

# Effect of a Demand Management Program on Outpatient Utilization

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## Premise

Individuals make numerous personal decisions every day that have significant implications for health and use of medical care services. Programmatic efforts to rationalize medical practice and provider decision-making are now being extended to consumer health and medical care decision-making.. with information being the common currency supporting informed decisions. Individuals who are better informed about disease prevention, self-care alternatives and the benefits and risks of care being sought will experience fewer preventable conditions and use fewer medical care services inappropriately than individuals who are less knowledgeable, and may use fewer services overall.

## Research Question

Will individuals provided a demand management program which includes a self-care reference, maternity education materials and a 24 hour nurse counseling program use fewer outpatient medical services than similar individuals not provided the program? The null hypothesis holds that there will be no significant differences between similar groups exposed vs. not exposed to such a program. Our alternative hypothesis is that a group exposed to the Taking Care demand management program will show lower utilization of specific outpatient medical services as compared to a similar group not exposed.

## Study Focus

The Center for Corporate Health, Inc. (CCHI) jointed with Wisconsin Education Association Insurance (WEA) and William M. Mercer, Inc. to assess the impact of the Taking Care "demand management" program on outpatient medical utilization and associated costs. The study involved approximately 48,000 people insured by WEA through 285 Wisconsin school districts.

The effect of self-care education programs has been previously evaluated, and a number of published studies have attributed statistically significant reductions in ambulatory visits to programs which used the *Take Care of Yourself* self-care book in combination with a health newsletter (Vickery et al, JAMA 1983, Medical Care 1988; Lorig et al, Medical Care 1985). However, the impact of a 24 hour nurse counseling program combined with a self-care book has not been evaluated in replicated studies. This study undertook

a formal evaluation of a 24 hour-a-day nurse counseling service (*Informed Care*) augmented by both a self-care reference (*Take Care of Yourself*) and maternity education materials as its primary investigation.

WEA sponsored the study, CCHI provided the Taking Care program and William M. Mercer, Inc. independently conducted the analysis.

## Methods

### Study Design

The study employed a "pre-to-post design", using one experimental group and one control group. The study compared the claims experience of the experimental group to that of the control for a pre-specified set of medical services. The groups were compared for a 12 month baseline period of September 1992 to August 1993 against a 12 month intervention period of September 1993 to August 1994. As in virtually all studies of this type, pre-to-post program impact was measured as the change in utilization of pre-specified outpatient services and associated expenses for the experimental group as compared to the control.

### Study Population

The population insured by WEA is a homogeneous population distributed throughout Wisconsin. WEA only insures and administers the medical plans of school personnel and their dependents. WEA also provided a uniform plan of health coverage to the entire study population for the two-year study period. This was an indemnity plan featuring a 100 dollar deductible provision. In and out of plan migration over the two-year study period was minimal, showing less than 2 percent change, pre-to-post, in total enrollee participation for either of the two groups.

School districts were assigned to the program and control groups based upon geographic location, age-sex composition and large claims experience. Stratified sampling with matching was used to assign school districts. School districts were sorted into geographic regions of Wisconsin. An age-sex factor and average large claims expense per enrollee was computed and adjusted by the number of enrollees per school district. Four school districts were put in a separate sampling stratum because they were each large enough to imbalance the overall groups. The only non-random aspect of assignment, which was not expected to affect study results, applied to school districts that had identical selection factors. In some instances, the district that had longer tenure with WEA was assigned to the experimental group. All school districts assigned had been insured by WEA prior to 1992.

After assignment based upon age-sex, the groups had to be re-balanced on adjusted large claims expense by reassigning some school districts. Last, some school districts that had been assigned to the program

declined to participate primarily because of the administrative requirements of participation. It was not necessary to re-balance the groups after districts dropped out because the *P* values showed no differences for the selection factors. Because the program group had been oversampled for the initial assignment, it contained more enrollees at baseline after some districts dropped out than did the control group. (i.e., 24,950 and 22,857 enrollees respectively).

## **Interventions**

The specific Taking Care intervention, referred to as the "Informed Care" group, included the following: the *Informed Care* service, a 24-hour telephone-based nurse counseling service; the *Take Care of Yourself* self-care guide; and the *Bright Futures* maternity education program.

