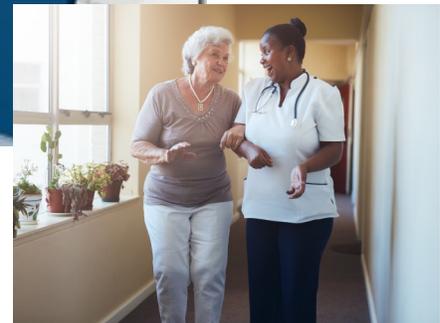


# PATTERNS OF ADAPTING TO HEALTH (PATH) AS DRIVERS OF HOSPITAL CARE REVENUES: A CASE STUDY



**PATH Institute**

8471 Ditmar Dr., Suite 20  
Rancho Cucamonga, CA 91730

Phone: 909-695-0090  
Email: [fred@pathinstitute.life](mailto:fred@pathinstitute.life)  
[www.pathinstitute.life](http://www.pathinstitute.life)

**Products & Services**

The ***Adaptive Health Behavior Inventory*** (AHBI) - the only assessment that can identify the Patterns of Adapting to Health (PATH).

***PATH Analysis Services*** - gives clients the power to identify the PATH mix within a patient, member, or community population, or diagnose an individual's dominant PATH through analysis of AHBI response data 24/7.

***PATH Engagement Protocols*** - applied to messaging and media make it easy to tailor marketing communications and advertising to appeal to adults based on their dominant PATH.



### Summary



**Situation:** A new serious diagnosis or disease condition prompts patients to adapt by seeking care, potentially leading them to seek and receive hospital-based services. **Question:** Do patient's health-related preferences, goals and adaptive habits reflected in their dominant Pattern of Adapting to Health (PATH) influence demand for hospital services as measured in objective health insurance plan claims? **Approach.** Facility expenditures, mainly generated by hospital-based care, were tracked for three years across a sample of over 8,295 health plan members. Each member's dominant Pattern of Adapting to Health (PATH) was identified using a mail survey. By the end of the three-year time frame, 5,721 members generated one or more hospital claims. **Analysis:** Logistic regression was used to assess if the PATH impacted the odds of having at least one facility claim over the three-year time frame. Nonparametric testing was used to assess if the average rank of total facility claims over three years were significantly different across the PATH. Finally, the percentage of total facility claims over the three years accounted for by each PATH were estimated by multiplying the average total facility claims by a population of 100,000. **Results:** The member's dominant PATH significantly impacted the odds of having or not having a facility claim over the three years. Four of the nine PATH had greater than 50% greater odds of generating a facility claim. The member's total average facility claims were also significantly different across the PATH with two generating over \$4,000 in additional hospital claims per member over the average total facility claims for the entire sample. **Conclusions:** A patient's health-related preferences, goals, and habits identified by the PATH have important impacts on the utilization of hospital services and the amount of hospital revenues generated. Patients dominated by PATH 7 accounted for the largest single share of total facility revenues. **Implications:** A patient's adaptive health behavior pattern as identified by the PATH offers greater value to hospital marketers by providing greater insight into the patient making health care decisions – something disease-specific marketing cannot provide.



## Introduction

Hospital marketing generally focuses on awareness building, brand promotion, and the promotion of condition-specific generally-high revenue producing service lines like cardiovascular, oncology, orthopedic, neurovascular, Women’s health and other specific health or disease conditions. The problem with this approach is that diseases and health conditions don’t make health care decisions. People do.

### Adapting to Health and Illness

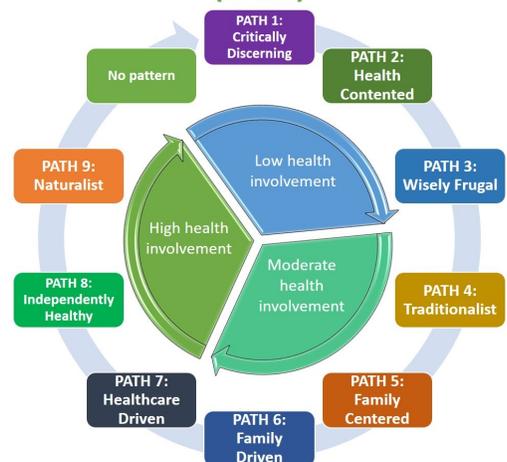
Once a patient is diagnosed with a serious disease or health-related condition, he or she begins adapting to it. The adaptive actions taken are influenced and limited by the patient’s health-related preferences, capabilities, habits, and dispositions that are all intertwined in a complex pattern. Within the context of this adaptive pattern, individuals evaluate hospital brand promises, make sense of physician and specialist inputs, weigh the perceived odds of successful outcomes considering factors like convenience and health coverage, and make a final care choice.

