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OUTPUT VALUE ANALYSIS

ATGON

WORKLOAD

WORKFORCE ESTIMATING



PUBLICATIONS, PRESENTATIONS, AND RESEARCH REPORTS

PROGRAM INFORMATION AND ANALYSIS DEPARTMENT  
FORT LOGAN MENTAL HEALTH CENTER

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FORT LOGAN MENTAL HEALTH CENTER

Output Value Analysis

(Supported by NIMH Grant #R12 MH 19503-01 MHS)

1. Halpern, J. and Binner, P. R. A model for an output value analysis of mental health programs. Administration in Mental Health, Winter 1972.

Output value analysis is described as a type of cost-benefit model developed for mental health treatment programs. The "product" is operationally defined as the patient who is returned as a functioning member of the community. A single admission cohort (1967-68) of FLMHC's Adult Psychiatry Division was used to demonstrate the model. The value of the program was measured in terms of patient improvement (relative to initial impairment) and patient anticipated economic productivity in comparison to the costs of treatment. The analysis provides the administrator a basis for decision making in terms of resource allocation.

2. Binner, P. R., Halpern, J., and Potter, A. An output value analysis of a mental health program: Some preliminary results. Unpublished manuscript, FLMHC, August 1972.

Two improvements were made in the original output value analysis: 1) an empirically derived estimated response percentage matrix was constructed, and 2) a refinement was made in the monetary value of the value of maximum response to treatment. The improved model was applied to the 1967-68 admission cohort of the FLMHC's Adult Psychiatry Division, and the results were compared to the previous analysis.

3. Binner, P. R., Halpern, J., and Potter, A. Output value analysis: A method for the evaluation of mental health programs. Presented at the American Psychological Convention, Honolulu, September 1-8, 1972.

The output value model was discussed with regard to its usefulness in providing mental health program information. A brief overview of the model was provided and issues of validity, reliability, and application were examined.

4. Binner, P. R., Halpern, J., and Potter, A. Patients, programs, and results in a comprehensive mental health center. Journal of Consulting and Clinical Psychology, 1973, 41(1), 148-156.

Five hundred eighty-one patients grouped by their degree of impairment at time of admission and treated by programs varying on the dimensions of intensity and extensiveness were examined. With regard to treatment intensity, the best return on the program dollar can best be attained by utilization of low intensity programs, and the best patient response was also attained with low intensity treatment. However, although the best return for the program dollar was also found for the low extensiveness programs, the high extensiveness programs yielded a better response to treatment. Limitations of cross-sectional data were discussed and a diminishing returns argument was developed.



5. Binner, P. R. Program performance as a function of diagnosis: An output value analysis. Presented for the Institute on Planning and Evaluation of Mental Health Programs, Memphis, April 19-20, 1973.

Data from 6,009 admission to Fort Logan was used to illustrate how the effectiveness and productivity of a program could be analyzed within the output value framework. Special attention was given to the differences in productivity of patients grouped by diagnosis. The output value analysis is proffered as a considerable improvement in evaluation strategy for the mental health program manager.

6. Binner, P. R. An output value analysis of schizophrenic patients at the Fort Logan Mental Health Center. Presented for the Institute on Psychosocial Treatment of Schizophrenia. American Orthopsychiatric Association, New York, May 28-June 1, 1973.

This paper uses the output value model to study 2,596 schizophrenic patients admitted to the Adult Psychiatry Division of FLMHC between July 1961 and June 30, 1971 and discharged by June 30, 1972. Sub-groups of the schizophrenic patients were analyzed with respect to their output values, improvement ratings, and response effectiveness. It was noted, in general, that even though the schizophrenic patient has a relatively low rate of return on investment, he contributes a large percentage of the gross output value.

7. Wilderman, E. Summary statistics six-year output value analysis--Adult Psychiatry Division. Unpublished manuscript, FLMHC, June 1973.

The paper is a summary of statistics produced by the Output Value Analysis of the data on the Adult Psychiatry Division of FLMHC for 1965-71. The Output Value Index is analyzed for various variables, such as age or employment, over the six-year period. The primary purpose of the paper is to provide a broad view of basic output value findings about FLMHC.

