee levels are appropriate.
- **Develop a negotiation strategy.** In preparation for contract negotiation, set a bargaining range that includes an optimum, minimum, and target goal. Go into the negotiation knowing the alternatives you have, including the preferred action if no agreement can be reached.

**From one bucket to another**

A CEO of a multispecialty cancer services network explains why his network assesses the weighted average reimbursements of insurance companies:

“The payers try to slide the money from one bucket to another. They’ll increase E&M [evaluation and management] codes by 20%, but that’s really only approximately 12% to 13% of business. At the same time, they decrease drug reimbursement by 2%, which offsets the E&M increase. We look at the aggregate contract to analyze the payer’s overall discount.”<sup>2</sup>

<sup>1</sup> Gesme & Wiseman (2010), Todd (2009)

<sup>2</sup> Gesme & Wiseman (2010)

## NEGOTIATE FEE SCHEDULE WITH A HEALTH INSURANCE COMPANY (US) continued

### B. RESEARCH RESULTS continued

#### 3. Detailed results continued

##### viii. *Produce output continued*

- **Negotiate effectively.** Contact the insurance company representative to set a date for a face-to-face meeting in the provider group's offices. Make it plain that you have a thorough understanding of the provider group's finances, and present your case for contract changes. Understand the goals and constraints of the insurance company, and negotiate in good faith. But if the insurance company is not willing to meet your minimum goal, walk away.

##### ix. *Send output*

Negotiation results are usually communicated during a face-to-face meeting in the provider group's offices.<sup>1</sup>

##### x. *Output messages*

There is no known research specifically about this behavior parameter.

#### 4. Conflicting results

There appears to be no research result that conflicts significantly with the results presented above.

#### 5. Limitations

Research about this behavior has the following limitations.

- **Lack of research.** There is a marked lack of research about this behavior.

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<sup>1</sup> Gesme & Wiseman (2010), Todd (2009)

## NEGOTIATE FEE SCHEDULE WITH A HEALTH INSURANCE COMPANY (US) continued

### C. RESEARCH GAPS

There are several gaps in the research about this health behavior:

- **Lack of studies.** There is a marked lack of studies about the behavior.
- **Lack of “produce output” research.** There is inadequate research about what actually happens for the “produce output” behavior parameter. This parameter is particularly important, because it ties together all the other parameters.
- **Missing behavior components.** Little or no research has been performed to elucidate the “goals”, “input messages”, “get input”, “experience”, “rules”, “context”, “send output”, “output messages”, or—most importantly—the “produce output” components of this behavior.

### D. SIMULATION MODELS

There is no known simulation model that incorporates this behavior.

### E. CROSS REFERENCES

Related behaviors:

A2.3.01:G2.1:B001.001: Negotiate fee schedule with a medical provider (US)

A2.2.99:G1.1:B001.001

UPDATED: FEBRUARY 10, 2013

**OFFER EMPLOYEES WORKPLACE WELLNESS PROGRAM INCENTIVES (US)**

A US employer offers its employees incentives to participate in its workplace wellness program.

**A. TERMINOLOGY**

**Health risk assessment:** A questionnaire that helps individuals to determine, evaluate, and mitigate their health risk factors. Synonymous terms: “HRA”, “health risk appraisal”, and “health and well-being assessment”.

**Workplace wellness program:** An activity or policy that an employer provides to promote healthy behavior among employees, in order to improve their health outcomes and productivity. A workplace wellness program might include health fairs, health education, medical screening, health coaching, a health risk assessment, on-site fitness classes and facilities, as well as flex-time for exercise, healthy food options in the cafeteria and vending machines, healthy workplace environmental changes, and financial incentives for employees to participate. There is no consensus about the definition of a workplace wellness program, and different employers define their programs differently.<sup>1</sup> Synonymous terms: “health promotion program”, “health management program”.

**B. RESEARCH RESULTS****1. Introduction**

More than 90 percent of employers with 200 or more employees have reported offering a workplace wellness program. For these programs, about 6 percent of employers have started using incentives to increase employee engagement. They offer incentives in a variety of forms, such as cash, cash equivalents (such as merchandise and travel vouchers), and variances in health insurance costs (such as reduced cost-sharing or lower employee premiums). The average annual value of incentives per employee is typically between \$100 and \$500.<sup>2</sup>

This section describes what we know about the behavior of employers related to offering wellness program incentives.

**Behavior components**

|                              |                                     |
|------------------------------|-------------------------------------|
| <b>Acting agent role:</b>    | A2.2.99 Other group healthcare role |
| i. <b>Goals:</b>             | G1.1 Enhance health                 |
| ii. <b>Attributes:</b>       | Any                                 |
| iii. <b>Input messages:</b>  | Any                                 |
| iv. <b>Get input:</b>        | Any                                 |
| v. <b>Experience:</b>        | Any                                 |
| vi. <b>Rules:</b>            | Any                                 |
| vii. <b>Context:</b>         | US health system                    |
| viii. <b>Produce output:</b> | Any                                 |
| ix. <b>Send output:</b>      | Any                                 |
| x. <b>Output messages:</b>   | Any                                 |

<sup>1</sup> Mattke, et al. (2012)

<sup>2</sup> Mattke, et al. (2012)

**STOP PARTICIPATING IN AN EMPLOYER-PROVIDED EXERCISE PROGRAM** continued**B. RESEARCH RESULTS** continued**2. Summary**

Following is a summary of the research available about this behavior, by behavior component.

- i. *Goals*. None known.
- ii. *Attributes*. Employers with more employees are more likely to offer incentives.
- iii. *Input messages*. None known.
- iv. *Get input*. None known.
- v. *Experience*. None known.
- vi. *Rules*. None known.
- vii. *Context*. None known.
- viii. *Produce output*. None known.
- ix. *Send output*. None known.
- x. *Output messages*. The most commonly incentivized program is completion of an HRA. Incentives are offered in a variety of forms, such as cash, gift cards, merchandise, time off, awards, recognition, raffles, lotteries, reduced health insurance premiums and co-payments, and contributions to flexible spending or health savings accounts. In 2010, the average value of incentives ranged between \$152 and \$557 per employee per year.

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**STOP PARTICIPATING IN AN EMPLOYER-PROVIDED EXERCISE PROGRAM** continued**B. RESEARCH RESULTS** continued**3. Detailed results**

Following are detailed research results about this behavior, organized by behavior component.

**i. *Goals***

The primary goal for this behavior is to “enhance health”. However, there is no known research specifically about this behavior parameter.

**ii. *Attributes***

Researchers have found that the following attributes are associated with variations in this behavior.

- **Number of employees.** Employers with more employees are more likely to offer incentives. Researchers for a survey-based study found that 6 percent of all firms, but 23 percent of firms with 500 or more employees, provided financial incentives.<sup>1</sup>

**iii. *Input messages***

There is no known research specifically about this behavior parameter.

**iv. *Get input***

There is no known research specifically about this behavior parameter.

**v. *Experience***

There is no known research specifically about this behavior parameter.

**vi. *Rules***

There is no known research specifically about this behavior parameter.

**vii. *Context***

Section 1003 of the Affordable Care Act added Section 2794 to the Public Health Service Act of 1944, including a provision that requires state insurance departments to conduct an annual review of “unreasonable” increases in health insurance premiums, defined through regulation as an increase of 10 percent or more. Health insurers must justify premium increases, which means that theoretically, large payment rate increases in provider contracts could lead to disapproval of the premium increase. The enhanced

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<sup>1</sup> Kaiser Family Foundation (2010)



transparency of negotiated rates and increased scrutiny of health plan rate increases will raise the profile of provider prices and could lead to public calls to restrain provider pricing.<sup>1</sup>

Researchers of a survey study found that the law's provision giving more authority to state insurance commissioners to review and approve premium increases might result in somewhat greater health plan resolve in negotiations.<sup>2</sup>

**viii. *Produce output***

There is no known research specifically about this behavior parameter.

**ix. *Send output***

There is no known research specifically about this behavior parameter.

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<sup>1</sup> Berenson, et al. (2012)

<sup>2</sup> Berenson, et al. (2012)

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**OFFER EMPLOYEES WORKPLACE WELLNESS PROGRAM INCENTIVES** continued**B. RESEARCH RESULTS** continued**3. Detailed results** continued**x. *Output messages***

The output message for this behavior is an incentive design. Following are common characteristics of incentive designs:

- **Program incentivized.** The most commonly incentivized program is completion of an HRA. According to researchers, 10 percent of all firms and 23 percent of large employers that offer an HRA provided an incentive to employees for completing it.<sup>1</sup>
- **Incentive type.** Incentives are offered in a variety of forms, such as cash, gift cards, merchandise, time off, awards, recognition, raffles, lotteries, reduced health insurance premiums and co-payments, and contributions to flexible spending or health savings accounts. Among firms with more than 200 employees that offered health benefits, 23 percent offered cash or cash equivalent incentives. 10 percent of the firms offered lower employee health premiums, 2 percent offered lower deductibles, and 7 percent offered higher health reimbursement account or health savings account contributions.<sup>2</sup> Cash and cash equivalents incentives were the most popular incentive for completing an HRA. In some cases, incentives are structured as penalties against employees for engaging in undesirable behaviors or failing to take actions that firms want to encourage. For example, an employer might add a surcharge to an employee's health insurance premium for failing to participate in a wellness program.
- **Incentive value.** In 2010, the average value of incentives ranged between \$152 and \$557 per employee per year.<sup>3</sup> Researchers for a survey found that the average incentive was \$220 per employee, with 43 percent of employers spending \$100 or less per employee, and 11 percent spending more than \$500 per employee.<sup>4</sup>

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<sup>1</sup> Mercer (2010), PricewaterhouseCoopers (2010), Hewitt (2010), Towers Watson (2010), Buck Consultants (2010)

<sup>2</sup> Kaiser Family Foundation (2010)

<sup>3</sup> Mercer (2010)

<sup>4</sup> Buck Consultants (2010)

**OFFER EMPLOYEES WORKPLACE WELLNESS PROGRAM INCENTIVES** continued

**B. RESEARCH RESULTS** continued

**4. Conflicting results**

There appears to be no research result that conflicts significantly with the results presented above.

**5. Limitations**

Research about this behavior has the following limitations.

- **Survey based.** Most of the studies about this behavior are survey-based, and thus have the potential biases associated with surveys.

**C. RESEARCH GAPS**

There are several gaps in the research about this health behavior:

- **Lack of studies.** There is a marked lack of studies specifically about this behavior.
- **Lack of “produce output” research.** There does not appear to be any research about the “produce output” behavior parameter. This parameter is particularly important, because it ties together all the other parameters.
- **Missing behavior components.** Little or no research has been performed to elucidate the “goals”, “input messages”, “get input”, “experience”, “rules”, “context”, “send output”, or—most importantly—the “produce output” components of this behavior.

**D. SIMULATION MODELS**

There is no known simulation model that incorporates this behavior.

**E. CROSS REFERENCES**

Related behaviors:

None

### A2.3. GROUP FINANCIAL ROLE

A2.3.01:G2.1:B001.001

UPDATED: FEBRUARY 20, 2013

**NEGOTIATE FEE SCHEDULE WITH A MEDICAL PROVIDER (US)**

A health insurance company in the US health system negotiates the medical reimbursement fee schedule with a medical provider.

**A. TERMINOLOGY**

**Patient Protection and Affordability Care Act (PPACA or ACA):** A federal statute signed into law on March 23, 2010 that overhauled the US healthcare system. The ACA's primary purpose was to increase the number of Americans covered by health insurance.