The maternity education materials were mailed to participating households and the self-care book was provided at the school district sites. The *Informed Care* nurse counseling service was available to eligible participants through a 1-800 number. All program services and materials were introduced through orientation sessions at the various school districts, and through a planned communications program administered both prior to and during the intervention period.

## **Data Collection**

It was hypothesized that the Informed Care program would impact use of pre-specified medical care services and preventable illness. The service are designated as follows:

- Outpatient MD Medical Services (office-based medical visits and services)
- Emergency Room Services
- Hospital Outpatient Department Services
- Outpatient MD Surgical Services
- Outpatient Surgical Facility Services

Prior to the study, WEA's medical care claims had been prepared in Mercer's Comprehensive Health Analysis and Management Program (CHAMP) claims analysis system. CHAMP is a combination mainframe/PC system that was used extensively to complete this study. CHAMP was used to analyze the enrollment and the utilization by detailed type and place of service of every school district assigned to the experimental and to the control group. Statistics were computed in an identical manner to support group assignment, baseline analysis, and comparison of experimental to control group performance fifteen months after program implementation.

## **Targeted Service and Intervention Costs**

Utilization "savings" from the program were translated into financial savings by applying the unit price of services to the volume of such services saved. The unit price of each medical care service studied was computed using CHAMP. CHAMP computes the price of each service (specific to place and type) by dividing the total covered claims expense for each service by the number of units of service utilized. For example, the unit price of outpatient physician medical services for the program group was \$48 per such service during the baseline year (so that savings do not include medical price inflation).

Intervention costs for each of the intervention groups consist of the full costs to purchase the materials or services for the full 12 month experimental period, September 1993 through August 1994.

## **Analysis**

### **Utilization**

Lower pre-to-post increases in utilization as compared to the control were defined as savings. The control group is viewed as the prevailing trend or what would have otherwise occurred, pre-to-post, had the interventions not been in effect. Reduction is defined as the intervention's pre-to-post absolute increase difference vs. the control, that is, the absolute difference in increased utilization between program and control groups. Alternatively, reduction is also expressed as the intervention's pre-to-post % rate of increase reduction vs. the control.

### **Savings**

First, the pre-to-post changes in services per 1,000 enrollees for each of the targeted services were calculated independently for the Informed Care group and the control group. Second, the Informed Care group's difference from the control group for each of the targeted services was determined and expressed as a dollar value. Third, these difference values or "savings" were summed across the targeted services for the Informed Care group and expressed as a total difference value, or, total savings. For example: if the control group's pre-to-post increase ER services is 10 percent, but the Informed Care group's pre-to-post increase is 5 percent, the absolute increase difference vs. the control group or "savings" is 5%. This difference value can be expressed as a per enrollee difference in dollars by applying the unit price for each service to the use rate of service. The difference values for all the other targeted services were obtained in the same way and summed to obtain total savings for the intervention group.

### **Discussion**

Prior to and during this study school districts insured by WEA experienced declining utilization of inpatient care and increasing utilization of outpatient care. It was expected that the program would slow the rate of

increase for each of the prespecified types of service. The lower rates of increase in utilization of outpatient services in the experimental group as compared to the control indicates that an inexpensive system of written communication and phone-based counseling can have a substantial impact on utilization behavior. While practical significance can be attributed to these apparent reductions, rigorous testing is required to affirm statistical level of significance. However, the large samples and the controls employed in this study provide a strong basis for the expectation that the observed increase differences will be statistically significant. Although not addressed in this article, a less intensive intervention was evaluated in this study using the same design and methodology. This intervention, which included the self-care book *Take Care of Yourself* and the *Taking Care* newsletter, also found lower rates of increase in outpatient services as compared with the control, resulting in cost savings as well.

These results may provide a conservative indication of overall impact on utilization and costs. The study did measure pre-to-post differences in pregnancy complications, but did not include observed reductions in the saving/cost calculation. This exclusion recognizes that the study was designed to measure changes in outpatient utilization, and pregnancy complications involved a mix of both inpatient and outpatient services. However, inclusion of these results would have increased the savings/cost ratio to 5.46:1. The study did not separately investigate impact on inpatient utilization, leaving this area open to question.