8. Binner, P. R. and Coates, C. J. Coping with accountability: Workload and output value measures. Paper presented at the Second Annual Meeting of The Western Conference on Mental Health Program Management, San Diego, October 1973.

In confronting the problem of accountability, two of the most common questions the manager has to answer for his funding source are, "Do the demands for your services justify the staff you have?" and "Are you producing results of sufficient value to justify the resources invested in your program?" This paper describes two current approaches to this problem at the Fort Logan Mental Health Center: Workload and Output Value.

9. Potter, A., Halpern, J., and Binner, P. R. Predicting resource utilization in a comprehensive center: An evaluation of three alternative methods. American Journal of Community Psychology. (in press).

Three alternative methods for obtaining anticipated resource utilization information for comprehensive mental health centers are proposed. Two of the methods involve the use of a chi-square procedure, while the third involves step-wise multiple regression. The latter method resulted in the highest agreement between predicted and actual resource utilization although differences in predictive validity among the three methods were not statistically significant. It was concluded that the multiple regression method was preferable to the other two in that it resulted in a substantially greater degree of flexibility.

10. Potter, A., Binner, P. R., and Halpern, J. Readmission discount factors in program evaluation: An output value analysis. American Journal of Community Psychology, Vol. 3, No. 4, December, 1975.

The application of output value analysis, a type of benefit/cost analysis, to a population of patients treated in the Adult Psychiatry Division of FLMHC is reported. A methodological refinement to the basic analytic framework for discounting the value produced by the program if the patient was readmitted to the Center within the first year after his discharge was introduced. The application of the discount factor reduces the magnitude of the value produced by the program and thereby reduces both the productivity and effectiveness indices. When applied to groups known to differ in readmission rates, such as first admissions and readmissions or voluntary and involuntary admissions, the application of the discount factor can accentuate group differences markedly. When selected diagnostic groups were compared, the application of the discount factor could even reverse the relative standing of the groups.

11. Halpern, J., Wilderman, E., and Binner, P. R. Income patterns and mental health treatment. Evaluation (in press).

In order to improve the economic benefits component of the Output Value Analysis model, actual earnings data on groups of patients were obtained from the Social Security Administration, in accordance with strict confidentiality provisions. This paper concerns a separate study undertaken on these data to look at the levels and patterns of patient earnings over the 10-12 years which occurred before, during, and after treatment.

Yearly mean earnings of 634 adult psychiatric patients, grouped by sex and treatment duration, were examined. Patients receiving the shortest durations of treatment showed steady decreases in incomes prior to treatment and steady increases in incomes after treatment, often to higher levels than were reached before treatment. Patients receiving longer durations of treatment showed somewhat less consistent income patterns. The data indicate that virtually all patients, after treatment, regain pre-treatment earnings levels. In comparison to earnings of a non-patient sample, mental patients earn approximately 35% of their non-patient counterparts, but after treatment some achieve as much as 50% of non-patient earnings. The findings illustrate the importance of pre- and post-treatment work performance measures and the potential use of such data in program evaluation.

12. Binner, P. R. Output value analysis: An overview. In Information and Feedback for Evaluation, B. Willer, G. Miller, L. Cantrell (Eds.). Proceedings of IF Conference, York University, Toronto, November, 1974. Toronto: York University, 1975.

This paper provides a broad overview of the output value analysis model for mental health program analysis and evaluation. It provides a review of the benefit/cost logic and basic mechanics of the system as currently operationalized; it reviews the various studies performed with the model, including some currently underway; and, it discusses a number of the issues involved in the use of output value analysis and rational management techniques in general.

13. Wilderman, E. Summary statistics, nine-year output value analysis, Adult Psychiatry Division, Fort Logan Mental Health Center. Unpublished manuscript, FLMHC, May 1975.