**B. RESEARCH RESULTS****1. Introduction**

Among private health insurers, there is wide variation in medical reimbursement fee schedules for hospitals and physician groups. For example, some hospitals command almost five times what Medicare pays for inpatient services, and more than seven times what Medicare pays for outpatient care, whereas other provider groups cannot negotiate much more than Medicare rates. In Los Angeles, the range of inpatient reimbursement fees for hospitals was from 80 percent of Medicare rates to more than 400 percent.<sup>1</sup> Such variation suggests that there are differences in how health insurance companies negotiate fee schedules with medical provider groups. Moreover, the negotiation landscape appears to be changing. Whereas in the past health insurers have often had considerable negotiation clout, in many recent showdowns between provider groups and health insurers, provider groups have generally won.<sup>2</sup>

Because the results of such negotiations drive a large portion of national health expenditures, it is important to understand the behavior of the negotiating parties. Unfortunately, health schedule negotiation strategies are not transparent, and little research has been done to learn about this behavior. (see the sidebar)

This section presents what is known about how health insurance companies in the US negotiate medical reimbursement fee schedules with medical provider groups.

**Behavior components**

|                                     |                                       |
|-------------------------------------|---------------------------------------|
| <b>Acting agent role:</b>           | A2.3.01 Health insurance organization |
| <b>i. <i>Goals:</i></b>             | G2.1 Decrease expenditures            |
| <b>ii. <i>Attributes:</i></b>       | Any                                   |
| <b>iii. <i>Input messages:</i></b>  | Any                                   |
| <b>iv. <i>Get input:</i></b>        | Any                                   |
| <b>v. <i>Experience:</i></b>        | Any                                   |
| <b>vi. <i>Rules:</i></b>            | Any                                   |
| <b>vii. <i>Context:</i></b>         | US health system                      |
| <b>viii. <i>Produce output:</i></b> | Any                                   |
| <b>ix. <i>Send output:</i></b>      | Any                                   |
| <b>x. <i>Output messages:</i></b>   | Negotiated fee schedule               |

**A black box**

The following is from an introduction to a forum that the National Health Policy Forum of George Washington University hosted in 2010 to discuss insurer-provider payment negotiations:

“The process by which insurers and providers negotiate payment rates is largely a black box to those not a party to the negotiations. However, these payment negotiations are key in determining health insurance premiums and ultimately overall health care costs.

Hospital and physician groups that seemingly cannot be left out of insurer networks due to location, reputation, or other factors—so called ‘must-have’ providers—can command higher payment rates during negotiations, while providers with less leverage in that market cannot. Prices paid by insurers to must-have providers may or may not be related to quality of service delivered, sickness of the patient population, underlying costs of delivering the service, or other factors. Consumers, employers, and the federal government have a stake in how these negotiations work and how imbalances of market power can increase health care costs.”

<sup>1</sup> Ginsburg (2010)

<sup>2</sup> Strunk, et al. (2001)

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**NEGOTIATE FEE SCHEDULE WITH A MEDICAL PROVIDER (US)** continued**B. RESEARCH RESULTS** continued**2. Summary**

Following is a summary of the research available about this behavior, by behavior component.

- i. *Goals*. None known.
- ii. *Attributes*. Health insurers that had larger memberships and could better employ incentives to steer patients to certain hospitals could negotiate larger fee discounts.
- iii. *Input messages*. None known.
- iv. *Get input*. None known.
- v. *Experience*. None known.
- vi. *Rules*. None known.
- vii. *Context*. The ACA's provisions may affect this behavior.
- viii. *Produce output*. Even when health insurers held a dominant market position, often they did not aggressively negotiate lower fee increases.
- ix. *Send output*. None known.
- x. *Output messages*. None known.

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**NEGOTIATE FEE SCHEDULE WITH A MEDICAL PROVIDER (US)** continued**B. RESEARCH RESULTS** continued**3. Detailed results**

Following are detailed research results about this behavior, organized by behavior component.

**i. *Goals***

The primary goal for this behavior is to “decrease expenditures”. However, there is no known research specifically about this behavior parameter.

**ii. *Attributes***

Researchers have found that the following attributes are associated with variations in this behavior.

- **Number of members.** Researchers found that health insurers with large memberships negotiated volume discounts from hospitals.<sup>1</sup>
- **Patient channeling.** Researchers found that health insurers that could better employ incentives to steer patients to certain hospitals were better able to negotiate discounts.<sup>2</sup>
- 

**iii. *Input messages***

There is no known research specifically about this behavior parameter.

**iv. *Get input***

There is no known research specifically about this behavior parameter.

**v. *Experience***

There is no known research specifically about this behavior parameter.

**vi. *Rules***

There is no known research specifically about this behavior parameter.

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<sup>1</sup> Wu (2009)

<sup>2</sup> Wu (2009)

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**NEGOTIATE FEE SCHEDULE WITH A MEDICAL PROVIDER (US)** *continued***B. RESEARCH RESULTS** *continued***3. Detailed results** *continued***vii. Context**

Because of the passage of the ACA, it is likely that the federal government, states, and consumers will pay greater attention to this behavior.

Researchers of a survey study found that respondents believed that the ACA's provision giving more authority to state insurance commissioners to review and approve premium increases might result in greater health insurer resolve in negotiations.<sup>1</sup>

**viii. Produce output**

Researchers found that even in markets where health insurers held dominant market position, often they were not aggressive in negotiating lower fee increases.<sup>2</sup>

**ix. Send output**

There is no known research specifically about this behavior parameter.

**x. Output messages**

There is no known research specifically about this behavior parameter.

**4. Conflicting results**

There appears to be no research result that conflicts significantly with the results presented above.

**5. Limitations**

Research about this behavior has the following limitations.

- **Lack of research.** There is a marked lack of research about this behavior.

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<sup>1</sup> Berenson, et al. (2012)

<sup>2</sup> Berenson, et al. (2012)



## NEGOTIATE FEE SCHEDULE WITH A MEDICAL PROVIDER (US) continued

### C. RESEARCH GAPS

There are several gaps in the research about this health behavior:

- **Lack of studies.** There is a marked lack of studies about the behavior.
- **Lack of “produce output” research.** There is inadequate research about the “produce output” behavior parameter. This parameter is particularly important, because it ties together all the other parameters.
- **Missing behavior components.** Little or no research has been performed to elucidate the “goals”, “input messages”, “get input”, “experience”, “rules”, “context”, “send output”, “output messages”, or—most importantly—the “produce output” components of this behavior.

### D. SIMULATION MODELS

There is no known simulation model that incorporates this behavior.

### E. CROSS REFERENCES

Related behaviors:

A2.2.01:G6.01.B001.001: Negotiate fee schedule with a health insurance company (US)

A2.3.01:G2.2:B001.001

UPDATED: OCTOBER 29, 2012

**ASSESS THE QUALITY OF PHYSICIAN PERFORMANCE (US)**

A health insurer organization in the US health system assesses the quality of physician performance.

**A. TERMINOLOGY**

**Quality of physician performance:** The quality of physician performance is a particularly difficult concept to define, and is largely in the eye of the beholder. Avedis Donabedian, the founder of the study of quality in health care, suggested that quality consists of seven dimensions: efficacy, efficiency, optimality, acceptability, legitimacy, equity, and cost.<sup>2</sup> (see the sidebar) The Institute of Medicine has defined quality as “the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge.”<sup>3</sup> But different stakeholders define view quality differently. Health insurer organizations tend to view quality from the perspective of cost-consciousness, evaluating how effectively premium dollars are being spent.<sup>4</sup>

**B. RESEARCH RESULTS****1. Introduction**

Increasingly, US health insurer organizations are using assessments of the quality of physician performance as the basis for quality improvement, network design, and financial incentives.<sup>5</sup> However, important technical barriers stand in the way of effectively assessing physician performance. Overcoming these barriers will require considerable additional research.<sup>6</sup>

It appears that there has been very little research about the behavior of health insurer organizations in assessing the quality of physician performance.

**Behavior components**

|                                     |   |
|-------------------------------------|---|
| <b>Acting agent role:</b>           | A2.3.01 Health insurer organization                 |
| <b>i. <i>Goals:</i></b>             | G2.2 Decrease financial risk                        |
| <b>ii. <i>Attributes:</i></b>       | Any   |
| <b>iii. <i>Input messages:</i></b>  | Any   |
| <b>iv. <i>Get input:</i></b>        | Any   |
| <b>v. <i>Experience:</i></b>        | Any   |
| <b>vi. <i>Rules:</i></b>            | Any   |
| <b>vii. <i>Context:</i></b>         | US health system                                    |
| <b>viii. <i>Produce output:</i></b> | Any   |
| <b>ix. <i>Send output:</i></b>      | Any   |
| <b>x. <i>Output messages:</i></b>   | Assessment of the quality of physician performance. |

**Not a sack of potatoes**

Avedis Donabedian, the founder of the study of quality in health care, wrote “The quality of care, how can it be assessed? ... There was a time, not too long ago, when this question could not have been asked. The quality of care was considered to be something of a mystery: real, capable of being perceived and appreciated, but not subject to measurement. The very attempt to define and measure quality seemed, then, to denature and belittle it. Now, we may have moved too far in the opposite direction. Those who have not experienced the intricacies of clinical practice demand measures that are easy, precise, and complete—as if a sack of potatoes was being weighed. True, some elements in the quality of care are easy to define and measure, but there are also profundities that still elude us. We must not allow anyone to belittle or ignore them; they are the secret and glory of our art. Therefore, we should avoid claiming for our capacity to assess quality either too little or too much...”<sup>1</sup>

<sup>1</sup> A. Donabedian (1988)

<sup>2</sup> Avedis Donabedian (1980)

<sup>3</sup> Lohr & Harris-Wehling (1991)

<sup>4</sup> McGlynn (1997)

<sup>5</sup> Scholle et al. (2009)

<sup>6</sup> Landon, Normand, Blumenthal, & Daley (2003)

**ASSESS THE QUALITY OF PHYSICIAN PERFORMANCE (US)** continued

**B. RESEARCH RESULTS** continued

**2. Summary**

Following is a summary of the research available about this behavior, by behavior component.

- i. *Goals*. None known.
- ii. *Attributes*. None known.
- iii. *Input messages*. None known.
- iv. *Get input*. None known.
- v. *Experience*. None known.
- vi. *Rules*. None known.
- vii. *Context*. None known.
- viii. *Produce output*. The primary measures used by health insurers to assess the quality of physician performance are HEDIS and appropriateness measures; and a common process they employ is the utilization review.
- ix. *Send output*. None known.
- x. *Output messages*. None known.

There is a lack of experimental studies for this behavior, and a lack of research about its “produce output” parameter.

There is no known simulation model that incorporates this behavior.

**ASSESS THE QUALITY OF PHYSICIAN PERFORMANCE (US)** continued

**B. RESEARCH RESULTS** continued

**3. Detailed results**

Following are detailed research results about this behavior, organized by behavior component.

**i. *Goals***

The primary goal for this behavior is to “decrease financial risk”. However, there is no known research specifically about this behavior parameter.

**ii. *Attributes***

There is no known research specifically about this behavior parameter.

**iii. *Input messages***

There is no known research specifically about this behavior parameter.

**iv. *Get input***

There is no known research specifically about this behavior parameter.

**v. *Experience***

There is no known research specifically about this behavior parameter.

**vi. *Rules***

There is no known research specifically about this behavior parameter.

**vii. *Context***

There is no known research specifically about this behavior parameter.

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**ASSESS THE QUALITY OF PHYSICIAN PERFORMANCE (US)** continued**B. RESEARCH RESULTS** continued**3. Detailed results** continued**viii. Produce output**

Health insurers use the following measures and processes to assess the quality of physician performance:

- **HEDIS measures.** The Health Plan Employer Data and Information Set (HEDIS) is a standardized set of quality and effectiveness measures based on administrative data such as medical claims data. An example of a HEDIS measure is the percent of women aged 21 to 64 who received a Papanicolaou test (a cancer screening test). Although originally developed to assess health insurer performance, health insurers use certain HEDIS measures to assess the quality of physician performance.<sup>1</sup>
- **Appropriateness measures.** Because of the cost-conscious perspective of health insurers, they tend to assess quality using measures of appropriate use of services (such as the proportion of people who underwent bypass surgery for whom the expected health benefits exceeded the expected health risks) rather than quantity measures (such as the number of bypass surgeries paid for in a certain period).<sup>2</sup>
- **Utilization review.** The utilization review is a process for monitoring the use, delivery, and cost-effectiveness of physician services.<sup>3</sup>

**ix. Send output**

There is no known research specifically about this behavior parameter.