### The Patterns of Adapting to Health (PATH)

The Patterns of Adapting to Health (PATH) offers an objective quantitative description of the health-related adaptive patterns followed by 90% of adults in the United States. First detected in the late 1980’s, over the past 30 years the PATH have reliably captured the diversity of how adults respond to and seek health information, engage in health care seeking in response to perceived illness, trust health care professional input, and consider the cost and quality of health care. Over this same time, the PATH have proven to be reliable and valid predictors of health, disease, demand for health care, and medical expenditures.



### Patterns of Adapting to Health (PATH)





***Does a patient's PATH influence the dollar value of the revenues that flow into hospitals?***



**Case Study Questions**

Given the PATH relationships to health, is there evidence supporting the relevance of the PATH to hospitals and hospital marketing?

The questions addressed in this case study are:

- *Does a patient's dominant PATH influence the odds of obtaining hospital care as measured by the occurrence of objective medical claims?*

If a patient's dominant PATH effects the likelihood of receiving care in a hospital, it would justify prioritizing the marketing focus on patients based on their PATH.

- *Does a patient's dominant PATH influence the dollar value of hospital claims generated, and, therefore, the per patient revenues that flow into hospitals?*

If a patient's dominant PATH has a relationship to the value of that patient in terms of hospital revenues as measured in real dollars, it would further justify prioritizing the marketing focus to appeal to and attract higher rates of these patients. This case study examines both questions.

**Approach**

**Participant Data.** The data was generated by Blue Cross-Blue Shield of Florida in 2004. Institutional expenditures, mainly generated by hospital-based care, were drawn from member claims data from 2001, 2002, and 2003 across a sample of 8,295 adult health plan members.

**Measures.** The archival database included items from the Adaptive Health Behavior Inventory (AHBI) measuring self-reported health-related behaviors from a mail survey, as well as health plan member age, sex, and historical facility claims in U.S. dollars generated by hospital-based care (Table 1).

Table 1  
*Variables in Archival Database*

Variable Names	Data
ID	Deidentified case ID
Adaptive Health Behavior Inventory (AHBI)	1 to 5 Likert items
Member's dominant Pattern of Adapting to Health (PATH)	1 to 10
F_CH_Y0 Facility claims in dollars for primary insured in year 1	2001 US dollars
F_CH_Y1 Facility claims in dollars for primary insured in year 2	2002 US dollars
F_CH_Y2 Facility claims in dollars for primary insured in year 3	2003 US dollars

**Procedures.** Prior to analysis, facility medical claims across all three years were summed. The average facility claims were then expressed in 2017 dollars by



multiplying the total three year's claims dollars by an inflation factor of 1.36, representing the inflation of US dollars from 2002 to 2017.<sup>1</sup> The AHBI response data was subjected to PATH Analysis to identify each health plan member's dominant Pattern of Adapting to Health (PATH), which was then appended to the data and linked to the three-year historical facility claims from the membership records.



**Analysis.** To evaluate the PATH relationship to the occurrence of facility claims, logistic regression was used to determine if a health plan member's dominant PATH predicted the presence or absence of a facility claim within the three years examined, after controlling for the patient's age and sex. Logistic regression calculated the odds of facility claims as a ratio of facility claims to no facility claims and assessed their significance in relation to the patient's dominant PATH.<sup>2</sup> The PATH relationship to the dollar value of facility claims were assessed by calculating the average of the three-year facility claims among those patients with a least one claim and comparing them across the patient's dominant PATH. The claims dollars were not normally distributed so could not be evaluated using ANOVA. Statistical significance of these differences were tested using the Kruskal-Wallis One-Way ANOVA on mean ranks.<sup>3</sup> All significance testing was done at  $p < .01$  (99% confidence).