This is an update of the June 1973 summary statistics produced by an output value analysis of information in the Fort Logan Record System on the Adult Psychiatry Division. It extends the statistics through the 1973-74 admission cohort; that is, it includes patients admitted to the Adult Division from July 1965 through December 1973 who were discharged by June 1974.

It consists of an introduction to the improved output value analysis method followed by 21 tables illustrating five basic components of the analysis: resource investment, estimated economic productivity, response level, readmission discount rate, and output value index. Each table represents these five statistics computed for different patient groupings based on demographic and treatment related variables.

14. Wilderman, E., Coates, C., and Potter, A. A benefit-cost approach to mental health program accountability across fiscal years. Unpublished manuscript, FLMHC, July 1975.

This study applies the Output Value Analysis to eight separate, consecutive admission cohorts of the Fort Logan Adult Psychiatry Division in order to illustrate a method for the longitudinal monitoring of a mental health treatment program. The study illustrates how the results of an Output Value Analysis can provide an empirical basis for answering a variety of mental health evaluation questions. Specifically, it can aid the program administrator who must monitor results for the purpose of allocating resources and justifying programs to outside funding sources. It helps answer the basic questions of how a program is performing from year to year of operation as well as why it is performing differently.

15. Binner, P. R., Potter, A., and Halpern, J. Workload levels, program costs, and program benefits: An output value analysis. Administration in Mental Health, Vol. 3, No. 2, Spring, 1976, 156-165.

This paper is an analysis of the relationship between program performance and the workload levels under which treatment took place. Program performance is measured both in terms of effectiveness and efficiency. Workload is measured in terms of the amount of direct service work done in relation to the amount of staff time available to do it. The results indicate that the best level of program effectiveness is obtained under medium workload levels whereas the greatest efficiency is obtained under high workload levels. The management dilemma resulting from these results and the application of empirically based management techniques is discussed.

16. Potter, A., Binner, P. R., and Halpern, J. Effectiveness and efficiency in mental health program management: A search for the point of diminishing returns. Unpublished manuscript, FLMHC, October 1975.

Effectiveness and efficiency in the delivery of mental health treatment services may be opposed to one another. In this study, a diminishing returns notion is formulated to analytically specify the problems; while costs increase at a constant rate as a function of the amount of treatment delivered, benefits increase at a decreasing rate, such that at some point in time the additional investment of treatment resources may exceed the additional value of treatment benefits. This notion was supported empirically by finding a linear relationship between the amount of treatment delivered and the resulting benefits. Applying the assumptions of an Output Value Analysis, the point of diminishing returns was operationally defined and subjected to sensitivity analysis. Finally, a potential application of diminishing returns to program management is briefly described.

17. Wilderman, E. Patients, programs, and results methodology applied to nine admission cohorts in a comprehensive mental health center. Unpublished manuscript, FLMHC, November 1975.

This study applies a methodology developed by Binner, Halpern, and Potter (1973) for measuring the complex interactions between types of patients, programs, and treatment outcomes to a sample of 4531 patients of the Fort Logan Mental Health Center. It was undertaken to investigate whether the conclusions drawn from the original study of 583 patients held for the larger number of patients and/or for these patients organized into more homogeneous subgroups by the variables of sex, admission status, age, readmission status, and diagnosis.

The results of this study added overwhelming support to the findings of the original study. That is, with a very few exceptions, it was found, again that patients of all four impairment levels achieved the best responses to treatment with lower intensities and the higher extent programs. The maximum return on the treatment dollar as measured by the output value index for all groupings of patients was found, also as in the original study, with the very low intensity and the very low extent programs.

18. Cicchinelli, L. F., Binner, P. R., and Halpern, J. Output value analysis of an alcoholism treatment program. Unpublished manuscript, FLMHC, May 1976.

Output Value Analysis, a benefit-cost method for program evaluation, was applied to the Alcoholism Division of a community mental health facility. It was found that different components of the program were differentially effective and efficient in treating patients. The program treated males and females with equal effectiveness, while it treated males more efficiently. Further, it was found that while the program was least efficient in treating severely impaired patients, it was the most effective for them. Finally, it was illustrated that the Output Value Analysis method of program evaluation is flexible enough to be used for the various divisions in a multiservice facility, although caution must be exercised when comparing results for the different types of patients and programs.