**x. Output messages**

The primary output message for this behavior is “Assessment of the quality of physician performance”. There is no known research specifically about this behavior parameter.

**4. Conflicting results**

There appears to be no research result that conflicts significantly with the results presented above.

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<sup>1</sup> Mainous & Talbert (1998)

<sup>2</sup> McGlynn (1997)

<sup>3</sup> Brook, McGlynn, & Cleary (1996)

**ASSESS THE QUALITY OF PHYSICIAN PERFORMANCE (US)** continued

**B. RESEARCH RESULTS** continued

**5. Limitations**

The primary limitation about the research for this behavior is that it is too sparse.

## ASSESS THE QUALITY OF PHYSICIAN PERFORMANCE (US) continued

### C. RESEARCH GAPS

Following are gaps in the research about this health behavior:

- **Lack of research.** There is a general lack of research about the behavior.
- **Lack of experiments.** The existing research is primarily based on statistical correlation analysis of survey results and administrative data. It appears that no experiment in a real-life situation has been performed about this behavior.
- **Missing behavior components.** Little or no research has been performed to elucidate the “attributes”, “goals”, “input messages”, “get input”, “experience”, “rules”, “resources”, “context”, “send output”, or “output messages” components of this behavior.

### D. SIMULATION MODELS

There is no known simulation model that incorporates this behavior.

### E. CROSS REFERENCES

Related behaviors:

A1.1.01:G1.3:B003.001: Assess the quality of physician performance (US)

A2.3.01;G2.2;B002.001

UPDATED: OCTOBER 29, 2012

**DETERMINE PHYSICIAN NETWORK PARTICIPATION (US)**

A health insurer organization in the US health system determines who will participate in its physician network.

**A. TERMINOLOGY**

**Physician network:** A group of physicians with whom a health insurer organization contracts to provide healthcare services for the organization's members. These physicians have agreed with the insurer to serve members under certain rules, including billing at a contracted rate.

**B. RESEARCH RESULTS****1. Introduction**

Most health insurer organizations—especially managed care organizations (such as preferred provider organizations, exclusive provider organizations, health maintenance organizations, and point-of-service plans)—in the US carefully select physicians to participate in a physician network to serve their members. Because the majority of healthcare services performed in the US are through such networks, and because their composition is a major determinant of healthcare quality and expenditures, it is important to know how health insurer organizations determine who will be allowed to participate in them.

Unfortunately, it appears that there is little research to elucidate how insurer organizations determine physician network participation. In 1995, Gold et al wrote, “Despite important studies of managed care, there is relatively little information on the arrangements managed-care plans make to recruit, pay, and monitor physicians.”<sup>1</sup> Writing about the overlap in HMO physician networks, in 2004 Chernew et al wrote, “Although we know that health plans have moved away from restricted networks in the past few years, we do not know how much overlap now exists or what covariates predict overlap.”<sup>2</sup>

Even though in the intervening years a few studies—including important studies by Gold and Chernew—have added more information, their statements are still largely true.

**Behavior components**

|                                     |  |
|-------------------------------------|--|
| <b>Acting agent role:</b>           | A2.3.01 Health insurer organization                          |
| <b>i. <i>Goals:</i></b>             | G2.2 Decrease financial risk                                 |
| <b>ii. <i>Attributes:</i></b>       | Any  |
| <b>iii. <i>Input messages:</i></b>  | Any  |
| <b>iv. <i>Get input:</i></b>        | Any  |
| <b>v. <i>Experiences:</i></b>       | Any  |
| <b>vi. <i>Rules:</i></b>            | Any  |
| <b>vii. <i>Context:</i></b>         | US health system   |
| <b>viii. <i>Produce output:</i></b> | Any  |
| <b>ix. <i>Send output:</i></b>      | Any  |
| <b>x. <i>Output messages:</i></b>   | Identifiers of physicians selected for the physician network |

<sup>1</sup> Gold, Hurley, Lake, Ensor, & Berenson (1995)

<sup>2</sup> M. E. Chernew, Wodchis, Scanlon, & McLaughlin (2004)



**DETERMINE PHYSICIAN NETWORK PARTICIPATION (US)** continued**B. RESEARCH RESULTS** continued**2. Summary**

Following is a summary of the research available about this behavior, by behavior component.

- i. *Goals*. None known.
- ii. *Attributes*. Researchers have found that variations in this behavior are associated with the location and type of insurer organization.
- iii. *Input messages*. None known.
- iv. *Get input*. None known.
- v. *Experience*. For many insurer organizations, variations in this behavior are associated with patterns of physician costs or utilization.
- vi. *Rules*. None known.
- vii. *Context*. None known.
- viii. *Produce output*. In performing this behavior, most insurer organizations take into account qualitative information about physicians, such as professional reputation and patterns of care, and nearly all organizations carefully screen physician applicants.
- ix. *Send output*. None known.
- x. *Output messages*. None known.

There is a lack of experimental studies for this behavior, and a lack of research about its “produce output” parameter.

There is no known simulation model that incorporates this behavior.

**DETERMINE PHYSICIAN NETWORK PARTICIPATION (US)** *continued***B. RESEARCH RESULTS** *continued***3. Detailed results**

Following are detailed research results about this behavior, organized by behavior component.

**i. *Goals***

The primary goal for this behavior is to “decrease financial risk”. However, there is no known research specifically about this behavior parameter.

**ii. *Attributes***

The following attributes are associated with variations in this behavior.

- **Location.** Many states have passed “any willing provider” laws that enable any qualified physician to participate in the physician network of a health insurer organization.<sup>1</sup>
- **Type of organization:** HMOs tend to have more restrictive physician networks.<sup>2</sup>

**iii. *Input messages***

There is no known research specifically about this behavior parameter.

**iv. *Get input***

There is no known research specifically about this behavior parameter.

**v. *Experience***

Researchers have discovered that the following facets of an individual’s experience (stored in the individual’s memory) are associated with variations in this behavior.

- **Physician characteristics:** In a survey study, 13 percent of managed care organizations responded that patterns of physician costs or utilization have a large influence on their network participation decisions, 26 percent responded that these factors have a moderate influence, and 61 percent responded that these factors have little influence.<sup>3</sup>

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<sup>1</sup> M. E. Chernew, et al. (2004) and Gold, et al. (1995)

<sup>2</sup> White (1999) and Gold, et al. (1995)

<sup>3</sup> Gold, et al. (1995)

## DETERMINE PHYSICIAN NETWORK PARTICIPATION (US) continued

## B. RESEARCH RESULTS continued

## 3. Detailed results continued

vi. *Rules*

There is no known research specifically about this behavior parameter.

vii. *Context*

There is no known research specifically about this behavior parameter.

viii. *Produce output*

Based on a survey study, the following table summarizes the procedures used by managed-care plans to recruit physicians.

| PROCEDURE   | ALL PLANS<br>(N = 108) | GROUP OR STAFF<br>HMOs (N = 29) | NETWORK OR IPA<br>HMOs (N = 50) | PPOs<br>(N = 29) |
|---|------------------------|---------------------------------|---------------------------------|------------------|
|   | <i>percent</i>         |                                 |                                 |                  |
| Selecting physicians  |                        |                                 |                                 |                  |
| Require board certification or board eligibility*   | 57                     | 90                              | 48†                             | 41†              |
| Require privileges at network hospital or ability to obtain them                            | 82                     | 86                              | 88                              | 69‡              |
| Require agreement to take predetermined number of patients or not to practice outside plan§ | 37                     | 48                              | 48                              | 7†¶              |
| State that the effect of previous costs or utilization patterns on the decision was large   | 13                     | 4                               | 18                              | 14               |
| Contracting with physicians   |                        |                                 |                                 |                  |
| Verify license and credentials**  | 100                    | 100                             | 100                             | 100              |
| Consult National Practitioner Data Bank, sources on substance abuse, or both                | 92                     | 86                              | 94                              | 93               |
| Visit physician's office, review facility, and screen care through medical records††        |                        |                                 |                                 |                  |
| Do all three  | 43                     | 38                              | 66                              | 7†¶              |
| Do none of these  | 27                     | 34                              | 8†                              | 52¶              |
| Review quantitative data from indemnity claims, hospital-discharge data, or both            | 37                     | 24                              | 38                              | 48               |
| Meeting four criteria for orienting new physicians‡‡  | 30                     | 69                              | 22†                             | 3†‡              |

\*Other plans may allow exceptions.

†P<0.01 for the comparison with group or staff HMOs.

‡P<0.10 for the comparison with network or IPA HMOs.

§Only 100 plans responded (27 group or staff HMOs, 45 network or IPA HMOs, and 28 PPOs).

¶P<0.01 for the comparison with network or IPA HMOs.

||P<0.10 for the comparison with group or staff HMOs.

\*\*Only 102 plans responded (25 group or staff HMOs, 48 network or IPA HMOs, and 29 PPOs).

††Because they are much more likely to hire than to contract with physicians who practice in their facilities, group or staff HMOs may find these steps unnecessary or address the underlying concerns in different ways (e.g., by contacting references).

‡‡The four criteria are as follows: plan has orientation meetings specifically for medical staff, 75 percent or more of physicians participate, top management is involved, and less than 75 percent of time is devoted to administrative issues. Of all plans, 5 percent met none of the criteria, 17 percent one, 23 percent two, 26 percent three, and 30 percent four.

**DETERMINE PHYSICIAN NETWORK PARTICIPATION (US)** *continued***B. RESEARCH RESULTS** *continued***3. Detailed results** *continued***viii. Produce output** *continued*

As the table shows, group or staff HMOs tended to have more demanding requirements. 90 percent of group or staff HMOs, but only 48 percent of the network or IPA HMOs and 41 percent of PPOs required board certification or eligibility. Also, a minority of plans (37 percent) used quantitative information about physicians' performance and practice style in selecting new physicians. However, 63 percent of plans took into account qualitative information, such as professional reputation and patterns of care. Further, before signing a contract with a new physician, virtually all plans verified the physician's license and credentials, and almost all screened for reportable disciplinary actions, substance abuse, or similar problems. 66 percent of network or IPA HMOs visited the physician's office, reviewed whether the facility met set standards, and screened care by reviewing medical records.<sup>1</sup>

**ix. Send output**

There is no known research specifically about this behavior parameter.

**x. Output messages**

The primary output message for this behavior is "Identifiers of physicians selected for the physician network". There is no known research specifically about this behavior parameter.

**4. Conflicting results**

There appears to be no research result that conflicts significantly with the results presented above.

**5. Limitations**

The primary limitation about the research for this behavior is that it is too sparse.

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<sup>1</sup> Gold, et al. (1995)

## DETERMINE PHYSICIAN NETWORK PARTICIPATION (US) continued

### C. RESEARCH GAPS

Following are gaps in the research about this health behavior:

- **Lack of research.** There is a general lack of research about the behavior.
- **Lack of experiments.** The existing research is primarily based on statistical correlation analysis of survey results and administrative data. It appears that no experiment in a real-life situation has been performed.
- **Missing behavior components.** Little or no research has been performed to elucidate the “input messages”, “get input”, “rules”, “send output”, or “output messages” components of this behavior.

### D. SIMULATION MODELS

There is no known simulation model that incorporates this behavior.

### E. CROSS REFERENCES

None.

A2.3.01:G6.1:B001.001

UPDATED: MARCH 10, 2013

**OFFER AN INDIVIDUAL HEALTH INSURANCE PLAN ON AN EXCHANGE (US)**

A health insurance company in the US health system offers an individual health insurance plan for a state-provided Health Insurance Exchange.