## Results

**Descriptive Statistics.** Among the sample of 8,295 health plan members 55.5% were female and 44.5% were male. The average age of the sample was 49.2 [95%CI: 48.9 – 49.3 years]. A total of 5,721 members (69%) had a least one facility claim within 2001, 2002, or 2003. Of these members, 61.7% were female and several years older, mean age = 50.3 [95%CI: 50.1 – 50.7], than members without a facility claim, mean age = 46.4 [95%CI: 45.9 – 46.8]. The three-year average facility claim was \$12,111 [95%CI: \$11,377 - \$12,847] or \$16,471 in 2017 dollars. PATH analysis successfully identified a dominant PATH for most members with only 10.8% obtaining a "no pattern" result. Four of the PATH accounted for 62% of members: Wisely Frugal (PATH 3) and Family Centered (PATH 5) each accounted for 16%; the Healthcare Driven (PATH 7) and Independently Healthy (PATH 8) each accounted for 15%.

**Significance Testing.** Logistic regression results examining PATH relationships to odds of having a facility claim over the three-year period was highly significant at  $p < .001$  representing greater than 99.9% confidence. Mean facility claim ranking differences were also highly significant across the PATH at  $p < .001$ , also representing greater than 99.9% confidence. The distribution of the PATH across the sample and among those with a least one facility claims, their associated odds ratios, and mean facility claims in both 2002 and 2017 dollars



$\alpha = .01$

Table 2

*Patterns of Adapting to Health (PATH), Facility Claim Risk Odds, and Mean Facility Claims\**

PATH	Name	n	n <sub>f</sub>	Risk Odds <sup>1</sup>	Risk Odds 95% CI		p	Mean Facility Claims <sup>2</sup>		Difference <sup>3</sup>
					Lower Limit	Upper Limit		2002	2017	
PATH 1	Critically Discerning	117	83	1.59	1.07	2.37	**	\$11,150	\$15,164	-\$1,307
PATH 2	Health Contented	195	133	1.11	0.80	1.54		\$10,366	\$14,098	-\$2,373
PATH 3	Wisely Frugal	1372	902	1.00	0.84	1.20		\$11,040	\$15,014	-\$1,457
PATH 4	Traditionalist	146	97	1.22	0.85	1.77		\$16,168	\$21,989	\$5,518
PATH 5	Family Centered	1342	977	1.48	1.24	1.77	***	\$11,422	\$15,534	-\$937
PATH 6	Family Driven	693	490	1.52	1.24	1.88	***	\$11,946	\$16,246	-\$225
PATH 7	Healthcare Driven	1277	962	1.37	1.14	1.64	***	\$15,593	\$21,206	\$4,735
PATH 8	Independently Healthy	1244	858	1.14	0.95	1.37		\$11,105	\$15,102	-\$1,369
PATH 9	Naturalist	1008	687	1.13	0.93	1.37		\$11,608	\$15,787	-\$684
PATH 0	No pattern	901	532	0.15	0.66	0.86	***	\$11,169	\$15,190	-\$1,281
Total		8295	5721					\$12,111	\$16,471	

\*Controlling for age and sex

<sup>f</sup>At least one facility claim in 2001, 2002, or 2003

<sup>1</sup>Risk odds of having at least one facility claim over three years

<sup>2</sup>Sum of facility claims from all three years in 2002 and 2017 dollars

<sup>3</sup>PATH claim difference from overall average in 2017 dollars

\*p < .05, \*\*p < .01, \*\*\*p < .001

are shown in Table 2. This table also summarizes the magnitude of the difference in the facility claims for each PATH from the overall sample mean.

**Generating Facility Claims.** Patients dominated by four of the PATH had significantly greater odds ratios (OR) of generating one or more facility claims: The Critically Discerning PATH1, OR = 1.59 (or 159% higher rate); the Family Centered PATH 5, OR = 1.48 (148% higher rate); the Family Driven PATH 6, OR = 1.52 (152% higher rate), and the Healthcare Driven PATH 7, OR = 1.37 (137% higher rate). Only patients with no pattern had significantly reduced odds of generating a facility claim, OR = .86 (14% lower rate). All these odds ratios were statistically significant with greater than 99.9% confidence.

**The Value of Facility Claims.** The differences in mean ranks of the facility claims across the PATH were statistically significant at p < .001 (99.9% confidence). Only patients dominated by two PATH generated facility claims dollars above the average of \$12,111. Patients dominated by the Traditionalist PATH 4 generated \$16,168, or \$21,989 in facility claims per patient in 2017 dollars. Patients dominated by the Healthcare Driven PATH 7 generated \$15,593 in facility claims, or \$21,206 per patient in 2017 dollars. Patients dominated by the remaining PATH





*A patient's PATH influences the odds of obtaining hospital care*

*A patient's PATH influences the per patient revenues that flow into hospitals*

generated facility claims below the total sample average.

