Innovation of Health Services: A Comparative Study of Hospitals and Health Departments

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This paper investigates the differential contribution of various organizational variables affecting the innovation of high-risk versus low-risk health service programs in two types of health care organizations: hospitals and health departments. It was found that variables are differentially related to both the type of program and the type of organization. Organizational size was a critical factor in program innovation as it relates to high-risk services in hospitals and low-risk services in health departments. Excluding size, characteristics of the staff, such as cosmopolitan orientation and training, were prime predictors for both high- and low-risk programs in health departments and low-risk programs in hospitals. The degree of formalization was the primary predictor of innovation of high-risk programs in hospitals. Cosmpolitan orientation of the administrator was a critical factor in the innovation of high-risk programs in both hospitals and health departments.

The assessment of change in health care organizations, and particularly program innovation, has received increasing attention by social scientists. Using a wide range of explanatory variables, research, with few exceptions, has tended to concentrate on explaining variation in the innovation of a single program or that of aggregate change. For a review of these studies see Kaluzny (1972). While this represents progress, it is important to consider two underlying problem areas. First, it is necessary to inquire into the general area of programmatic change and whether factors associated with program innovation differ by type of program innovated. Essentially, this exploration involves assessment of a set of services and activities that have common characteristics, making possible generalization from known determinants of innovation of one program to other programs with similar characteristics. Secondly, explanation of differences by type of organization is necessary to provide insight into the specific organizational setting under which

various factors are most appropriate. Thus, the introduction of a comparative study of organizational innovation permits an assessment of the generalizability of findings and provides an evaluation of the impact of organizational variables on concrete operational programs. Insight into these aspects is critical to the development of effective intervention strategies that may be used systematically to administer organizational innovation.

In an attempt to address these problems, the present study will provide a comparative analysis of organizational factors affecting the innovation of selected health services with a specific set of characteristics in two types of health care organizations: hospitals and health departments. The objective is to assess the differential contribution of organizational variables relating to the innovation of selected health services with specific characteristics as implemented within and between hospitals and health departments. To meet this objective, two specific questions are examined. First, is there a difference in organizational variables which accounts for innovation of services having different characteristics? Second, are there differences between organizational variables for hospitals as one type of health care organization and those for health departments as a distinctively different type of health care organization?

Method

Data for the study are based on questionnaires and interviews conducted in all organized county and city health departments in New York State excluding New York City ($n = 23$) and a sample of general acute hospitals ($n = 59$) located in the respective health department jurisdictions. Within each health department jurisdiction at least two hospitals were selected, unless only one hospital was available. The selection of hospitals was based on their innovative status and number of beds. Hospitals with three or more of the six program areas under study were considered innovative; all other hospitals were considered low innovators. Hospitals in each of the two innovation groups were further classified into those with more than 500 beds and those with 500 or fewer beds. Final selection of hospitals included all high-innovation hospitals regardless of number of beds and all hospitals of over 500 beds regardless of innovative status. One-fourth of the low-innovator hospitals with 500 or fewer beds were randomly selected. These hospitals were evenly di-

vided on the basis of whether they had more or fewer than 300 beds.

Within sample organizations, four sets of respondents were selected. For hospitals, the list included (a) the administrator, (b) assistant-associate administrators and all department heads, (c) executive directors of the boards of trustees and a randomly selected sample of trustees, (d) chairmen of medical staff and a sample of physicians on the staff of the respective hospitals. For health departments, the respondents included (a) the director of the health department, (b) deputy and all department heads, (c) executive officers of the board of health and a sample of board members, and (d) a sample of staff public health nurses. Non-professionals and non-supervisory personnel were excluded because they were less directly involved in decision-making processes within the organization.

Administrators of both organizations were interviewed. In addition, questionnaires were sent to all personnel including the administrator. For hospitals, responses were received from 48 administrators (81 percent), 343 associate and assistant administrators and department heads (85 percent), 529 physicians (61 percent), and 366 hospital trustees (70 percent). In health departments, responses were received from 23 health officers (100 percent), 112 department heads (89 percent), 96 members of boards of health (61 percent), and 176 public health nurses (82 percent). Analysis of data from hospitals and health departments excluded from this analysis and non-respondents from within participating organizations indicates that the non-participants are not significantly different from organizations and respondents that did participate in the study.

Within participating organizations, attention focuses on the innovation of selected health services and activities associated with six program areas: home health, family planning, rehabilitation, mental health, medical social work, and chronic-disease screening. The specific services within each program area are shown in Table 1. These services were selected because of their association with the comprehensiveness and continuity of community health services. As the table indicates, the most commonly provided service for hospitals is physical therapy within a rehabilitation program, and, for health departments, home nursing within home health programs. Less commonly provided services for both hospitals and health de-

TABLE 1

Proportion of Hospitals and Health Departments Implementing Services and Activities