19. Binner, P. R. Outcome measures and cost analysis. Paper presented at the Program Evaluation Conference, Monticello, New York, May 25-28, 1976.

The thesis developed in this paper is that there are not two equally valid ways of looking at costs of mental health treatment programs. It attempts to show that the older, traditional form of cost analysis, the cost per day, as it is ordinarily used, is an inadequate and misleading method for analyzing program costs. The cost per patient discharged appears to have far fewer drawbacks, although it too has important limitations. A method for putting a value on each discharged patient, in addition to determining the costs associated with patients' treatment, is described briefly as a possible future alternative method for analyzing program costs.

20. Potter, A., Binner, P. R., and Halpern, J. Strategies for resource allocation: A cost-benefit approach to program management. Paper presented at the Annual Meeting of the Southern Regional Conference on Mental Health Statistics, New Orleans, October 3-6, 1976.

A method of estimating the values associated with treatment outcomes of mental health services is presented. The method was applied to a specific management problem, that of determining the amount of treatment associated with cost-effective outcomes. Expressing the relationships between costs and benefits mathematically, the breakeven point and the point of diminishing returns are defined. The implications for the development of resource allocation strategies are discussed.

AUTOMATED TRI-INFORMANT GOAL ORIENTED NOTE (ATGON)

(Supported by NIMH Grant #5 R01 MH 16858)

1. Wilson, N. C., Ellis, R. H., Booth, R. E., and Mumpower, J. Treatment effectiveness, program evaluation, and ATGON. (ATGON publication) FLMHC, August 1973.

This overview booklet introduces a new approach to some of the problems surrounding program evaluation in mental health. The Automated Tri-informant Goal Oriented Note (ATGON) was developed to: 1) improve patient care; 2) determine program and agency effectiveness; 3) aid in planning and evaluating individual patient treatment; and 4) streamline the paperwork accompanying delivery of these services.

The developmental history is traced, current usage is described with samples and future plans discussed.

2. ATGON sample forms and method definitions. (ATGON publication) FLMHC, August 1973.

All input and output documents are included as an example for system users. Goal definitions are given on the back of the goal selection sheets. Treatment methods used in various programs, their code numbers and definitions are also given.

3. ATGON goals. (ATGON publication) FLMHC, August 1973.

There are 718 possible goals to pick from in the ATGON System. These are divided into six general categories; medical, symptom, self-concept, patient initiated interaction, other initiated interaction, and disposition. Each goal has a distinct number code. These are collapsed to 135 for storage on the computer master file and for data analysis. The numbers of the original goals which were represented by the new collapsed goal are included in the latter listing.

This booklet serves as a reference tool for anyone working with the ATGON data. It also provides a guide for other systems in which goals need to be coded or otherwise organized.

4. ATGON team manual. (ATGON publication) FLMHC, August 1971.

Basic instructions, time schedules, definitions, and other relevant information for clinical personnel using the ATGON forms and system are presented.

5. ATGON interview manual. (ATGON publication) FLMHC, August 1971.

Each patient and a community collateral, if available, is interviewed by a non clinical staff person to ascertain their goals for treatment and later their perceived attainment of those goals. The interview consists of an open-ended segment on a semi-structured segment. These are outlined with examples and other instructions for the interviewer.

6. Wilson, N. C. An information system for clinical and administrative decision-making, research, and evaluation. Presented at symposium sponsored by Computer Support in Military Psychiatry (COMPSY), Washington, D. C., March 22-23, 1973. A revised and extended version of this paper is included as Chapter 10 in Progress in Mental Health Information Systems: Computer Applications. Crawford, J. L., Morgan, D. W., and Gianturco, D. (Eds.). Cambridge, Mass.: Ballinger Publishing Company, 1974.