**A. TERMINOLOGY**

**Health Insurance Exchange:** Health Insurance Exchanges are generally state-based entities established by the Patient Protection and Affordability Care Act (ACA - see below) that provide individual and business consumers with a centralized way to purchase standardized health insurance offered by a variety of health insurers.

The Exchange offers insurance in four tiers, from lowest actuarial value to highest: bronze, silver, gold, and platinum.

Introducing Exchanges, President Barack Obama said they should be, "... a market where Americans can one-stop shop for a health care plan, compare benefits and prices, and choose the plan that's best for them."

Exchanges also carry out other tasks: they certify health insurance plans, provide outreach to consumers, determine consumer eligibility, describe health plan choices, and enroll beneficiaries.

For most states, Health Insurance Exchanges will first become operational in 2014. Synonymous terms: "Exchange", "Health Benefits Exchange".<sup>1</sup>

**Patient Protection and Affordability Care Act (PPACA or ACA):** A federal statute signed into law on March 23, 2010 that overhauled the US healthcare system. The ACA's primary purpose was to increase the number of Americans covered by health insurance.

**B. RESEARCH RESULTS****1. Introduction**

This section presents what is known about how health insurance companies in the US health system offer individual health insurance plans on an Exchange.

**Behavior components**

|                                     |                                     |
|-------------------------------------|-------------------------------------|
| <b>Acting agent role:</b>           | A2.3.01 Health insurer organization |
| <b>i. <i>Goals:</i></b>             | G6.1 Increase agent income          |
| <b>ii. <i>Attributes:</i></b>       | Any                                 |
| <b>iii. <i>Input messages:</i></b>  | Any                                 |
| <b>iv. <i>Get input:</i></b>        | Any                                 |
| <b>v. <i>Experience:</i></b>        | Any                                 |
| <b>vi. <i>Rules:</i></b>            | Any                                 |
| <b>vii. <i>Context:</i></b>         | US health system                    |
| <b>viii. <i>Produce output:</i></b> | Any                                 |
| <b>ix. <i>Send output:</i></b>      | Any                                 |
| <b>x. <i>Output messages:</i></b>   | Health plan offered on Exchange     |

<sup>1</sup> From a letter President Obama wrote to Senators Edward Kennedy and Max Baucus.

OFFER A HEALTH INSURANCE PLAN ON AN EXCHANGE (US) continued

B. RESEARCH RESULTS continued

2. Summary

Following is a summary of the research available about this behavior, by behavior component.

- i. *Goals*. None known.
- ii. *Attributes*. None known.
- iii. *Input messages*. None known.
- iv. *Get input*. None known.
- v. *Experience*. None known.
- vi. *Rules*. None known.
- vii. *Context*. None known.
- viii. *Produce output*. None known.
- ix. *Send output*. None known.
- x. *Output messages*. None known.

**OFFER A HEALTH INSURANCE PLAN ON AN EXCHANGE (US)** continued**B. RESEARCH RESULTS** continued**3. Detailed results**

Following are detailed research results about this behavior, organized by behavior component.

**i. *Goals***

The primary goal for this behavior is to “increase agent income”. However, there is no known research about this behavior parameter.

**ii. *Attributes***

There is no known research specifically about this behavior parameter.

**iii. *Input messages***

There is no known research specifically about this behavior parameter.

**iv. *Get input***

There is no known research specifically about this behavior parameter.

**v. *Experience***

There is no known research specifically about this behavior parameter.

**vi. *Rules***

There is no known research specifically about this behavior parameter.

**vii. *Context***

There is no known research specifically about this behavior parameter.

**viii. *Produce output***

There is no known research specifically about this behavior parameter.

**ix. *Send output***

There is no known research specifically about this behavior parameter.

**x. *Output messages***

There is no known research specifically about this behavior parameter.



## OFFER A HEALTH INSURANCE PLAN ON AN EXCHANGE (US) continued

### B. RESEARCH RESULTS continued

#### 4. Conflicting results

There appears to be no research result that conflicts significantly with the results presented above.

#### 5. Limitations

Research about this behavior has the following limitations.

- **Lack of research.** There is a marked lack of research about this behavior.

### C. RESEARCH GAPS

There are several gaps in the research about this health behavior:

- **Lack of studies.** There is a marked lack of studies about the behavior.
- **Lack of “produce output” research.** There is inadequate research about the actual “produce output” behavior that insurers follow for this behavior. This parameter is particularly important, because it ties together all the other parameters.
- **Missing behavior components.** Little or no research has been performed to elucidate the “goals”, “attributes”, “input messages”, “get input”, “experience”, “rules”, “context”, “send output”, “output messages”, or—most importantly—the “produce output” components of this behavior.

### D. SIMULATION MODELS

There is no known simulation model that incorporates this behavior.

### E. CROSS REFERENCES

Related behaviors:

None

A2.3.01:G6.01:B002.001

UPDATED: MARCH 10, 2013

**SET PREMIUM INCREASE RATE FOR INDIVIDUAL INSURANCE (US)**

A health insurance company in the US health system sets the premium increase rate for an individual health insurance product offered on a state-provided Health Insurance Exchange.

**A. TERMINOLOGY**

**Health Insurance Exchange:** Health Insurance Exchanges are generally state-based entities established by the Patient Protection and Affordability Care Act (ACA - see below) that provide individual and business consumers with a centralized way to purchase standardized health insurance offered by a variety of health insurers.

The Exchange offers insurance in four tiers, from lowest actuarial value to highest: bronze, silver, gold, and platinum.

Introducing Exchanges, President Barack Obama said they should be, "... a market where Americans can one-stop shop for a health care plan, compare benefits and prices, and choose the plan that's best for them."

Exchanges also carry out other tasks: they certify health insurance plans, provide outreach to consumers, determine consumer eligibility, describe health plan choices, and enroll beneficiaries.

For most states, Health Insurance Exchanges will first become operational in 2014. Synonymous terms: "Exchange", "Health Benefits Exchange".<sup>1</sup>

**Patient Protection and Affordability Care Act (PPACA or ACA):** A federal statute signed into law on March 23, 2010 that overhauled the US healthcare system. The ACA's primary purpose was to increase the number of Americans covered by health insurance.

**Behavior components**

|                                     |                                     |
|-------------------------------------|-------------------------------------|
| <b>Acting agent role:</b>           | A2.3.01 Health insurer organization |
| <b>i. <i>Goals:</i></b>             | G6.01 Increase agent income         |
| <b>ii. <i>Attributes:</i></b>       | Any                                 |
| <b>iii. <i>Input messages:</i></b>  | Any                                 |
| <b>iv. <i>Get input:</i></b>        | Any                                 |
| <b>v. <i>Experience:</i></b>        | Any                                 |
| <b>vi. <i>Rules:</i></b>            | Any                                 |
| <b>vii. <i>Context:</i></b>         | US health system                    |
| <b>viii. <i>Produce output:</i></b> | Any                                 |
| <b>ix. <i>Send output:</i></b>      | Any                                 |
| <b>x. <i>Output messages:</i></b>   | Premium rate increase               |

<sup>1</sup> From a letter President Obama wrote to Senators Edward Kennedy and Max Baucus.

**SET PREMIUM INCREASE RATE FOR INDIVIDUAL INSURANCE (US)** *continued*

**B. RESEARCH RESULTS**

**1. Introduction**

In the US, increases in healthcare expenditures have significantly outpaced general inflation. Because the premium rate increases for private health insurers are a major component of such health expenditure increases, it is important to understand how health insurers set premium increase rates.

This section presents what is known about how health insurance companies in the US health system set premium increase rates for individual health insurance products offered on a state-provided Health Insurance Exchange.

SET PREMIUM INCREASE RATE FOR INDIVIDUAL INSURANCE (US) continuedB. RESEARCH RESULTS continued

## 2. Summary

Following is a summary of the research available about this behavior, by behavior component.

- i. *Goals*. None known.
- ii. *Attributes*. Insurers with larger market shares set higher premium increase rates than insurers with smaller market shares. Also, for-profit insurers set higher premium increase rates than not-for-profit insurers.
- iii. *Input messages*. None known.
- iv. *Get input*. None known.
- v. *Experience*. None known.
- vi. *Rules*. None known.
- vii. *Context*. Some states have laws limiting insurers' ability to increase premiums. Also, as a results of the ACA, HHS together with states will establish a process for the annual review of "unreasonable" premium increases.
- viii. *Produce output*. A general formula that many insurers use to determine premium increase rates is:  
Last year's claims times the medical inflation rate, plus:
  - Increased administrative costs
  - Expenditures due to increased utilization of services
  - Expenditures for new technology and drugsdivided by the number of people in the insurance pool
- ix. *Send output*. None known.
- x. *Output messages*. None known.

SET PREMIUM INCREASE RATE FOR INDIVIDUAL INSURANCE (US) *continued*B. RESEARCH RESULTS *continued*

## 3. Detailed results

Following are detailed research results about this behavior, organized by behavior component.

i. *Goals*

The primary goal for this behavior is to “increase agent income”. However, there is no known research about this behavior parameter.

ii. *Attributes*

Researchers have found that the following attributes are associated with variations in this behavior.

- **Market share.** Researchers who studied a national database of large employer-sponsored health insurance plans found that insurers with larger market shares set higher premium increase rates than insurers with smaller market shares.<sup>1</sup>
- **Ownership status.** Researchers who studied a national database of large employer-sponsored health insurance plans found that for-profit insurers set higher premium increase rates than not-for-profit insurers.<sup>2</sup>

iii. *Input messages*

There is no known research specifically about this behavior parameter.

iv. *Get input*

There is no known research specifically about this behavior parameter.

v. *Experience*

There is no known research specifically about this behavior parameter.

vi. *Rules*

There is no known research specifically about this behavior parameter.

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<sup>1</sup> Dafny & Ramanarayanan (2012)

<sup>2</sup> Dafny & Ramanarayanan (2012)

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**SET PREMIUM INCREASE RATE FOR INDIVIDUAL INSURANCE (US)** *continued***B. RESEARCH RESULTS** *continued***3. Detailed results** *continued***vii. Context**

Currently, some states have laws limiting insurers' ability to raise premiums by placing a cap on annual increases. Usually, these laws limit increases to 10-15 percent above the rate they offer to the lowest risk customers.

The ACA directs Health and Human Services (HHS), in conjunction with the states, to establish a process for the annual review of “unreasonable” premium increases. ACA does not give power to states to prohibit these rate increases, but it instead requires the public posting of rate increases that are deemed unreasonable.

Competition also plays an important role in insurer premium setting behavior. Researchers who studied a national database of large employer-sponsored health insurance plans found that insurers with larger market shares set higher premium increase rates than insurers with smaller market shares.<sup>1</sup>

**viii. Produce output**

A general formula that many insurers use to determine premium increase rates is:

Last year's claims times the medical inflation rate, plus:

- Increased administrative costs
- Expenditures due to increased utilization of services
- Expenditures for new technology and drugs

divided by the number of people in the insurance pool

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<sup>1</sup> Dafny & Ramanarayanan (2012)

SET PREMIUM INCREASE RATE FOR INDIVIDUAL INSURANCE (US) *continued*B. RESEARCH RESULTS *continued*3. Detailed results *continued*viii. *Produce output continued*

For many insurers, the following affect premium increase rates:

- **Cost of care.** The fee schedules for service that insurers negotiate with providers.
- **Usage of care.** The number and type of services used.
- **Administrative costs.** The costs for processing claims plus the usual costs of doing business.
- **New technology and drugs.** There are new procedures, medications and services continually entering the marketplace.
- **Benefit plan changes.** States pass laws to require insurers to cover additional services, which results in higher premiums.
- **Baseline.** If last year's medical costs turn out to be higher than the insurance company estimated, then premiums for next year need to "catch up," so the company can pay all claims during the upcoming policy year.
- **Law changes.** State and federal governments can pass laws dictating what companies must cover in their policies, such as preventive screenings or certain procedures.<sup>1</sup>

ix. *Send output*

There is no known research specifically about this behavior parameter.

x. *Output messages*

There is no known research specifically about this behavior parameter.