Services and Activities	*Proportion of Hospitals Implementing*	*Proportion of Health Departments Implementing*
Home health		
Social services	11.7	20.9
Home nursing	9.6	66.3
Physician services (for coordination and planning of patient care)	7.7	28.8
Homemaker or health aide	5.4	43.4
Home-delivered food	2.3	1.5
Transportation	5.4	7.3
Patient care conferences	7.1	43.4
Physical therapy	11.9	51.7
Speech therapy	5.2	25.4
Family planning		
Provision as separate entity	11.7	41.5
Provision in conjunction with other services	20.2	43.4
Case-finding activities	14.2	26.3
Systematic follow-up procedures	13.3	49.8
Community case-finding activities using indigenous workers	4.6	28.8
Rehabilitation		
Routine evaluation of all patients	20.8	23.9
Standard nursing procedures	38.3	42.4
Physical therapy	67.9	41.5
Occupational therapy	31.7	16.6
Speech and hearing therapy	27.5	32.2
Mental health		
Outpatient diagnostic and treatment	26.3	23.4
Inpatient diagnostic and treatment	40.6	7.3
Use of indigenous workers for case-finding and information dissemination	8.5	8.8
Integration with other health services	20.8	36.7
Follow-up care after hospitalization	20.0	44.9
Medical social work		
Psychological and social consultation	29.6	22.9
Information and referral	42.7	29.3
Predischarge planning (hospitals)	40.0	
Assist families with legal problems (health departments)		7.3
Chronic disease screening		
Cervical cytology	36.3	53.7
Ocular tonometry for glaucoma	18.9	26.8
EKG cardiac anomaly	17.3	11.7
Multiple blood chemistry	36.0	19.5
Self-administered health questionnaire	4.8	5.9

partments are generally within the home care programs, with home-delivered food the least commonly provided.

Organizational Innovation

In using the concept of innovation, a number of alternatives have been considered for the classification of the dependent variable, i.e., degree of innovativeness of the organizations under study. Most of the classification schemes have various shortcomings. The least complex score which has been used with these data is classification of organizations on a scale of innovativeness using a simple sum of the 32 study services provided by each organization while controlling for the date of innovation. If innovation is considered as the simple adoption of services, the more services adopted the more innovative is the organization.

However, the gross services-provided score has several drawbacks. First is the fact that an organization providing a large number of services may have implemented them at some point in the fairly distant past but may not currently be undergoing substantial change. In essence, an organization, innovative in the past and hence receiving a high innovation score, may no longer be innovative. Another related problem is the difficulty of relating explanatory organizational variables based on cross-sectional data to retrospective data on innovation.

A partial solution to these problems has been to consider only programs implemented within the five-year period prior to the study in developing a score of innovation. This tends to limit the effect of extensive early adoption of services and also the possibility that early innovators may no longer be innovative. The use of data for the last five years does, however, produce one conceptual problem. Because a finite number of services are under consideration, some highly innovative organizations may have implemented all or most of the services prior to the five-year period and then moved off into other even more innovative areas which our data do not tap. A partial control for this possibility can be developed using the number of services provided at the beginning of the five-year period.

A second major difficulty in developing an index of innovation based on the 32 services under study is the diversity of the services. As Table 1 shows, a score based on the total 32 services combines a large number of fairly diverse activities. On the face of it, no logi-

cal reason exists to assume that homemaker services are comparable to routine cervical cytology, or that speech and hearing rehabilitation are comparable to family-planning case finding. A logical procedure for assuring a greater degree of consistency within an innovation score using the 32 services is to generate a score for each of the six program areas. Such scores, however, seem unsatisfactory for two reasons. On the one hand, services such as family-planning case finding and mental-health case finding may have more in common with one another than with other family-planning or mental-health services. Speech therapy within the home and in-hospital speech therapy, family-planning case finding and mental-health case finding, or integration of either family-planning services or mental-health services with other routine activities of the institution represent similar examples. Consequently, it is difficult even to evaluate the meaning of specific program scores.

At the same time, the services under study do not represent an exhaustive list of activities or services a health establishment might provide. Despite the fact that a real effort has been made to include all services considered to be critical to the successful operation of the six program areas, a legitimate case might be made for other services, or, indeed, for other programs as the focus of study in innovation. Because specific services analyzed leave little potential for generalization to other unstudied services and little potential for discussing the attributes or underlying commonalities of services rather than the services themselves, a means must be found to classify services on some logical basis relative to the nature or effect on the organization.

Fliegel and Kivlin (1966), in a study of the adoption of innovative practices among farmers in the state of Pennsylvania, discuss a number of attributes of practices such as cost, payoff, social approval, and divisibility which may be used to describe such practices. Using judgments by various experts about the attributes of farm practices, they are able to find high correlations between the attributes of a particular practice and the degree of adoption of that practice.

Drawing on the work of Fliegel and Kivlin, a set of potential attribute categories was devised. To arrive at a rating for each of these attributes, a group of judges, all having relevant administrative experience, was asked to rate each of the 32 health care services under study on a set of 10 nine-point scales. The 10 attributes,

their definition, the overall mean rating and standard error for both hospitals and health departments are shown in Table 2. While the specifics are discussed in a previous paper (Kaluzny and Veney, 1973), Table 2 shows that the ratings for both hospitals and health departments are quite similar for all attributes. The two possible exceptions are rate of cost recovery where the mean differs by as much as the standard error of the hospital measure, and association with the major activities of the enterprise where the mean differs by half of the standard error. The standard errors of the ratings for both hospitals and health departments are also relatively similar with the exceptions being in initial cost, continuing cost, and social approval where there was slightly more variation among the services for health departments than for hospitals.

For the purposes of this paper the question is whether attribute judgments for each service can be used to classify services into logically related categories. A factor analysis, carried out for each of the 32 services and the mean value of all judgments on the ten attributes, produced two major factors for both hospitals and health departments. The respective factor loadings for the 32 services are shown in Table 3 along with the proportion of variance accounted for by both factors.