The record system, resource utilization system, workload analysis, workforce estimating, ATGON, and output value analysis constitute the bulk of the management information system at Fort Logan. These systems intertwine to provide measures of efficiency and effectiveness. The development of, problems with, utilization of, and future plans for each system are discussed.

7. Wilson, N. C. The automated tri-informant goal-oriented progress note. Journal of Community Psychology, 1973, 1(3), 302-306.

Using a goal attainment model, ATGON was developed to serve as a communication tool regarding patient, staff, and family treatment goals and as an evaluation tool for clinical and administrative decision makers. Each informant group chooses goals from a list of over 700. Staff goals are selected during team meetings; those of the patient and family during a semi-structured interview.

The data are recorded on optical scan sheets and computer-generated goal-method narratives, response rating scales, and summary attainment statements are obtained using an IBM 360. A success score is obtained for each goal rated and these scores can be combined in various ways to assess treatment effectiveness across patients, informants, and time.

Both content and predictive validity were checked and found acceptable. The inter- and intra-interviewer reliabilities were exceptionally good. While the comparison of success scores among the three informant groups was only moderate, it is probable that most of the variance is due to real situational differences in the hospital vs. community settings of the informants.

8. Wilson, N. C. and Mumpower, J. L. Automated Evaluation of goal-Attainment ratings. Hospital & Community Psychiatry, Vol. 26, No. 3, March 1975.

During 1970-71, eighty-one relatives or close friends of patients on an Adult Psychiatric team at FLMHC were asked to set goals for each patient at admission, then rate progress and reset goals at one month. All goals from both settings were rated at discharge or 120 days after admission, whichever came first.

The community ratings indicated noticeable progress toward 64% of their goals and regression or failure on only 6.5% (29.5% indicated no change). No significant differences in degree of goal attainment by types of goals were revealed. The community's average attainment ratings indicated that perceived progress on the most important goals was approximately the same as perceived degree of progress on goals of lesser importance.

9. Ellis, R. H. and Wilson, N. C. Evaluating treatment effectiveness using a goal-oriented automated progress note. Evaluation, Monograph 1, 1973, 6-11.

The advantages of the goal orientation and the tri-informant approach are described along with the general ATGON Project objectives. A schematic description of the planning-feedback cycle is presented in addition to a narrative accounting of the information available and the decision makers receiving it.

10. Wilson, N. C. The ATGON approach to program evaluation. Paper presented at the 4th Annual Clinical-Community Workshop on Program Evaluation sponsored by the University of Maryland, Department of Psychology, October 17, 1974, Silver Springs, Maryland.

This paper describes the background and concepts which figured in the development of the ATGON model for program evaluation. It describes the procedures and results of the ATGON method and illustrates in detail the uses and possible further applications of ATGON data.

11. Swanson, R. M., Mumpower, J. L., Wilson, N. C., and Ellis, R. H. Dimensions of mental health treatment goals: A tri-informant conception. Unpublished manuscript, FLMHC, December 1975.

The major purpose of this study was to seek and describe goal dimensions that transect popular and theoretical notions of mental health. Clinical staff, clients and friends or relatives of clients independently selected mental health treatment goals for clients of a community-oriented state hospital, then rated goal attainment during treatment and at discharge. Empirical analyses of these goal choices were done with the objective of developing a more widely acceptable set of criteria for evaluating the efficacy of mental health treatment programs.

The results of the study repeatedly demonstrated a lack of consensus among clinical staff, clients, and community informants about the appropriate goals of mental health treatment. No common dimension shared by all three groups was identified, although meaningful dimensions could be identified within each group. It was therefore concluded that evaluation of treatment effectiveness should include all three informant groups.

12. Wilson, N. C. The Automated Tri-Informant Goal-Oriented Note: One Approach to Program Evaluation. Program Evaluation for Mental Health Methods, Strategies, and Participants, Robert Coursey et al. (Eds). Grune & Stratton Inc., New York, 1977 (Chapter 8).