## 4. Conflicting results

The findings that this behavior varies with the market share and ownership status of health insurers conflicts with earlier research.<sup>2</sup>

## 5. Limitations

There is a market lack of research about this behavior.

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<sup>1</sup> Feldstein (2012) Chapters 9 and 10, Ertel (2011)

<sup>2</sup> Dafny & Ramanarayanan (2012)

**SET PREMIUM INCREASE RATE FOR INDIVIDUAL INSURANCE (US)** *continued*

**C. RESEARCH GAPS**

There are several gaps in the research about this health behavior:

- **Lack of studies.** There is a marked lack of studies about the behavior.
- **Lack of “produce output” research.** There is inadequate research about the actual “produce output” behavior that insurers follow for this behavior. This parameter is particularly important, because it ties together all the other parameters.
- **Missing behavior components.** Little or no research has been performed to elucidate the “goals”, “input messages”, “get input”, “experience”, “rules”, “send output”, “output messages”, or—most importantly—the “produce output” components of this behavior.

**D. SIMULATION MODELS**

There is no known simulation model that incorporates this behavior.

**E. CROSS REFERENCES**

Related behaviors:

None



A2.3.99:G3.2:B001.001

UPDATED: MARCH 10, 2013

**ADVERTISE AN INDIVIDUAL HEALTH INSURANCE PLAN (US)**

An Exchange in the US health system advertises an individual health insurance plan.

**A. TERMINOLOGY**

**Health Insurance Exchange:** Health Insurance Exchanges are generally state-based entities established by the Patient Protection and Affordability Care Act (ACA - see below) that provide individual and business consumers with a centralized way to purchase standardized health insurance offered by a variety of health insurers.

The Exchange offers insurance in four tiers, from lowest actuarial value to highest: bronze, silver, gold, and platinum.

Introducing Exchanges, President Barack Obama said they should be, "... a market where Americans can one-stop shop for a health care plan, compare benefits and prices, and choose the plan that's best for them."

Exchanges also carry out other tasks: they certify health insurance plans, provide outreach to consumers, determine consumer eligibility, describe health plan choices, and enroll beneficiaries.

For most states, Health Insurance Exchanges will first become operational in 2014. Synonymous terms: "Exchange", "Health Benefits Exchange".<sup>1</sup>

**Massachusetts Connector:** In 2006, Massachusetts legislation created a Health Insurance Exchange called the Connector, which offers health insurance to individuals, families, and small employers. The Connector offers two programs. The first is Commonwealth Choice, which offers unsubsidized commercial health insurance with three tiers of coverage (Gold, Silver, and Bronze) as well as Young Adult insurance for people ages 18–26. The second program is Commonwealth Care, which offers subsidized health insurance from Medicaid for families whose incomes are no more than 300 percent of the federal poverty level.<sup>2</sup>

**Behavior components**

|                                     |   |
|-------------------------------------|---|
| <b>Acting agent role:</b>           | A2.3.99 Other group financial role (Exchange) |
| <b>i. <i>Goals:</i></b>             | G3.2 Increase healthcare choice               |
| <b>ii. <i>Attributes:</i></b>       | Any   |
| <b>iii. <i>Input messages:</i></b>  | Any   |
| <b>iv. <i>Get input:</i></b>        | Any   |
| <b>v. <i>Experience:</i></b>        | Any   |
| <b>vi. <i>Rules:</i></b>            | Any   |
| <b>vii. <i>Context:</i></b>         | US health system                              |
| <b>viii. <i>Produce output:</i></b> | Any   |
| <b>ix. <i>Send output:</i></b>      | Any   |
| <b>x. <i>Output messages:</i></b>   | Plan advertisement                            |

<sup>1</sup> From a letter President Obama wrote to Senators Edward Kennedy and Max Baucus.

<sup>2</sup> Commonwealth Health Insurance Connector Authority (2010), Massachusetts Division of Health Care Finance and Policy (2011)

## ADVERTISE AN INDIVIDUAL HEALTH INSURANCE PLAN (US) *continued*

### A. TERMINOLOGY *continued*

**Patient Protection and Affordability Care Act (PPACA or ACA):** A federal statute signed into law on March 23, 2010 that overhauled the US healthcare system. The ACA's primary purpose was to increase the number of Americans covered by health insurance.

### B. RESEARCH RESULTS

#### 1. Introduction

One of the administrative functions of many Exchanges will be performing marketing and outreach.<sup>1</sup>

Although Exchanges will provide a great deal of comparative information about health plans, in many states health insurers will probably have the main responsibility for advertising their products.<sup>2</sup>

Direct marketing of insurance plans through the Exchange, to the extent it occurs, also will reduce the ability of agents and brokers to engage in “street underwriting”—that is, through marketing practices to informally steer low-risk enrollees away from the Exchange, and high-risk enrollees into the Exchange.<sup>3</sup>

This section presents what is known about how Exchanges will advertise an individual health plan.

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<sup>1</sup> Jost (2010)

<sup>2</sup> Jost (2010)

<sup>3</sup> Jost (2010)

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**ADVERTISE AN INDIVIDUAL HEALTH INSURANCE PLAN (US)** continued**B. RESEARCH RESULTS** continued**2. Summary**

Following is a summary of the research available about this behavior, by behavior component.

- i. *Goals*. None known.
- ii. *Attributes*. None known.
- iii. *Input messages*. None known.
- iv. *Get input*. None known.
- v. *Experience*. None known.
- vi. *Rules*. None known.
- vii. *Context*. HHS regulations provide criteria for Exchanges to follow for advertising plans.
- viii. *Produce output*. None known.
- ix. *Send output*. None known.
- x. *Output messages*. None known.

**ADVERTISE AN INDIVIDUAL HEALTH INSURANCE PLAN (US)** *continued***B. RESEARCH RESULTS** *continued***3. Detailed results**

Following are detailed research results about this behavior, organized by behavior component.

**i. *Goals***

The primary goal for this behavior is to “increase healthcare choice”. However, there is no known research about this behavior parameter.

**ii. *Attributes***

There is no known research specifically about this behavior parameter.

**iii. *Input messages***

There is no known research specifically about this behavior parameter.

**iv. *Get input***

There is no known research specifically about this behavior parameter.

**v. *Experience***

There is no known research specifically about this behavior parameter.

**vi. *Rules***

There is no known research specifically about this behavior parameter.

**vii. *Context***

Section 1311(c) of the ACA requires the Secretary of Health and Human Services (HHS) to develop regulations establishing marketing criteria for plans offered on an Exchange. Under these criteria, a plan should not employ market practices that discourage people with significant health needs from enrolling. The Secretary of HHS issued proposed rules that urge Exchanges to work closely with state insurance departments to ensure that insurers in and out of the Exchange are subject to the same minimum marketing standards in order to create a level playing field with equal consumer protections.

The ACA also requires that Exchanges ensure that participating health insurers meet the regulatory marketing standards.

**ADVERTISE AN INDIVIDUAL HEALTH INSURANCE PLAN (US)** *continued*

**B. RESEARCH RESULTS** *continued*

**3. Detailed results** *continued*

**viii. *Produce output***

There is no known research specifically about this behavior parameter.

**ix. *Send output***

There is no known research specifically about this behavior parameter.

**x. *Output messages***

There is no known research specifically about this behavior parameter.

**4. Conflicting results**

There appears to be no research result that conflicts significantly with the results presented above.

**5. Limitations**

Research about this behavior has the following limitations.

- **Lack of research.** There is a marked lack of research about this behavior.

## ADVERTISE AN INDIVIDUAL HEALTH INSURANCE PLAN (US) continued

### C. RESEARCH GAPS

There are several gaps in the research about this health behavior:

- **Lack of studies.** There is a marked lack of studies about the behavior.
- **Lack of “produce output” research.** There is inadequate research about the actual “produce output” behavior that states will follow. This parameter is particularly important, because it ties together all the other parameters.
- **Missing behavior components.** Little or no research has been performed to elucidate the “goals”, “attributes”, “input messages”, “get input”, “experience”, “rules”, “context”, “send output”, “output messages”, or—most importantly—the “produce output” components of this behavior.

### D. SIMULATION MODELS

There is no known simulation model that incorporates this behavior.

### E. CROSS REFERENCES

Related behaviors:

None

A2.3.99:G3.2:B002.001

UPDATED: MARCH 10, 2013

**OFFER AN INDIVIDUAL HEALTH INSURANCE PLAN (US)**

An Exchange in the US health system offers an individual health insurance plan.

**A. TERMINOLOGY**

**Health Insurance Exchange:** Health Insurance Exchanges are generally state-based entities established by the Patient Protection and Affordability Care Act (ACA - see below) that provide individual and business consumers with a centralized way to purchase standardized health insurance offered by a variety of health insurers.

The Exchange offers insurance in four tiers, from lowest actuarial value to highest: bronze, silver, gold, and platinum.

Introducing Exchanges, President Barack Obama said they should be, "... a market where Americans can one-stop shop for a health care plan, compare benefits and prices, and choose the plan that's best for them."

Exchanges also carry out other tasks: they certify health insurance plans, provide outreach to consumers, determine consumer eligibility, describe health plan choices, and enroll beneficiaries.

For most states, Health Insurance Exchanges will first become operational in 2014. Synonymous terms: "Exchange", "Health Benefits Exchange".<sup>1</sup>

**Massachusetts Connector:** In 2006, Massachusetts legislation created a Health Insurance Exchange called the Connector, which offers health insurance to individuals, families, and small employers. The Connector offers two programs. The first is Commonwealth Choice, which offers unsubsidized commercial health insurance with three tiers of coverage (Gold, Silver, and Bronze) as well as Young Adult insurance for people ages 18–26. The second program is Commonwealth Care, which offers subsidized health insurance from Medicaid for families whose incomes are no more than 300 percent of the federal poverty level.<sup>2</sup>

**Behavior components**

|                                     |   |
|-------------------------------------|---|
| <b>Acting agent role:</b>           | A2.3.99 Other group financial role (Exchange) |
| <b>i. <i>Goals:</i></b>             | G3.2 Increase healthcare choice               |
| <b>ii. <i>Attributes:</i></b>       | Any   |
| <b>iii. <i>Input messages:</i></b>  | Any   |
| <b>iv. <i>Get input:</i></b>        | Any   |
| <b>v. <i>Experience:</i></b>        | Any   |
| <b>vi. <i>Rules:</i></b>            | Any   |
| <b>vii. <i>Context:</i></b>         | US health system                              |
| <b>viii. <i>Produce output:</i></b> | Any   |
| <b>ix. <i>Send output:</i></b>      | Any   |
| <b>x. <i>Output messages:</i></b>   | Offered plan                                  |

<sup>1</sup> From a letter President Obama wrote to Senators Edward Kennedy and Max Baucus.

<sup>2</sup> Commonwealth Health Insurance Connector Authority (2010), Massachusetts Division of Health Care Finance and Policy (2011)

**OFFER AN INDIVIDUAL HEALTH INSURANCE PLAN (US)** *continued***A. TERMINOLOGY** *continued*

**Patient Protection and Affordability Care Act (PPACA or ACA):** A federal statute signed into law on March 23, 2010 that overhauled the US healthcare system. The ACA's primary purpose was to increase the number of Americans covered by health insurance.

**B. RESEARCH RESULTS****1. Introduction**

The ACA provides states with broad discretion in how they will offer health insurance plans on their Exchanges. At a minimum, the law requires Exchanges to offer “qualified” health insurance plans and to support consumers in selecting such plans through a website and toll-free phone support. States can, however, exceed this minimum.

States have a spectrum of choices regarding how much they influence the plans offered through Exchanges. On one end of the spectrum, they may choose a minimalist open-market model, in which health insurance plans must meet only certain baseline criteria, leaving the selection process to individual consumers. At the other end, they may implement an active purchaser model, in which the Exchange negotiates prices with health insurers.