Analysis of the two separate factors for hospitals and health departments reveals some interesting characteristics. When the mean attribute score for services with high factor loadings on each factor was compared to the mean attribute score for services with low factor loadings, a pattern emerged. The mean attribute judgment appears in Table 4. Those services which generate high factor loadings in factor 1 for hospitals tend to be judged low in initial and continuing costs and high in payoff, social approval, complexity, clarity of results, association with major activities, and pervasiveness. Those services which generate high factor loadings for factor 1 in health departments tend to be the same types of services as appeared for hospitals. At the same time, the attributes tend to remain quite similar. This includes low initial and continuing cost and high payoff, clarity of results, and association with major activities of the enterprise.

The comparison of mean attribute judgments of those services with high loadings on factor 2 in both hospitals and health departments produces almost a mirror image of factor 1, except for the fact that certain services load high on both factors and certain ones

TABLE 2
Mean and Standard Error of Attribute Ratings
for Hospitals and Health Departments

Attributes	Hospitals		Health Departments	
	$\bar{X}$	*S.E.*	$\bar{X}$	*S.E.*
Initial cost: cost to initiate the use of this particular service or activity in a hospital (health department)	4.96	1.00	4.80	1.40
Continuing cost: cost to provide this service or activity on a continuing basis within a hospital (health department)	5.48	0.87	5.39	1.10
Rate of cost recovery: length of time it takes to return the investment cost of implementing this service or activity in a hospital (health department)	4.68	0.52	5.20	0.65
Payoff: impact the service or activity has in terms of improving the quality and/or continuity-comprehensiveness of overall services or activities provided in a hospital (health department)	7.11	0.71	7.00	0.71
Social approval: amount of increased community recognition gained by the hospital (health department) in providing this service or activity	6.30	0.71	6.45	1.01
Divisibility: feasibility of implementing part of the service or activity on a trial basis in a hospital (health department)	6.04	0.70	6.65	0.93
Complexity: ease with which the objectives of the service or activity can be explained or understood	6.55	0.62	6.58	0.74
Clarity of results: visibility of the implemented service or activity relative to objectives	6.34	0.83	6.46	0.79
Association with major enterprise of hospital (health department): degree to which service or activity has to do with direct patient care of the hospital/preventive services of health departments	6.71	1.00	7.18	1.00
Pervasiveness: degree to which the provision of this service or activity requires other changes in the hospital (health department)	5.98	0.74	5.58	0.64
Percentage which have service	20.46	15.14	28.95	16.17

TABLE 3
Factor Loadings for Each Study Service or Activity

SERVICE AND ACTIVITIES	HOSPITALS		HEALTH DEPARTMENTS	
	Column 1 *Low Risk*	Column 2 *High Risk*	Column 3 *Low Risk*	Column 4 *High Risk*
Home health				
Social services	.6924	.6117	*.6036	.5449
Home nursing	*.8747	.4560	*.9161	-.3048
Physician services (for coordination and planning of patient care)	*.8892	.3768	*.7632	.3571
Homemaker or health aide	.5922	*.7348	*.7341	.5235
Home-delivered food	.6230	.6401	.6313	.7259
Transportation	.7328	.6187	.6366	.7207
Patient care conferences	.2675	*.8741	-.0373	*.6466
Physical therapy	*.8229	.4714	*.9448	-.0312
Speech therapy	*.7629	.5629	*.8482	.4679
Family planning				
Provision as separate entity	*.8673	.4709	*.9201	-.0538
Provision in conjunction with other services	.5454	*.7770	*.6473	.4622
Case-finding activities	.3098	*.9123	.1274	*.8243
Systematic follow-up procedures	.2133	*.9580	.0015	.4164
Community case-finding activities using indigenous workers	.2616	*.8968	.0582	*.9100
Rehabilitation				
Routine evaluation of all patients	*.7374	.4794	.6837	.6179
Standard nursing procedures	.4674	.4555	.4772	.5733
Physical therapy	*.6320	-.4443	*.9673	.1100
Occupational therapy	*.8795	.2161	*.8429	.5136
Speech and hearing therapy	*.8564	.2660	*.9416	.3004
Mental health				
Outpatient diagnostic and treatment	*.9352	.1727	*.9287	.2581
Inpatient diagnostic and treatment	*.9261	.0122	*.8722	.3197
Use of indigenous workers for case-finding and information dissemination	.2895	*.8964	.1793	*.9646
Integration with other health services	.5597	*.7027	.5779	*.6697
Follow-up care after hospitalization	*.8355	.4388	*.8614	.3323
Medical social work				
Psychological and social consultation	*.8072	.3703	*.7862	.4376
Information and referral	4553	.4441	.3179	*.8265
Predischarge planning (hospitals)	.3702	.5295		
Assist families with legal problems (health departments)			.3549	*.8853
Chronic disease screening				
Cervical cytology	*.6957	.3589	*.8561	.0448
Ocular tonometry for glaucoma	*.7437	.5197	*.6413	.6110
EKG cardiac anomaly	*.8063	.4433	*.8670	.4751
Multiple blood chemistry	*.8466	.1661	*.8108	.5178
Self-administered health questionnaire	.0781	*.9538	-.0437	*.9375
Pct. Variance explained	82.0	13.7	73.5	18.9

* Indicates those services used in computation of high- and low-risk scores.