## Discussion

### The PATH and Demand for Hospital Care

Does a patient's dominant PATH influence the odds of obtaining hospital care as measured by the occurrence of objective medical claims?

The answer is – *yes*.

A patient's dominant PATH influenced the odds of having or not having a facility claim. Patients dominated by the Critically Discerning, Family Centered, Family Driven, and Healthcare Driven PATH had increased odds of receiving hospital care based on actual medical claims.

### The PATH and Hospital Revenue Values

Does a patient's dominant PATH influence the dollar value of hospital claims generated, and, therefore, the per patient revenues that flow into hospitals?

The answer, according to the evidence, is – *yes*.

Patients dominated by the Traditionalist and Healthcare Driven PATH generated higher facility claims dollars relative to patients dominated by any of the other PATH. Hospital revenues generated by patients dominated by the Traditionalist PATH exceeded the average claim of the total sample by \$5,518 per patient (2017 dollars). Likewise, facility claims generated by patients dominated by the Healthcare Driven exceeded the average claim of the total sample by \$4,735 per patient (2017 dollars).

### Accounting for Total Patient Hospital Revenues

The estimated facility claims generated by the entire sample was just over \$94 million in 2017 dollars. The percentage of facility claims accounted for by the patient's dominant PATH varied considerably. Patients dominated by the Critically Discerning PATH 1, Health Contented PATH 2, and Traditionalist PATH 4 together accounted for less than 6% of the total facility claims. In contrast, patients dominated by the Healthcare Driven PATH 7 accounted for over 21% of total facility claims all by themselves, followed by patients dominated by the Family Centered PATH 5 at 16%.

How might these numbers look when applied to a typical market? Marketing research studies representing a total sample of 53,990 adults interviewed across multiple markets were used to identify the typical PATH mix in a market. This percentage breakdown is shown in the third column from the left in Table 3. Applying these percentages to 100,000 adults, then applying the product of the obtained percentage rate of having a facility claim and the mean facility claim obtained for each PATH, the patient hospital revenues breakdown for 100,000



Table 3

*Estimated 3 Year Facility Revenues by PATH Per 100,000 Patients*

PATH	Name	PATH Mix* %	% with Facility Claims**	Projected Facility Expenditures	
				2017 Dollars***	%
PATH 1	Critically Discerning	1.6%	70.9%	\$17,673,197	1.5%
PATH 2	Health Contented	3.6%	68.2%	\$34,783,664	3.0%
PATH 3	Wisely Frugal	16.3%	65.7%	\$161,326,859	13.8%
PATH 4	Traditionalist	3.2%	66.4%	\$46,270,922	4.0%
PATH 5	Family Centered	12.4%	72.8%	\$139,905,909	12.0%
PATH 6	Family Driven	8.2%	70.7%	\$94,403,006	8.1%
PATH 7	Healthcare Driven	20.5%	75.3%	\$327,970,542	28.1%
PATH 8	Independently Healthy	12.3%	69.0%	\$128,296,123	11.0%
PATH 9	Naturalist	11.2%	68.2%	\$120,647,786	10.3%
PATH 0	No pattern	10.6%	59.0%	\$94,890,320	8.1%
Total Facility Expenditures		100.0%	69.0%	\$1,166,168,329	100.0%

\*Breakdown of PATH across multiple markets,  $n = 53,990$

\*\*Obtained percent of members with facility claims

\*\*\*Product of 100,000, percent of members with facility claims, and mean facility claims in 2017 dollars

adults in a typical market are shown in Table 3.

A population of 100,000 adults was estimated to generate about \$1.17 million in facility claims. Applying the rate of having at least one facility claim by the mean facility claim in 2017 dollars, adults dominated by the Healthcare Driven PATH 7 accounted for the largest share at over \$327 thousand representing 28% of the total patient care revenue value per 100,000 (Figure 1). No other PATH comes close to this level. The next largest share of the value, representing less than half the value generated by the patients dominated by the Healthcare Driven PATH 7, were patients dominated by the Wisely Frugal PATH 3 at over \$161 thousand representing just under 14% of the total patient care revenue value. Patients dominated by three other PATH accounted for the remaining bulk of facility claims value: The Family Centered PATH 5, Independently Healthy PATH 7, and Naturalist PATH 9 each accounted for 12%, 11%, and just about 10%, respectively.