The ACA sets up four “metallic” tiers of health plans that people will be able to purchase through Exchanges, with each tier defined by its actuarial value. The value of the Platinum tier is 90 percent or greater; Gold, 80–89 percent; Silver, 70–79 percent; and Bronze 60–69 percent. More than half of Americans who had individual insurance in 2010 were enrolled in plans that would not qualify as Bronze level plans under ACA rules.<sup>1</sup>

This section presents what is known about how Exchanges will offer an individual health plan.

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<sup>1</sup> Gabel et al. (2012)



**OFFER AN INDIVIDUAL HEALTH INSURANCE PLAN (US)** continued**B. RESEARCH RESULTS** continued**2. Summary**

Following is a summary of the research available about this behavior, by behavior component.

- i. *Goals*. None known.
- ii. *Attributes*. None known.
- iii. *Input messages*. None known.
- iv. *Get input*. None known.
- v. *Experience*. None known.
- vi. *Rules*. To decide how to offer insurance plans, the Massachusetts Connector conducts focus groups. It also seeks feedback from its telephone support staff, and conducts market research.
- vii. *Context*. The ACA as well as a state's political environment and laws affect how a state carries out this behavior.
- viii. *Produce output*. There are two commonly mentioned models for producing output: the "active purchaser" model and the "passive purchaser" model. Some state Exchanges are active purchasers, some are passive purchasers, and some are between the two.
- ix. *Send output*. The ACA requires Exchanges to offer its plans on a website.
- x. *Output messages*. The Massachusetts Connector offers only a few standardized plan designs, whereas the Utah Exchange offers a wide range of plans.

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**OFFER AN INDIVIDUAL HEALTH INSURANCE PLAN (US)** *continued***B. RESEARCH RESULTS** *continued***3. Detailed results**

Following are detailed research results about this behavior, organized by behavior component.

**i. *Goals***

The primary goal for this behavior is to “increase healthcare choice”. However, there is no known research about this behavior parameter.

**ii. *Attributes***

There is no known research specifically about this behavior parameter.

**iii. *Input messages***

There is no known research specifically about this behavior parameter.

**iv. *Get input***

There is no known research specifically about this behavior parameter.

**v. *Experience***

There is no known research specifically about this behavior parameter.

**vi. *Rules***

To decide how to offer health insurance plans, the Massachusetts Connector conducts focus groups, both with consumers who used the Connector and those who did not. It also seeks feedback from its telephone support staff, and conducts market research. <sup>1</sup>

To decide which plans to offer, the Massachusetts Connector established selection criteria that in 2007 included affordability of premiums and estimated cost sharing, plan design and preferred features such as select networks or wellness incentives, marketing and marketability, network access and coverage, and other elements such as operational requirements. <sup>2</sup>

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<sup>1</sup> Day & Nadash (2012)

<sup>2</sup> Day & Nadash (2012)

OFFER AN INDIVIDUAL HEALTH INSURANCE PLAN (US) *continued*B. RESEARCH RESULTS *continued*3. Detailed results *continued*vii. *Context*

The ACA provides states with broad discretion in how they will offer health insurance plans on their Exchanges. At a minimum, the law requires Exchanges to offer “qualified” health insurance plans and to support consumers in selecting such plans through a website and toll-free phone support. States can, however, exceed this minimum.

A state’s political environment and its state laws affect how it carries out this behavior.<sup>1</sup>

viii. *Produce output*

There are two commonly mentioned models for producing output (see the sidebar):

- **Active purchaser.** In this model, the Exchange takes an active role on behalf of consumers to offer insurance plans that meet their needs. Under this model, the Exchange may set tough participation rules for plans to be offered, selectively contract with health insurers, or negotiate premiums levels.
- **Passive purchaser.** In this model, the Exchange offers all plans eligible under ACA rules, and does not act as an intermediary on behalf of participating consumers.<sup>3</sup>

The Massachusetts Connector is currently more of an active purchaser. It requires health insurers to provide standardized plans that meet specifications for covered benefits and cost-sharing. The Connector leaves the insurers some design discretion, such as waiving co-payments for preventive care.<sup>4</sup>

Colorado’s law states that all qualified insurers are eligible to sell insurance plans on the Exchange, and that the Exchange may not engage in selective contracting with health insurers or otherwise adopt an active purchaser model.<sup>5</sup>

**Unrealistic labels**

“While the labels have some value in organizing the debate, neither an extreme version of a passive exchange, in which the state’s market for individual and small group coverage remains the same, with Exchanges simply providing a Travelocity-like informational and coordinating function, nor an extreme version of an active exchange, in which Exchanges mimic a purchasing manager for a firm’s health benefits plan, is a realistic option for states.

The purely passive, clearinghouse model is unrealistic because the ACA sets out some requirements for Exchanges that go beyond merely serving as a conduit to private insurers. And a very active Exchange, mimicking the aggressive conduct of a firm’s benefits manager, is unrealistic due to practical constraints faced by any Exchange attempting to accomplish the tasks facing it.”<sup>2</sup>

<sup>1</sup> Hall & Swartz (2012)

<sup>2</sup> Jacobi (2012)

<sup>3</sup> Day & Nadash (2012)

<sup>4</sup> Day & Nadash (2012)

<sup>5</sup> Hall & Swartz (2012)

**OFFER AN INDIVIDUAL HEALTH INSURANCE PLAN (US)** *continued***B. RESEARCH RESULTS** *continued***3. Detailed results** *continued***viii. Produce output** *continued*

California law requires its Exchange to adopt the active purchaser model and engage in selective contracting with health plans.<sup>1</sup>

The Hawaiian Exchange must allow the sale of all qualified health plans.<sup>2</sup>

The Rhode Island Exchange may selectively contract based on price, quality, cost containment, standardization, and the best interests of qualified individuals and employers.<sup>3</sup>

The Vermont Exchange may selectively contract based on price, quality, coverage of preventive services, participation in health reform, and other criteria.<sup>4</sup>

The Utah Exchange is currently a passive purchaser. It does not require plans on its Exchange to be standardized, and does not provide regulations dictating how health insurance companies design plans.<sup>5</sup>

**ix. Send output**

The ACA requires Exchanges to offer health insurance plans on a website.<sup>6</sup> On the Massachusetts Connector website, after consumers enter demographic information, they are offered a choice of plans arranged in value tiers.<sup>7</sup>

**x. Output messages**

The Massachusetts Connector offers only a few standardized plan designs (nine in 2009).<sup>8</sup> The Utah Exchange offers a wide range of insurance plans.<sup>9</sup>

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<sup>1</sup> Hall & Swartz (2012)

<sup>2</sup> Rosenbaum, Lopez, Burke, & Dorley (2012)

<sup>3</sup> Rosenbaum, et al. (2012)

<sup>4</sup> Rosenbaum, et al. (2012)

<sup>5</sup> Day & Nadash (2012)

<sup>6</sup> Day & Nadash (2012)

<sup>7</sup> Ericson & Starc (2012b)

<sup>8</sup> Day & Nadash (2012)

<sup>9</sup> Day & Nadash (2012)

## OFFER AN INDIVIDUAL HEALTH INSURANCE PLAN (US) continued

### B. RESEARCH RESULTS continued

#### 4. Conflicting results

There appears to be no research result that conflicts significantly with the results presented above.

#### 5. Limitations

Research about this behavior has the following limitations.

- **Lack of research.** There is a marked lack of research about this behavior.

### C. RESEARCH GAPS

There are several gaps in the research about this health behavior:

- **Lack of studies.** There is a marked lack of studies about the behavior.
- **Missing behavior components.** Little or no research has been performed to elucidate the “goals”, “attributes”, “input messages”, “get input”, “experience”, and “rules” components of this behavior.

### D. SIMULATION MODELS

There is no known simulation model that incorporates this behavior.

### E. CROSS REFERENCES

Related behaviors:

None

## A2.4. GROUP SOCIAL POLICY ROLE

A2.4.02:G3.1:B001.001

UPDATED: MARCH 10, 2013

**SET HEALTH INSURANCE PREMIUM INCREASE LIMIT (US)**

A state governmental agency in the US health system sets the premium increase limit for a health insurance plan.

**A. TERMINOLOGY**

**Medical loss ratio:** The medical loss ratio is the fraction of total premiums that a health insurer devotes to clinical services, as distinct from administration and profit.<sup>1</sup>

**Patient Protection and Affordability Care Act (PPACA or ACA):** A federal statute signed into law on March 23, 2010 that overhauled the US healthcare system. The ACA's primary purpose was to increase the number of Americans covered by health insurance.

**B. RESEARCH RESULTS****1. Introduction**

The ACA includes a number of new strategies designed to improve the affordability of health insurance, particularly for individual consumers and small businesses. As one of these strategies, the ACA requires each state—or the federal government on behalf of a state—to review proposed increases in health insurance premiums and determine whether such increases are reasonable. Such rate review is intended to constrain unjustified premium increases through a comprehensive review process that helps ensure that insurers' rates are based on accurate, verifiable data and realistic projections. Robust rate review processes are expected to play a critical role in ensuring the success of the ACA's broader market reforms.<sup>2</sup>

However, there is no research about the impact of state rate review on premium growth. It is possible that even with rate review, health insurers could earn excess profits by modifying services that are difficult for states to measure and verify. Also, rate review could cause some insurers to exit the market and prevent others from entering, leading to decreased competition and higher premiums.<sup>3</sup>

This section presents what is known about how state agencies implement rate review under ACA.

**Behavior components**

|                                     |   |
|-------------------------------------|---|
| <b>Acting agent role:</b>           | A2.4.02 Healthcare regulation   |
| <b>i. <i>Goals:</i></b>             | G3.9 Other social goal: improve the affordability of health insurance |
| <b>ii. <i>Attributes:</i></b>       | Any   |
| <b>iii. <i>Input messages:</i></b>  | Any   |
| <b>iv. <i>Get input:</i></b>        | Any   |
| <b>v. <i>Experience:</i></b>        | Any   |
| <b>vi. <i>Rules:</i></b>            | Any   |
| <b>vii. <i>Context:</i></b>         | US health system  |
| <b>viii. <i>Produce output:</i></b> | Any   |
| <b>ix. <i>Send output:</i></b>      | Any   |
| <b>x. <i>Output messages:</i></b>   | Premium rate limit  |

<sup>1</sup> Robinson (1997)

<sup>2</sup> Corlette, Lucia, & Keith (2012)

<sup>3</sup> Fulton & Scheffler (2012)

## SET HEALTH INSURANCE PREMIUM INCREASE LIMIT (US) continued

## B. RESEARCH RESULTS continued

## 2. Summary

Following is a summary of the research available about this behavior, by behavior component.

- i. *Goals*. None known.
- ii. *Attributes*. There is wide variation in this behavior from state to state.
- iii. *Input messages*. Some states require the following data input for rate review: proposed premium rates, benefits covered, member changes, changes in medical and pharmacy costs, administrative expenses, changes in cost sharing, benefit changes, historical financial results, historical and expected future medical loss ratios, historical rate changes.
- iv. *Get input*. None known.
- v. *Experience*. None known.
- vi. *Rules*. None known.
- vii. *Context*. The ACA and HHS provide minimum rate review standards.
- viii. *Produce output*. Some states require prior rate approval. Others allow insurers to use rates without prior approval.

Many states use the medical loss ratio as a criterion for rate review, but states vary in how they define the ratio.

A few states involve consumers in the rate review process.

- ix. *Send output*. Many states have taken action to improve the transparency of the rate review process.
- x. *Output messages*. None known.



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**SET HEALTH INSURANCE PREMIUM INCREASE LIMIT (US)** continued**B. RESEARCH RESULTS** continued**3. Detailed results**

Following are detailed research results about this behavior, organized by behavior component.

**i. *Goals***

The primary goal for this behavior is to “improve the affordability of health insurance”. However, there is no known research about this behavior parameter.