TABLE 4

Mean Attribute Ratings by Factor: High versus Low Loading

	HOSPITALS				HEALTH DEPARTMENTS			
	Factor 1		Factor 2		Factor 1		Factor 2	
	Loading		*Loading*		*Loading*		*Loading*	
	High	*Low*	*High*	*Low*	*High*	*Low*	*High*	*Low*
Initial cost	4.3	< 6.0	5.7	> 4.5	4.3	< 6.1	5.8	> 4.2
Continuing cost	4.9	< 6.3	6.2	> 5.0	5.0	< 6.5	6.3	> 4.9
Rate cost recovery	4.8	4.4	4.6	4.7	5.1	5.6	5.5	5.0
Payoff	7.4	> 6.7	6.5	< 7.5	7.0	7.0	6.9	7.1
Social approval	6.6	> 5.8	6.0	6.4	6.8	> 5.3	5.8	< 6.9
Divisibility	6.0	6.1	6.0	6.0	6.5	7.0	6.5	6.8
Complexity	6.8	> 6.2	6.1	< 6.8	6.7	6.3	6.4	6.7
Clarity of results	6.7	> 5.7	5.8	< 6.7	6.7	> 5.9	6.3	6.6
Association with major enterprise of hospital (health department)	7.2	> 5.8	5.8	< 7.2	7.4	> 6.5	6.5	< 7.6
Pervasiveness	6.3	> 5.4	5.4	< 6.3	5.6	5.5	5.3	5.7

load high on neither. In general, however, those programs which load high on factor 2 in hospitals are characterized by judgments of high initial and continuing cost, low payoff, low complexity, low clarity of results, low association with the major activities of the enterprise, and low pervasiveness; while in health departments, they are high on judgments of initial and continuing cost and low on social approval and association with the major activities of the enterprise.

Except for the fact that separate factors in this type of analysis are conceptually and statistically assumed to reflect different underlying dimensions, one is tempted to view the services with high loadings on the first factor as primarily low-risk services and those with high loadings on the second factor as high-risk services. Because a substantial proportion of the total variance is contained in factor 1, both for hospitals and health departments, this course takes on additional appeal. While any number of names could be devised to differentiate between factor 1 and factor 2 in each case, it was decided to consider the critical underlying dimension to be the judges' assessment of risk involved in attempting to provide the

services. On the basis of this information, two separate measures of innovation were devised for hospitals and health departments.

The first measure for hospitals, the level of implementation of low-risk services (those services marked by asterisks in column 1, Table 3) is a summation of all such services, i.e., home nursing, home physician services, physical therapy, and so on, implemented by each hospital. The second measure for hospitals, the level of implementation of high-risk services (those marked by asterisks in column 2, Table 3) is a summation of all such services, i.e., homemaker, patient care conferences, implemented by each hospital. Similar measures were constructed for health departments using data from columns 3 and 4 of Table 3. Those services with high loadings on both factors were eliminated from consideration as well as those with low loadings, in order to avoid confounding the results.

In accepting these measures of organizational innovation, there is some concern that organizations which had implemented numerous services prior to the last five years would be limited in the amount of innovation they would be able to record in the last five-year period simply because of the limit on the number of programs under study. If, for example, the organization had innovated most of the study services prior to the last five-year period, it would not be able to obtain a high innovation score by the measure being used no matter how innovative the organization actually was during the more recent period. By the same token, an organization having done nothing prior to the last five-year period could potentially implement a number of services during the last five-year period and be classified as highly innovative.

Consequently, before accepting the services implemented in the last five years as a measure of innovation, it was desirable to examine the relationship between that score and both an overall measure of innovation and a measure of the services provided by the organization prior to the last five years. An examination of these data, however, indicates that the measure of services implemented in the last five years as the innovation score is not artificially reduced by the finite limit to the number of services under study.

Table 5 shows the relationship between those services provided in the last five years and the total number of services provided as well as those services provided in the last five years as compared to those provided prior to the last five years. Only with

TABLE 5

Relationship of High- and Low-Risk Services of Hospitals and Health Departments by Overall Innovation and Innovation Prior to the Five-Year Study Period

	INNOVATION WITHIN LAST FIVE YEARS			
	Health Departments		Hospitals	
	Low-risk	*High-risk*	*Low-risk*	*High-risk*
Overall innovation				
Low-risk	.717	—	.756	—
High-risk	—	.848	—	.901
Innovation prior to last five years				
Low-risk	0.48[a]	—	.138[a]	—
High-risk	—	.415 (.05)	—	.226[a]

[a] Not Significant

high-risk programs in health departments is there a significant correlation between those services provided in the last five years and those provided prior to the last five-year period. This correlation, moreover, is positive, which indicates that the more high-risk services provided prior to the last five years, the more such services an organization is likely to innovate within the most recent five-year period. This finding eliminates our initial concern that the finite number of services would reduce the number any organization could innovate over a five-year period relative to those begun prior to that period. Moreover, the relatively high correlations between total scores and the scores for the last five years, ranging from .901 for high-risk services within hospitals to .717 for low-risk services within health departments, lead to the conclusion that the finite number of services under study will not artificially decrease the innovation score assigned to any one organization. Thus, the number of services innovated in the last five years in each of these areas is the operating definition of innovation in this study.

Factors Influencing Organizational Innovation

Selection of the set of explanatory variables used in the analysis was guided by the Pugh et al. (1963) scheme of conceptually distinct

levels of analysis in the behavior of organizations: (1) context within which the organization is found, (2) organizational structure and function, (3) organizational composition, (4) individual personality and behavior. The last level for our purposes was specified as selected personality and behavioral aspects of the administrator of the hospital or the director of the local health department.