The study did not test for group differences in baseline health risk and health status. Health risk has been found to explain a very small proportion of variation in claims costs. The relationship of morbidity level and use of medical care is imprecise as well. The presence and severity of symptoms or conditions have been shown to account for a relatively small portion of the variability in utilization of medical services. Several researchers have pointed out that use of medical care is not a simple and direct response to a distinct medical condition, and that two individuals with a similar health status can respond very differently to their symptoms. Health care seeking is, itself, a distinct behavior with perhaps the most significant predictive value of all. This study did test for group differences in utilization of the target services at baseline and found no differences. In addition, the groups were also equivalent on adjusted large claims expenses per enrollee.

As in most studies of this type, there a number of scientific limitations that should be placed on generalizability of findings until additional studies on other populations are conducted. First, the study measured short term impacts over a 12 month period or exposure. Therefore, the results cannot be generalized beyond one year. Ongoing evaluation is necessary to substantiate continuity of impact in subsequent years. Second, the study population (school districts) was extremely homogeneous, and therefore, limits wide applicability for the results. Third, the study was conducted within a pure indemnity

insurance environment which employed a uniform deductible for the entire study period. Further research needs to be conducted to determine the impact of this type of program in managed care environments. The very same factors which contribute substantially to sound methodology and control, thereby helping to validate the results, serve also to limit wide applicability of those results.

Nevertheless, the initial results of this study strongly suggest that the health care decision-support system that was evaluated in this study associated with reductions in use of medical services. Furthermore, these reductions were achieved within a very short period of time. Further statistical analysis is required to fully validate these findings.

## **Taking Care Program Efficacy**

The efficacy of the "Taking Care Program", a health promotion intervention that focuses on prevention, self-care and informed individual decision-making, has been assessed using both controlled experimental and quasi-experimental designs as well as on a purely financial basis. A clear and convincing convergence of demand reduction and utilization "savings", and cost-effectiveness results can be seen across all four studies. These studies were published in reputable peer review journals, as follows:

*Effect of self-care education on medical visits, D. Vickery et al, published in JAMA, 1983.* This was a prospective, randomized, controlled trial of self-care educational interventions conducted in a health maintenance organization to determine their effect on ambulatory care utilization. Statistically significant decreases in total medical visits and minor illness visits were found in each of three experimental groups as compared with a control group. These decreases average 17% and 35%, respectively, and were linked to a system of written communications, specifically including the Take Care of Yourself Book, emphasizing personal decision-making about the use of medical care. The study estimates that the decreases in utilization represent a savings of \$2.50 to \$3.50 for each dollar spent on the educational interventions.

*Effect of a workplace health education program on outpatient visits, K. Lorig et al, published in Medical Care, 1985.* In this study, the Taking Care program was offered to employees through 22 California employers. A total of 5,200 employees attended a presentation, received self-help books (specifically, the Take Care of Yourself book) and completed self-administered questionnaires. The study did not randomize employees or households to experimental or control groups, but used a quasi-experimental staggered intervention design involving eight different cohorts, before and after comparisons for each cohort, and various statistical adjustments for intervening variables. A statistically significant reduction, 17%, in outpatient visit rates was observed for households insured by Blue Cross of California. This represents 2.0 visits per household per year.

*Effect of self-care interventions on use of medical services in a Medicare population, D. Vickery et al, published in Medical Care, 1988.* This was a prospective, randomized, controlled trial of self-care communications-based health educational program conducted with a Medicare population within a health maintenance organization. The study was designed to determine the program's effect on ambulatory care utilization. A statistically significant decrease of 15% in total medical visits was found in the experimental group as compared with a control group. This decrease was linked to a system of written communications (again including the Take Care of Yourself book) emphasizing personal decision-making about the use of medical care. The study estimates that the decreases in utilization represent a savings of \$2.19 for each dollar spent on the educational interventions.

*A benefit-to-cost analysis of the Travelers Taking Care Program, T. Golaszewski et al, published in Journal of Occupational Medicine, 1992.* This study of the "Taking Care Program", conducted by Travelers HR group, employed a purely financial return-on-investment model to analyze the benefit-to-cost ratio of the program over the years 1986 through 1990, and also made projections through the year 2000. The analysis compared and quantified in dollars the program costs for personnel, capital expenses, materials, and rent against the program benefits associated with health care cost savings (adjusted for increased pension liability accruing to increased health and longevity effects accruing to illness prevention), increased productivity, decreased absenteeism, decreased life insurance claims, and program-generated income. After adjusting to present value the stream of annual costs and benefits, a benefit-to-cost ratio of 3.4 was estimated for the program