Workload Analysis

1. Binner, P. R. and Shipley, G. S. An approach to workload analysis. Unpublished manuscript, FLMHC, June 1971.

The first step was to recognize that volume of patients moving through the Center could be accounted for in terms of input--evaluations and admissions; process--average daily enrollment and average daily attendance; and output--discharges. Workload indicators were defined as ratios of different categories of work volume (input, process, and output) to the resources available to do the work (FTE's). A pilot study using these ratios to summarize the workload for nine years of the Center's history was developed for the Center as a whole, as well as for some other functional divisions. A discussion of needed refinements was pursued.

2. Nassimbene, R., Binner, P. R., and Shipley, G. S. An approach to workload analysis: Part II. Unpublished manuscript, FLMHC, June 1971.

While the volume of work to resources ratios developed by Binner and Shipley (1971) appeared to be improvements over the single measure of average daily attendance, this paper focused on two system performance indicators (system productivity and turnover) which attempt to capture more dynamic aspects of the mental health organization. System productivity is defined as the volume of work that is produced in a given time period by a given amount of resources, where "volume" is the number of patients processed by the system. System turnover is defined as the number of times the caseload changes during a given time period. These measures are calculated and compared for various divisions and teams at FLMHC.

3. Nassimbene, R. and Binner, P. R. On measuring work done in a mental health facility. Unpublished manuscript, FLMHC, March 1972.

The use of a productivity measure, instead of average daily attendance or simple workload measures of the ratio of average daily attendance to FTE's, was supported as a means for assistance in managing a mental health facility. Productivity was defined as output per full time employee. The importance of quality of output measures was stressed.

Workforce Estimating

1. Binner, P. R. and Nassimbene, R. An approach to workforce estimating. Unpublished manuscript, FLMHC, June 1972.

A summary was made of developments in the evolution of a workload estimating system from average daily attendance, to multiple measures of direct services provided, to additional refinements of a single measure which incorporated a common time base and a method of weighting different kinds of work. Two user related problems with the workload index were discussed: 1) users assuming the index was a linear predictor of FTE's required, and 2) users treating the workload index as a measure of program "goodness."

2. Binner, P. R., Nassimbene, R., and Truitt, E. Workforce estimating: An illustration of the method. Unpublished manuscript, FLMHC, July 1972.

A direct method for estimating workforce requirements was developed. The framework for the analysis was described which includes what kinds of work need to be done, how long the work should take, and a classification of time obligations into fixed, step-variable, and variable relationships. Both hypothetical and actual data were reviewed, and the initial results indicated the method provided sensitive and realistic estimates.

3. Nassimbene, R. and Binner, P. R. Effect of patient workload changes on clinical staffing requirements. Unpublished manuscript, FLMHC, March 1973.

The relationship between changes in patient workload demands and changes in FTE workforce requirements was examined with the aid of some examples. Within certain ranges of capacity for the Center, an increase (or decrease) in patient workload caused a smaller increase (or decrease) in FTE requirements due to fixed costs.

4. Binner, P. R. Evaluation of program needs and program results: An overview. Paper prepared for a symposium on Operations Research at The Johns Hopkins University, School of Hygiene and Public Health, Baltimore, January 1974.

This paper reviews the various methods used at the Fort Logan Mental Health Center to evaluate the staffing and funding needs of the Center and to measure the results of the program. Because of the increasingly sophisticated demands of funding sources, these two lines of inquiry are becoming a critical part of the budgetary process. While much still remains to be done in developing methods for measuring the workforce requirements of the Center and the results of the program, some productive lines of analysis have been started. The pace of future developments depends heavily on the availability of the additional funds needed to support these increasingly sophisticated management and evaluation systems.

A number of additional studies have been made by staff members, students, and other professionals. These include such topics as:

Length of Stay

Readmissions

Resource Utilization

Response to Treatment

Patient Chronicity

Follow-up

Dropouts

Treatment Costs

Suicide

A number of additional studies have been made by staff members, students, and other professionals. These include such topics as:

- Length of Stay
- Reservations
- Resource Utilization
- Response to Treatment
- Medical Chronology
- Follow-up
- Prognosis
- Transfer Costs
- Religion