The findings of the major studies of organizational innovation were a second important influence in designating specific factors that might account for variation in the innovation of the respective programs in the two types of organizations. In fact, the empirical analysis reported in this paper was primarily oriented toward considering variables within the conceptual levels of analysis for which some theoretical and/or empirical evidence had alreay been elaborated.[1] Thus, the major emphasis is not only to replicate and test relationships where possible, but, more important, to assess the generalizability of these propositions and/or empirical evidence to the innovation of high- versus low-risk programs in hospitals and health departments.

Organizational Context. Pugh et al. (1963) posit that the socioeconomic context of the organization has primary influence on its structure and function and thus on its innovative activity. Two contextual variables are considered. Size of organization is important to any analysis of organizational innovation simply because it connotes a summary of factors that constitute various organizational resources, complexities, etc. However, there is less agreement as to which aspects of size are related to program innovation and to the differential relationships between type of organization and type of program. Mytinger (1968) finds various indices of health department size, e.g., number of staff, size of budget, and characteristics of the jurisdiction, strongly influencing the innovation of various types of health care programs. Contrariwise, Mohr (1969), in a similar assessment of program innovation in health departments, notes that resources available as a consequence of size have no impact on the proportion of total increase of resources devoted to instituting or expanding innovative health care services. In this

[1] Variables already eliminated because of the minimal contribution and/or high correlation with other variables include rule observation, hierarchy of authority, organizational member's values toward change, and professional activism and professional training of the administrator.

analysis, organizational size for hospitals was defined simply as the number of beds within the organization. For health departments, size was defined as the population within the department's jurisdiction. In both cases, we expect organizational size to be positively related to program innovation.[2]

Other contextual variables considered relevant and obviously part of the general composite of variables involved with size are resources and specifically organizational slack. The latter is defined as the existence of uncommitted money or manpower available to the organization (March and Simon, 1964). Although this variable has received limited empirical documentation within health care organizations (Mohr, 1969), the notion as presented by March and Simon suggests that if slack resources exist, various specializations arise with respect to commitment to new programs or program elaboration. Thus, to the extent that variation exists between organizations, the availability of slack resources may differentially influence the amount and type of program innovation.

Two different measures of slack are utilized relative to the type of organization. For hospitals, slack is measured by the ratio involving the number of assistant-associate administrators per bed. It is inferred that the larger the ratio the greater the slack. A comparable measure was not available for health departments; however, as an approximation for this type of organization, slack was measured by the ratio of dollars to population coverage.

Organizational Structure and Function. Organizational structure and function in this analysis include three variables: (a) centralization as defined by the degree of participation in organizational decision making;[3] (b) formalization as defined by the degree to which

[2] Data for hospitals were obtained from the 1969 Hospital Guide Issue. The size of health department jurisdiction was based on data available in the City-County Data Book (1968).

[3] The index of participation in decision making was based on the extent to which individuals indicated participation in decisions concerning the following items: (a) allocation of total organizational income, (b) adoption and implementation of new organization-wide programs and services, (c) development of formal affiliation with other organizations, (d) appointment and promotion of administrative personnel, (e) appointment of medical staff members, and (f) long-range planning for new hospital-wide programs and services. Response categories involved (a) considerable participation, (b) some participation, and (c) no participation. The data were obtained from all respondent groups in both types of organizations.

rules define the person's activity within the organization;[4] (c) perceived performance as defined by the membership's satisfaction with the ability of the organization to meet community health needs and with the organization's reputation in the community.[5]

Although no available data exist on a comparative assessment of these variables in different types of health care organizations or as they relate to programs having different characteristics, there is a fair amount of agreement that both centralization and formalization are negatively related to innovation. Hage and Aiken (1967), in their study of sixteen health and welfare organizations, find that a high degree of participation and low formalization are highly associated with a high rate of program change. Palumbo (1969), in his assessment of health departments, presents similar findings. In a study of a single innovation, i.e., adoption of new drugs in hospitals, Rosner (1968), using a measure comparable to formalization, finds a negative relationship between the degree to which members of the organization follow procedures specified by superiors and that of innovation.

There has been no empirical attention given to performance satisfaction as a factor in organizational innovation. However, following March and Simon (1964), performance satisfaction refers to the amount of satisfaction with the organization's achievement relative to its changing environment. The underlying theory is that the lower the satisfaction with the organization's performance, the

[4] Formalization was based on scales developed by Hall (1963) and was measured by the individual's response to two questions: (1) Are how things are done here left up to the person doing the job? (2) Do most people here make their rules on the job? Response categories involved (a) basically true, (b) basically false, and (c) no opinion. Data were obtained from the administrators, assistant/associate administrators, and all department heads in hospitals and from the director, deputy, all department heads, and a sample of staff public health nurses in health departments.

[5] Organizational reputation was measured by a single question with five response categories: "To the best of your knowledge, what kind of reputation does this hospital (health department) have in the community?" (1) excellent; (2) very good; (3) good; (4) fair; (5) poor. Perceived need was similarly measured: "On the whole, how well do you feel this hospital (health department) is meeting the needs of the community as compared to similar hospitals (health departments) in this area of the country?" (1) extremely well; (2) very well; (3) adequately; (4) not well enough; (5) poorly. For both questions responses were received for all respondent groups within the organization.

greater the probability that programs will be innovated in an attempt to increase the level of satisfaction.

Organizational Composition.[6] Two variables are presented under this category: cosmopolitan-local nature of the staff[7] and the degree of training.[8] Both of these may be considered as a measure of organizational complexity and as such present a direct relationship with the rate of program change (Hage and Aiken, 1967). Empirical data on both health departments and general health and welfare organizations suggest that both these measures have a positive association with program innovation (Mytinger, 1968; Mohr, 1969).