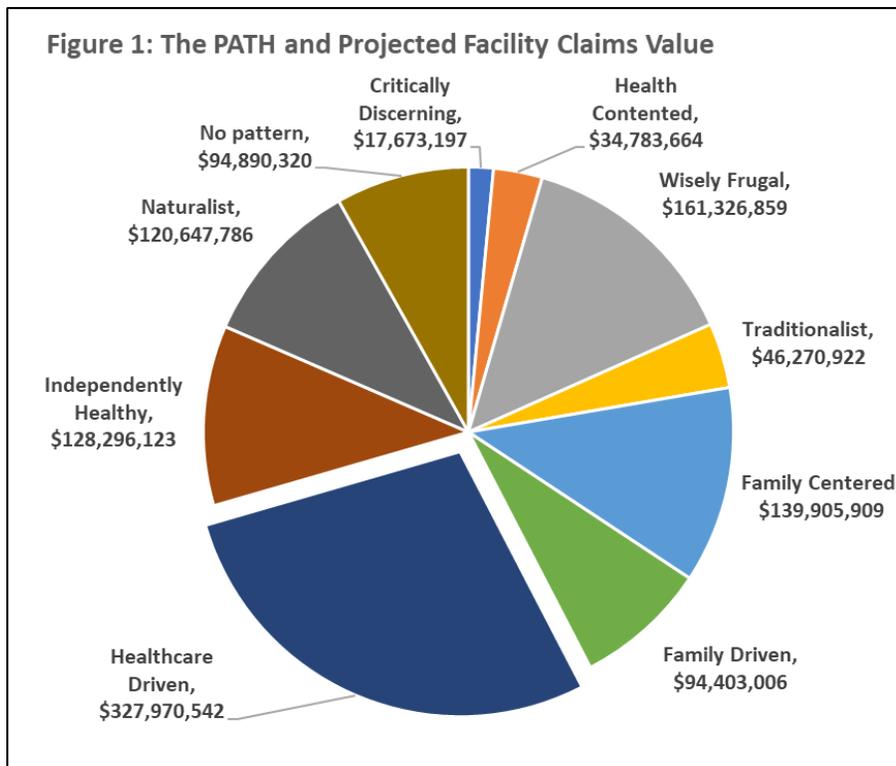
### Implications

The evidence offered by this case study supports the relevance of the PATH to hospitals and hospital marketers. A patient’s dominant PATH influences both their demand for hospital-based care and the value of that care to hospitals in terms of revenue generation as expressed in actual claims dollars. Based on the examination of objective facility claims, patients dominated by one PATH – the Healthcare Driven PATH 7 – were shown to offer the most value to hospitals and





*A patient's dominant PATH influences both their demand for hospital care and the value of that care to hospitals in terms of revenue generation as expressed in actual claims dollars.*



hospital marketers. These patients represent the highest demand for hospital care and generate hospital revenues per patient well above the average.

The Patterns of Adapting to Health (PATH) give hospital marketers insight into the link between patient health-related adaptive patterns and demand for hospital services. This insight provides hospital marketers with information that can be used to tailor brand messaging and service line advertising to optimally appeal to the high demand consumers who make the actual health care decision. In addition to tailoring service line marketing by disease state, hospital marketers can apply the insights provided by the PATH to further tailor messaging to optimally appeal to high demand segments of the local population based on their health-related values, preferences, and habits. The PATH approach gives hospital marketers the ability to address the actual decision-makers – the patients with a disease – rather than appealing to the disease state only in relation to service line marketing.

### References

1. CPI Inflation Calculator. Retrieved from <http://www.in2013dollars.com/2002-dollars-in-2017?amount=100>
2. What is logistic regression? Retrieved from <http://www.statisticssolutions.com/what-is-logistic-regression/>
3. Kruskal–Wallis one-way analysis of variance. Retrieved from [https://en.wikipedia.org/wiki/Kruskal–Wallis\\_one-way\\_analysis\\_of\\_variance](https://en.wikipedia.org/wiki/Kruskal–Wallis_one-way_analysis_of_variance)