**ii. *Attributes***

Researchers have found that there is wide variation in this behavior among the states. For example, the state of Alabama lacks authority to review premiums for insurers in the individual and small group markets, whereas other states have robust premium review procedures.<sup>1</sup>

**iii. *Input messages***

In carrying out this behavior the Maryland Insurance Administration, for example, receives the following data:

- Proposed premium rate for the health insurance plan
- Benefits covered under the health insurance plan
- Changes in the number of members covered under the plan
- Changes in medical and pharmacy costs of the plan
- Past and future administrative expenses
- Changes in cost sharing
- Changes in benefits
- Historical profits, future profit goals, and any changes from previous rate filings
- History of medical loss ratios and expected future loss ratios
- History of rate changes
- Data about the health insurance company’s financial strength

**iv. *Get input***

There is no known research specifically about this behavior parameter.

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<sup>1</sup> Corlette, et al. (2012)

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**SET HEALTH INSURANCE PREMIUM INCREASE LIMIT (US)** continued**B. RESEARCH RESULTS** continued**3. Detailed results** continued**v. *Experience***

There is no known research specifically about this behavior parameter.

**vi. *Rules***

There is no known research specifically about this behavior parameter.

**vii. *Context***

The ACA allows the US Department of Health and Human Services (HHS) to establish minimum standards for the review of premium rate increases. While state departments of insurance (DOI) have the responsibility for reviewing the premiums charged by health insurers, the ACA provides for a federal review of premiums when a state fails to meet federal premium review standards. To meet federal standards for an effective premium review program, a state DOI must receive sufficient data from health insurers to adequately examine whether a proposed rate increase is reasonable. The examination must consider, where applicable, medical cost trends, changes in utilization, benefits and cost sharing, changes in the risk profile of enrollees, reserves, administrative costs, taxes and fees, medical loss ratios, and the insurer's capital and surplus. The state must also have a standard for determining whether a proposed rate is reasonable, and the DOI must post on its website either rate filings, justifications, or links to the federal government's posting of rate justifications. States must also provide for a public process to review and comment on proposed rate increases.<sup>1</sup>

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<sup>1</sup> Corlette, et al. (2012)

**SET HEALTH INSURANCE PREMIUM INCREASE LIMIT (US)** continued**B. RESEARCH RESULTS** continued**3. Detailed results** continued**viii. Produce output**

Some states require strict “prior approval” of proposed premiums. In these states, the insurer files documents showing its proposed premiums and explaining why higher premiums are justified given the expected costs of medical claims, administration, and other factors. The insurer cannot actually begin charging the proposed rates until the state’s department of insurance approves them. A larger number of states with prior approval laws on the books include provisions to “deem” proposed premiums as approved if the state does not respond by a given time. Insurers can begin charging their new rates after that time, but the state can always challenge the ratings and require revisions later.<sup>1</sup>

Other states allow insurers to “file and use” a premium rate structure. In these states, the insurer files documents showing its proposed premiums, but it need not wait for state approval before it begins charging those premiums. The state may eventually review all premium filings, a sample of premium filings, certain filings in response to a complaint, or premiums that appear to be unusually high or low compared to other insurers. If the state determines that the premiums are not in compliance with state requirements or were not based on sound actuarial principles, the state may require the insurer to make prospective or retroactive adjustments.<sup>2</sup>

States may also perform “market conduct examinations” of insurers. Market conduct examinations can be used to look at the products sold by a health insurance company, the agents’ sale practices, claims payment, underwriting standards, complaint data, a company’s internal oversight procedures, and the premiums charged. The National Association of Insurance Commissioners has developed suggested procedures for market conduct examinations. However, according to a Government Accounting Office (GAO) report, many states either do not use the procedures or examine only a small fraction of insurers each year.<sup>3</sup>

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<sup>1</sup> Fish-Parcham (2006)

<sup>2</sup> Fish-Parcham (2006)

<sup>3</sup> Fish-Parcham (2006)

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**SET HEALTH INSURANCE PREMIUM INCREASE LIMIT (US)** continued**B. RESEARCH RESULTS** continued**3. Detailed results** continued**viii. *Produce output continued***

Massachusetts uses three actuarial criteria for presumptive disapproval of premium increases, but the remaining criteria are based on undefined standards.<sup>1</sup>

The medical loss ratio is a key criterion that many states use for rate approval, but for these ratios states vary in how they distinguish medical from non-medical costs.<sup>2</sup>

A few states, such as Rhode Island and Oregon, involve consumers in the premium review process. For example, Oregon's Insurance Division has instituted a public comment period for rate filings, contracted with a consumer advocacy group to comment on rate filings on behalf of consumers, and initiated public hearings.<sup>3</sup>

State insurance departments generally respond to consumer complaints about rates, as well as other complaints that consumers may have about their insurance plans. On receipt of a complaint, most states review whether the premiums for that consumer are consistent with the approved rates for the insurer. Using statutes about discrimination or unfair competition and practices, some insurance departments also respond to individual complaints about underwriting decisions.<sup>4</sup> These responses may take the form of mediation with the insurance carrier, or through providing additional information to correct the insurance carrier's perception of the individual's medical condition.<sup>5</sup>

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<sup>1</sup> Fulton & Scheffler (2012)

<sup>2</sup> Fulton & Scheffler (2012)

<sup>3</sup> Corlette, et al. (2012)

<sup>4</sup> Fish-Parcham (2006)

<sup>5</sup> Fish-Parcham (2006)

**SET HEALTH INSURANCE PREMIUM INCREASE LIMIT (US)** continued

**B. RESEARCH RESULTS** continued

**3. Detailed results** continued

**ix. *Send output***

Perhaps the most significant change produced by the ACA regarding this behavior is improvement in the transparency of state premium review processes. Many states have taken action to provide customers with information about rates, the rate review process, and the drivers of rate increases.<sup>1</sup>

**x. *Output messages***

There is no known research specifically about this behavior parameter.

**4. Conflicting results**

There appears to be no research result that conflicts significantly with the results presented above.

**5. Limitations**

Research about this behavior has the following limitations.

- **Lack of research.** There is a marked lack of research about this behavior.

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<sup>1</sup> Corlette, et al. (2012)

**SET HEALTH INSURANCE PREMIUM INCREASE LIMIT (US)** continued

**C. RESEARCH GAPS**

There are several gaps in the research about this health behavior:

- **Lack of studies.** There is a marked lack of studies about the behavior.
- **Missing behavior components.** Little or no research has been performed to elucidate the “goals”, “get input”, “experience”, “rules”, and “output messages” components of this behavior.

**D. SIMULATION MODELS**

There is no known simulation model that incorporates this behavior.

**E. CROSS REFERENCES**

Related behaviors:

None

## A2.6. GROUP ADMINISTRATIVE ROLE

A2.6.01:G2.2:B001.001

UPDATED: MARCH 10, 2013

**REALLOCATE PREMIUMS TO HEALTH INSURERS (US)**

In order to adjust for risk exposure under the ACA, a state governmental agency in the US health system reallocates premiums to health insurance companies.

**A. TERMINOLOGY**

**Adverse selection:** Adverse selection is when individuals who have higher exposure to health risks buy insurance policies with more coverage or higher expected payments. In adverse selection, the true health risk of an individual is private information, and is unknown to the health insurer.

**Health Insurance Exchange:** Health Insurance Exchanges are generally state-based entities established by the Patient Protection and Affordability Care Act (ACA - see below) that provide individual and business consumers with a centralized way to purchase standardized health insurance offered by a variety of health insurers.

The Exchange offers insurance in four tiers, from lowest actuarial value to highest: bronze, silver, gold, and platinum.

Introducing Exchanges, President Barack Obama said they should be, "... a market where Americans can one-stop shop for a health care plan, compare benefits and prices, and choose the plan that's best for them."

Exchanges also carry out other tasks: they certify health insurance plans, provide outreach to consumers, determine consumer eligibility, describe health plan choices, and enroll beneficiaries.

For most states, Health Insurance Exchanges will first become operational in 2014. Synonymous terms: "Exchange", "Health Benefits Exchange".<sup>1</sup>

**Behavior components**

|                                     |   |
|-------------------------------------|---|
| <b>Acting agent role:</b>           | A2.6.01 Health system administration organization |
| <b>i. <i>Goals:</i></b>             | G2.2 Decrease financial risk                      |
| <b>ii. <i>Attributes:</i></b>       | Any   |
| <b>iii. <i>Input messages:</i></b>  | Any   |
| <b>iv. <i>Get input:</i></b>        | Any   |
| <b>v. <i>Experience:</i></b>        | Any   |
| <b>vi. <i>Rules:</i></b>            | Any   |
| <b>vii. <i>Context:</i></b>         | US health system                                  |
| <b>viii. <i>Produce output:</i></b> | Any   |
| <b>ix. <i>Send output:</i></b>      | Any   |
| <b>x. <i>Output messages:</i></b>   | Reallocated premiums                              |

<sup>1</sup> From a letter President Obama wrote to Senators Edward Kennedy and Max Baucus.



**REALLOCATE PREMIUMS TO HEALTH INSURERS (US)** continued**A. TERMINOLOGY** continued

**Patient Protection and Affordability Care Act (PPACA or ACA):** A federal statute signed into law on March 23, 2010 that overhauled the US healthcare system. The ACA's primary purpose was to increase the number of Americans covered by health insurance.

**Risk adjustment:** Risk adjustment is a procedure that the ACA requires, whereby a state entity reallocates premium income from insurance companies with healthier enrollee to companies with sicker enrollees, in order to equalize health expenditure risk among the companies, and to remove incentives for companies to seek only the healthiest enrollees.

**B. RESEARCH RESULTS****1. Introduction**

In order to ameliorate the negative impact of adverse selection on a state's health insurance companies, the ACA requires states to provide risk adjustment for them. Although there is evidence that risk adjustment does not work<sup>2</sup>, this section is not about risk adjustment's efficacy. Rather, it presents what is known about how state agencies implement risk adjustment under ACA.

Dutch and Swiss experiences indicate how critical a good risk-adjustment mechanism is. Because the initial Swiss risk-adjustment system was relatively crude and ineffective, leaving significant inequities among health insurance organizations, it had to be reformed. The Dutch implemented a more sophisticated formula, which thus far has discouraged insurers from engaging in risk selection.<sup>3</sup>

The German experience with risk adjustment indicates how hard it is to achieve risk equity. Even after reform of their adjustment system, significant risk inequities remain.<sup>4</sup>

**Outfoxing risk adjustment**

“To date, insurers have been able to outfox the best risk-adjustment algorithms.”

Henry J. Aaron <sup>1</sup>

<sup>1</sup> Aaron & Frakt (2012)

<sup>2</sup> Brown, Duggan, Kuziemko, & Woolston (2011), Ericson & Starc (2012a)

<sup>3</sup> van Ginneken & Swartz (2012)

<sup>4</sup> Buchner, Goepffarth, & Wasem (2013)

**REALLOCATE PREMIUMS TO HEALTH INSURERS (US)** continued**B. RESEARCH RESULTS** continued**2. Summary**

Following is a summary of the research available about this behavior, by behavior component.

- i. *Goals*. None known.
- ii. *Attributes*. None known.
- iii. *Input messages*. There are concerns about the reliability and completeness of claims and other electronic data required to implement risk adjustment methods. There are also concern that, for states using a pharmacy claims based adjustment method, providers or insurers may up-code pharmacy risk scores.
- iv. *Get input*. There are concerns about the resources and challenges associated with the collection and protection of claims and other data required to implement risk adjustment methods.
- v. *Experience*. None known.
- vi. *Rules*. None known.
- vii. *Context*. The ACA and its implementing regulations describe the operational details for risk adjustment.
- viii. *Produce output*. There are several risk adjustment methods that states may adopt, including the “Johns Hopkins adjusted clinical groups method”, the “Hierarchical condition clusters method”, and the “Pharmacy claims based method”. There is no consensus among experts about the best method to use.
- ix. *Send output*. None known.
- x. *Output messages*. None known.