Characteristics of the Administrator. Two basic characteristics of the administrator are considered. The first involves his values toward change and in this sense represents an index of his ability to

[6] Organizational composition variables are what Lazarsfeld and Menzel (1961) term analytical properties of collectivities, i.e., properties of collectives which are obtained by performing some mathematical operation upon some property of each single member.

[7] Index of cosmopolitanism-localism was based on the extent to which individuals within respective respondent groups participated in various professional activities. In hospitals, trustees and administrative staff responded to the degree to which they participated in (a) American College of Hospital Administrators and (b) American Hospital Association. Physicians responded as to their activities in the American Medical Association. In health departments, the members of the board of health, department heads, and staff nurses responded as to their participation in the (a) American Public Health Association and (b) the New York State Public Health Association. Response categories involved (1) attend meetings regularly; (2) have presented paper at meetings; and (3) currently hold or have held office.

[8] We used an organizational complexity scale developed by Hage and Aiken (1967). The index was scored as follows: (a) an absence of training beyond a college degree and the absence of other professional training received a score of 0; (b) an absence of training beyond a college degree and the presence of other professional training received a score of 1; (c) a presence of training beyond a college degree and the absence of other professional training received a score of 2; (d) a presence of training beyond a college degree and the presence of other professional training received a score of 3. Data were obtained for all assistant-associate administrators including department heads in both hospitals and health departments.

accept new concepts and ideas.[9] The second variable is the extent to which the administrator is cosmopolitan in his orientation.[10] Studies which have included the administrator as a unit of analysis strongly support the inclusion of both these variables in any consideration of innovation. Becker (1970), for example, notes that more cosmopolitan administrators tend to be early adopters of programs classified as having high adaptive potential. Similarly, Kaplan (1967), in an assessment of aggregate change, notes that administrators who manifest psychological flexibility have a higher proportion of program innovation. Finally, Mytinger (1968), in his study of health departments, finds the cosmopolitan orientation of the administrator strongly associated with program innovation.

Data Analysis and Findings

Before launching into the analysis of the data, it is necessary to give special attention to organizational size as one of the major variables under study. Organizational size, which has been discussed previously, was measured in hospitals by the number of beds the hospital reported in our interview. The measure of size for health departments was considered to be the number of people within the geographical area served by the health department. In a number of previous analyses of data from a national survey of hospitals and

[9] Index of values toward change was based on scales developed by McClosky (1958). Four questions from the original nine-item scale were selected: (1) I prefer a practical man any time to a man with ideas; (2) if something has existed a long time, there is very likely much wisdom in it; (3) I'd want to know that something would really work before I would be willing to take a chance on it; (4) groups can live in harmony in this country without changing the system in any way. Respondents were asked to "agree" or "disagree" with each of these four items. An "agree" response is a conservative response.

[10] The administrator's cosmopolitan orientation was based on the degree to which he was involved in professional groups. For hospital administrators this involved the American Hospital Association and the American College of Hospital Administrators. For health department directors, this involved the Public Health Association and the New York State Public Health Association. The response categories were the same as those presented in footnote 7.

health departments (Veney et al., 1971) and the New York data, size, either as measured by beds or by population served, has shown itself to be an influential variable. However, some question exists as to whether size per se is a causal variable. Size by its very nature stands as a proxy for a number of other characteristics of the organization. Examining national data, it was found that size of the organization was highly correlated with such things as population density, region of the country, urban/rural locations, and even with mean income and education of the population.

In a simple stepwise multiple regression in which these types of variables are permitted to enter the equation in order of explained variance, size generally serves to eliminate most of the variance which may be attributed to the characteristics of the region in which the organization is located. At the other end of the spectrum, we also found size to be highly correlated with the characteristics of the organization's structure and characteristics of the personnel of that organization. In the data under study, size correlates more highly with overall innovation for both high- and low-risk services and for both organizations than does any other variable with the exception of staff training within the high-risk programs in health departments (refer to Tables 6–9).

Because we believe that size is essentially a proxy for other characteristics of the organization, there are two ways in which size might be viewed. Size can be considered first as essentially a prior causal variable which is in part largely a characteristic of the region of the country in which the organization is located. Thus, densely populated urban areas tend to produce larger hospitals and larger health departments, which in turn attract more capable administrators and more capable staff, and produce a structure which is more favorable and amenable to change. This view of size suggests that the effect of the other variables under study could not be evaluated until the variance attributable to size had been eliminated from the innovation score. Under this assumption, size is an essentially uncontrollable external constraint.

The alternative view of size is as an emergent variable. From this view, growth is a part of the whole host of organizational characteristics, some of which can be manipulated and some of which cannot. Even from this view, size may be in part an uncontrollable external constraint, particularly as it is a function of location. However, size can also be seen as a characteristic of the structure and

organization of the hospital, including the characteristics of the administrator.[11]

Given these two alternative views of size, the analysis was carried out both with size included, in which case it is considered to be a prior variable, and with size eliminated from the analysis. In the latter case, size itself is considered to be partly a function of the independent variables under study. Interestingly enough, as may be seen from the column marked R^2 in Tables 6–9, there appears to be an interaction effect between type of service, i.e., high- or low-risk, the organization which is doing the innovating, and the variable size. Table 6 shows that size is independently important to the innovation of low-risk services within health departments, and Table 9 shows that, alternatively, size is important to the innovation of high-risk services within hospitals. In health departments, as shown in Table 6, the over-all significant regression equation allows the prediction of 55 percent of the variance in low-risk innovation score with size included, but only 42 percent of the innovation score with size eliminated. By the same token, in Table 9, the significant regression equation allows a prediction of approximately 31 percent of the innovation score for high-risk services within hospitals, but, with size eliminated, the overall significant regression equation allows only the prediction of 21 percent of the variance in the innovation score for high-risk services.

However, as Tables 7 and 8 show, size is not a critical variable in the prediction of high-risk services within health departments or prediction of low-risk services within hospitals. Fifty-nine percent of the variance in the innovation score for low-risk services can be predicted using size within health departments and about 57 percent can be predicted without size. Similarly, as Table 8 shows, 31 percent of the variance in the low-risk innovation score can be

[11] This view of size as an emergent variable does gain some support from the data of the study itself. Thirty-nine of the 59 hospitals under study indicated that they had increased their number of beds in the five years prior to the study date. Twenty of these hospitals indicated that they had changed their size as much as 60 beds or more. At the same time 11 of the 23 health departments under study indicated that they had merged with another health department in the previous five years. These findings lead to an interesting direction for further research—the extent to which the set of independent variables under study here can predict change in size of health organizations over time. This examination remains for further analysis, however.

TABLE 6

Multiple Regression of Health Department Factors in Innovation of Low-Risk Services

Variable	*Multiple R*	R^2	*Simple R*	*B*	*Std. B*	*Beta*
Organizational size	.6273	.3935	.6273	.0053	.0024	.6939
Staff—professional training	.6962	.4847	.3928	.4231	.1856	.4349
Org—cosmopolitanism	.7075	.5005	.4543	.5712	.4425	.2891
Administrator—cosmopolitanism	.7301	.5331	.3817	−.0514	.0431	−.3076
Formalization	.7380	.5446	−.3812	.6813	.8622	.1682
Centralization	.7417	.5501	.1804	−.1990	.3506	−.1202
Slack Resources	.7436	.5529	.1134	−.1548	.4467	−.0619
Administrator—change values	.7442	.5538	.3249	.0739	.4121	.0384
(Constant)				−.5401		

Variable[a]	*Multiple R*	R^2	*Simple R*	*B*	*Std. B*	*Beta*
Org—cosmopolitanism	.4543	.2064	.4543	.8381	.3510	.4242
Staff—professional training	.6038	.3645	.3928	.4690	.1944	.4821
Administrator—change values	.6284	.3941	.3249	.5657	.4147	.2938
Centralization	.6458	.4171	.1804	.3372	.3522	.2036
Organizational performance	.6485	.4205	.2878	−.2392	.6828	−.0707
(Constant)				−16.1713		

[a] Organizational size excluded.

TABLE 7

Multiple Regression of Health Department Factors in Innovation of High-Risk Services

Variable	*Multiple R*	R^2	*Simple R*	*B*	*Std. B*	*Beta*
Organizational size	.5518	.3045	.5518	.0012	.0008	.3554
Staff—professional training	.7591	.5763	.5984	.2259	.0735	.5041
Slack resources	.7659	.5866	−.0634	.1817	.1846	.1578
Administrator—cosmopolitanism	.7719	.5946	.4656	.0102	.0162	.1331
Centralization	.7732	.5978	.3263	.0580	.1277	.0760
Formalization	.7742	.5994	−.4601	−.1008	.3561	−.0540
(Constant)				−2.6349		

Variable[a]	*Multiple R*	R^2	*Simple R*	*B*	*Std. B*	*Beta*
Staff—professional training	.5984	.3581	.5984	.2343	.0894	.5225
Administrator—cosmopolitanism	.6066	.4852	.4656	.0210	.0179	.2723
Formalization	.7191	.5171	−.4601	−.3141	.3454	−.1687
Slack resources	.7378	.5443	−.0634	.2014	.2127	.1749
Administrator—change values	.7503	.5630	.3020	.1230	.1865	.1396
Org—cosmopolitanism	.7526	.5664	.3176	.0687	.1948	.0755
Organizational performance	.7536	.5680	.3286	−.0634	.3311	−.0407
Centralization	.7539	.5684	.3263	.0223	1691	.0293
(Constant)				−4.1420		

[a] Organizational size excluded.

TABLE 8

Multiple Regression of Hospital Factors in Innovation of Low-Risk Services

Variable	*Multiple R*	R^2	*Simple R*	*B*	*Std. B*	*Beta*
Organizational size	.3426	.1173	.3426	.0016	.0021	.1174
Staff—Professional training	.4212	.1774	.3165	.3038	.1820	.2211
Org—cosmopolitanism	.4624	.2139	.3403	.4562	.2377	.2906
Administrator—change values	.4893	.2394	.2330	.2757	.1768	.1929
Organizational performance	.5091	.2592	.0893	.5506	.3601	.1989
Centralization	.5363	.2876	−.0034	−.2922	.2184	−.1729
Administrator—cosmopolitanism	.5519	.3046	−.0050	−.0246	.0262	−.1152
Slack resources	.5554	.3085	.1779	.0015	.0023	.0910
Formalization	.5586	.3120	.3018	−.3991	.7784	−.0758
(Constant)				−5.1151		

Variable[a]	*Multiple R*	R^2	*Simple R*	*B*	*Std. B*	*Beta*
Org—cosmopolitanism	.3403	.1158	.3403	.4905	.2319	.3131
Staff—professional training	.4129	.1705	.3165	.3089	.1811	.2248
Organizational performance	.4497	.2023	.0893	.6365	.3397	.2299
Administrator—change values	.4865	.2367	.2230	.2846	.1757	.1998
Centralization	.5179	.2682	.0036	.2945	.2174	.1743
Slack resources	.5339	.2851	.1779	.0024	.0020	.1423
Formalization	.5442	.2962	−.3018	−.5851	.7342	−.1111
Administrator—cosmopolitanism	.5518	.3045	−.0050	−.0201	.0255	−.0945
(Constant)				−4.3318		

[a] Organizational size excluded.