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**REALLOCATE PREMIUMS TO HEALTH INSURERS (US)** continued**B. RESEARCH RESULTS** continued**3. Detailed results**

Following are detailed research results about this behavior, organized by behavior component.

**i. *Goals***

The primary goal for this behavior is to “decrease financial risk”. However, there is no known research specifically about this behavior parameter.

**ii. *Attributes***

There is no known research specifically about this behavior parameter.

**iii. *Input messages***

For states to implement a diagnosis-based risk adjustment model (see section viii. Produce output, below) they require claims and other electronic data. Recent evidence of systematic geographic coding variation within the Medicare program has generated concerns about the reliability of such data. Also, certain data may be missing because many services are under capitated or carve-out arrangements. <sup>1</sup>

If a state uses a pharmacy claims based adjustment model (see section viii. Produce output, below) a health insurer or provider group might “up-code” pharmacy risk scores by writing more prescriptions to make it appear that the insurer has more serious health risks. For example, if a certain prescription is discretionary—such as an oral hypoglycemic in the early stages of diabetes—and providers know that their relative risk scores will be based on the prescription profile of their enrollees, they may be more likely to write such prescriptions. <sup>2</sup>

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<sup>1</sup> Weiner, Trish, Abrams, & Lemke (2012), Kessler (2012)

<sup>2</sup> Weiner, et al. (2012)

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**REALLOCATE PREMIUMS TO HEALTH INSURERS (US)** *continued***B. RESEARCH RESULTS** *continued***3. Detailed results** *continued***iv. *Get input***

The US Department of Health and Human Services (HHS) provides that states should process risk adjustment data centrally. This means that—with appropriate privacy safeguards—insurers would submit detailed or summary data to a state collection unit. Recent evidence of systematic geographic coding variation within the Medicare program has generated concerns about the resources and challenges associated with the collection and protection of such data.<sup>1</sup>

**v. *Experience***

There is no known research specifically about this behavior parameter.

**vi. *Rules***

There is no known research specifically about this behavior parameter.

**vii. *Context***

The ACA charged the US Department of Health and Human Services (HHS) to work with states to establish the criteria and methods for risk adjustment. The operational details of risk adjustment were described in proposed regulations and a follow-up HHS white paper.<sup>2</sup>

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<sup>1</sup> Weiner, et al. (2012), Kessler (2012)

<sup>2</sup> Weiner, et al. (2012)

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**REALLOCATE PREMIUMS TO HEALTH INSURERS (US)** continued**B. RESEARCH RESULTS** continued**3. Detailed results** continued**viii. Produce output**

There are several methods that states may use to adjust risk, including:

- **Johns Hopkins adjusted clinical groups method.** This method is a comprehensive diagnosis-based risk-adjustment method that captures risk information from a current period to predict future costs.<sup>1</sup>
- **Hierarchical condition clusters method.** This method is used for risk adjustment in the Medicare Advantage program. It is likely that this will be a federally-approved method.<sup>2</sup>
- **Pharmacy claims based method.** This method is based on pharmacy claims data only, rather than on all medical claims.<sup>3</sup>

Each state will need to decide which method best meets its needs. In addition, there are many technical factors that states must consider as they implement risk adjustment. For example, states will need to decide whether to use a prospective or a concurrent rating period for risk adjustment. Guidance from the American Academy of Actuaries suggests that, on this as well as other technical factors, there is no consensus among experts about the best alternative.<sup>4</sup> It is likely that from state to state, there will be wide variation in implementing risk adjustment.<sup>5</sup>

**ix. Send output**

There is no known research specifically about this behavior parameter.

**x. Output messages**

There is no known research specifically about this behavior parameter.

**4. Conflicting results**

There appears to be no research result that conflicts significantly with the results presented above.

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<sup>1</sup> Weiner, et al. (2012)

<sup>2</sup> Weiner, et al. (2012)

<sup>3</sup> Weiner, et al. (2012)

<sup>4</sup> Weiner, et al. (2012)

<sup>5</sup> Weiner, et al. (2012)

## 5. Limitations

Research about this behavior has the following limitations.

- **Lack of research.** There is a marked lack of research about this behavior.

## C. RESEARCH GAPS

There are several gaps in the research about this health behavior:

- **Lack of studies.** There is a marked lack of studies about the behavior.
- **Lack of “produce output” research.** There is inadequate research about the actual “produce output” behavior that states will follow. This parameter is particularly important, because it ties together all the other parameters.
- **Missing behavior components.** Little or no research has been performed to elucidate the “goals”, “input messages”, “get input”, “experience”, “rules”, “context”, “send output”, “output messages”, or—most importantly—the “produce output” components of this behavior.

## D. SIMULATION MODELS

There is no known simulation model that incorporates this behavior.

## E. CROSS REFERENCES

Related behaviors:

None

## CLASSIFICATION INDEX

| Reference             | Behavior  | Page |
|-----------------------|---|------|
| A1.1.01:G1.1:B001.001 | Select a primary care physician (US)  |      |
| A1.1.01:G1.1:B002.001 | Switch primary care physicians (US)   |      |
| A1.1.01:G1.1:B101.001 | Enroll in a workplace wellness program (US)   |      |
| A1.1.01:G1.1:B102.001 | Complete an employer-provided health risk assessment (US)   |      |
| A1.1.01:G1.1:B103.001 | Obtain biometric measurements for a workplace wellness program (US)                                 |      |
| A1.1.01:G1.1:B104.001 | Read employer-provided educational material about improving exercise (US)                           |      |
| A1.1.01:G1.1:B105.001 | Watch an employer-provided video about improving exercise (US)                                      |      |
| A1.1.01:G1.1:B106.001 | Play an employer-provided computer game about improving exercise (US)                               |      |
| A1.1.01:G1.1:B107.001 | Participate in an employer-provided interactive computer intervention about improving exercise (US) |      |
| A1.1.01:G1.1:B108.001 | Start an employer-provided exercise program (US)  |      |
| A1.1.01:G1.1:B109.001 | Maintain an employer-provided exercise program (US)   |      |
| A1.1.01:G1.2:B001.001 | Purchase an individual health insurance policy from an Exchange (US)                                |      |
| A1.1.01:G1.3:B001.001 | Request treatment from a primary care physician (US)  |      |
| A1.1.01:G1.3:B002.001 | Comply with treatment recommendations (US)  |      |
| A1.1.01:G1.3:B003.001 | Assess the quality of physician performance (US)  |      |
| A1.1.01:G2.1:B001.001 | Pay a penalty tax (US)  |      |

CLASSIFICATION INDEX *continued*

| Reference              | Behavior  | Page |
|------------------------|---|------|
| A1.2.1.1:G1.3:B001.001 | Recommend treatment (US)                                      |      |
| A1.2.1.1:G1.3:B002.001 | Recommend a specialist (US)                                   |      |
| A1.2.1.2:G1.3:B001.001 | Recommend treatment (US)                                      |      |
| A2.2.01:G6.01.B001.001 | Negotiate fee level with a health insurance company (US)      |      |
| A2.2.99.G1.1:B001.001  | Offer employees workplace program incentives (US)             |      |
| A2.3.01:G2.1:B001.001  | Negotiate fee schedule with a medical provider                |      |
| A2.3.01:G2.2:B001.001  | Assess the quality of physician performance (US)              |      |
| A2.3.01:G2.2:B002.001  | Determine physician network participation (US)                |      |
| A2.3.01:G6.1:B001.001  | Offer an individual health insurance plan on an Exchange (US) |      |
| A2.3.01:G6.1:B002.001  | Set premium increase rates for individual insurance (US)      |      |
| A2.3.99:G3.2:B001.001  | Advertise an individual health insurance plan (US)            |      |
| A2.3.99:G3.2:B002.001  | Offer an individual health insurance plan (US)                |      |
| A2.4.02:G3.1:B001.001  | Set health insurance premium increase limit (US)              |      |
| A2.6.01:G2.2:B001.001  | Reallocate premiums to health insurers (US)                   |      |



## AGENT ROLE INDEX

| Role                        | Behavior  | Page |
|-----------------------------|---|------|
| Individual person           | Select a primary care physician (US)  |      |
| Individual person           | Switch primary care physicians (US)   |      |
| Individual person           | Enroll in a workplace wellness program (US)   |      |
| Individual person           | Complete an employer-provided health risk assessment (US)   |      |
| Individual person           | Obtain biometric measurements for a workplace wellness program (US)                                 |      |
| Individual person           | Read employer-provided educational material about improving exercise (US)                           |      |
| Individual person           | Watch an employer-provided video about improving exercise (US)                                      |      |
| Individual person           | Play an employer-provided computer game about improving exercise (US)                               |      |
| Individual person           | Participate in an employer-provided interactive computer intervention about improving exercise (US) |      |
| Individual person           | Start an employer-provided exercise program (US)  |      |
| Individual person           | Maintain an employer-provided exercise program (US)   |      |
| Individual person           | Purchase an individual health insurance policy from an Exchange (US)                                |      |
| Individual person           | Request treatment from a primary care physician (US)  |      |
| Individual person           | Comply with treatment recommendations (US)  |      |
| Individual person           | Assess the quality of physician performance (US)  |      |
| Individual person           | Pay a penalty tax (US)  |      |
| Primary care physician      | Recommend a specialist (US)   |      |
| Primary care physician      | Recommend treatment (US)  |      |
| Specialist practitioner     | Recommend treatment (US)  |      |
| Group healthcare role       | Negotiate fee schedule with a health insurance company (US)   |      |
| Group healthcare role       | Offer employees workplace wellness program incentives (US)  |      |
| Health insurer organization | Negotiate fee schedule with a medical provider (US)   |      |
| Health insurer organization | Assess the quality of physician performance (US)  |      |
| Health insurer organization | Determine physician network participation (US)  |      |
| Health insurer organization | Offer an individual health insurance plan on an Exchange (US)                                       |      |
| Health insurer organization | Set premium increase rate for individual insurance (US)   |      |
| Other financial role        | Advertise an individual health insurance plan (US)  |      |
| Other financial role        | Offer an individual health insurance plan (US)  |      |
| Group social policy role    | Set health insurance premium increase rate (US)   |      |
| Group administrative role   | Reallocate premiums to health insurers (US)   |      |

## ALPHABETICAL INDEX

| <b>Behavior</b>   | <b>Page</b> |
|---|-------------|
| Advertise an individual health insurance plan (US)  |             |
| Assess the quality of physician performance (US)  |             |
| Assess the quality of physician performance (US)  |             |
| Complete an employer-provided health risk assessment (US)   |             |
| Comply with treatment recommendations (US)  |             |
| Determine physician network participation (US)  |             |
| Enroll in a workplace wellness program (US)   |             |
| Maintain an employer-provided exercise program (US)   |             |
| Negotiate fee schedule with a health insurance company (US)   |             |
| Negotiate fee schedule with a medical provider  |             |
| Obtain biometric measurements for a workplace wellness program (US)                                 |             |
| Offer an individual health insurance plan (US)  |             |
| Offer an individual health insurance plan on an Exchange (US)                                       |             |
| Offer employees workplace program incentives (US)   |             |
| Participate in an employer-provided interactive computer intervention about improving exercise (US) |             |
| Pay a penalty tax (US)  |             |
| Play an employer-provided computer game about improving exercise (US)                               |             |
| Purchase an individual health insurance policy from an Exchange (US)                                |             |
| Read employer-provided educational material about improving exercise (US)                           |             |
| Reallocate premiums to health insurers (US)   |             |
| Recommend a specialist (US)   |             |
| Recommend treatment (US)  |             |
| Recommend treatment (US)  |             |
| Request treatment from a primary care physician (US)  |             |
| Select a primary care physician (US)  |             |
| Set health insurance premium rate increase limit (US)   |             |
| Set premium increase rates for individual health insurance (US)                                     |             |
| Start an employer-provided exercise program (US)  |             |
| Switch primary care physicians (US)   |             |
| Watch an employer-provided video about improving exercise (US)                                      |             |

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