TABLE 9

Multiple Regression of Hospital Factors in Innovation of High-Risk Services

Variable	*Multiple R*	R^2	*Simple R*	*B*	*Std. B*	*Beta*
Organizational size	.4851	.2353	.4851	.0037	.0014	.4241
Formalization	.5111	.2613	−.3159	−.4271	.5062	−.1244
Slack resources	.5247	.2754	.0709	.0014	.0015	.1335
Staff—professional training	.5356	.2868	.2006	.1344	.1184	.1500
Centralization	.5430	.2949	.0225	.1361	.1420	.1235
Organizational performance	.5516	.3042	.1481	.2132	.2342	.1181
Administrator—cosmopolitanism	.5574	.3107	.1865	.0117	.0171	.0837
Administrator—change values	.5598	.3134	.0442	−.0458	.1150	−.0491
Org—cosmopolitanism	.5616	.3154	.2472	.0607	.1546	.0594
(Constant)				−.9499		

Variable[a]	*Multiple R*	R^2	*Simple R*	*B*	*Std. B*	*Beta*
Formalization	.3159	.0998	−.3159	−.8204	.4897	−.2390
Administrator—cosmopolitanism	.3702	.1371	.1865	.0211	.0172	.1520
Organizational performance	.4136	.1711	−.1481	.4286	.2289	.2374
Staff—professional training	.4392	.1929	.2097	.1497	.1177	.1670
Org—cosmopolitanism	.4484	.2011	.2472	.1544	.1560	.1512
Centralization	.4629	.2143	.0225	.1408	.1478	.1278
(Constant)				.6468		

[a] Organizational size excluded.

predicted using size in hospitals and 30 percent can be predicted without size.

These data, then, do not give us a firm mandate for eliminating size as a predictive variable. However, because we wish to examine those characteristics of the organiaztion which may be subject to change and their predictive power in determining organizational innovation, the remaining discussion will be limited primarily to that analysis in which size is not included.

Low-Risk Services

Tables 6 and 8 show the predictive equations for low-risk services within health departments and hospitals, respectively. Forty-two percent of the variance in innovation score for low-risk services within health departments may be attributed to the cosmopolitan orientation of organizational members, training of the staff, values of the administrator toward change, participation of organizational members in decision making, and their perceived performance of the organization. At the same time, 30 percent of the variance in innovation scores for low-risk services within hospitals can be accounted for by the cosmopolitanism of organiaztional members, training of the staff, perceived performance of the hospital, the values of the administrator toward change, participation of organizational members in decision making, available slack in the organization, formalization, and the cosmopolitanism of the administrator. Within both these organizations, the innovation score in low-risk services can best be accounted for, once size is removed, by the degree of cosmopolitanism on the part of organizational members. This variable accounts for 20 percent of the variance within health departments and 11 percent of the variance within hospitals.

The second most important variable in each case is staff training, which accounts for an additional 16 percent of the variance in health departments and an additional 6 percent of the variance in hospitals. Within both organizations, these two variables entered the equations in one-two order. In the ultimate prediction equation, cosmopolitanism of organizational members and training of the staff have the largest beta weights in each instance except within hospitals where performance satisfaction of the organization has a beta weight slightly stronger than the ultimate beta weight of training. The administrator's values toward change, with a beta weight

of .29 in health departments and .20 in hospitals, is also important to over-all prediction. However, the perceived performance of the health department, with a beta weight of $-.07$, is not an important variable in predicting innovation of low-risk services, whereas perceived performance recorded a strong beta weight in hospitals.

Nevertheless, the conclusion might be safely reached from Tables 6 and 8 that the innovation of low-risk services, both within hospitals and health departments, may be attributed substantially to the same basic set of characteristics. Thirty-nine percent of the variance in the innovation of low-risk services may be accounted for in health departments by the cosmopolitanism of organizational members, training of the staff, and administrator's values toward change, in that order. The ultimate significant prediction is 42 percent. Twenty-four percent of the variance in innovation score for low-risk services within hospitals can be predicted by cosmopolitanism of organizational members, training of the staff, preceived performance of the organization, and administrator's values toward change, in that order. The significant overall prediction is 30 percent.

High-Risk Services

Within the scores for innovation of high-risk services, there is less obvious consistency than appeared in the case of low-risk services. The predictor equations for high-risk services are shown in Tables 7 and 9. As Table 7 shows, training of the staff is again critical to innovation of high-risk services in health departments. Training entered the equation first and accounts for about 36 percent of the variance explained. The second variable to enter the equation was cosmopolitanism again—in this case not the cosmopolitanism of organizational members but the cosmopolitanism of the administrator himself.

Examining the predictor equation for hospitals in Table 9, one finds a similar result. While formalization, reflecting the extent to which rules do not define individual activity within the organization, is the first and most important variable in the innovation of high-risk services in hospitals, accounting for about 10 percent of the variance, the cosmopolitanism of the administrator again comes in as the second most important variable in the equation and accounts for an additional approximate 4 percent. In this latter case the pro-

portion of variance accounted for is fairly small, and it may be safe to suggest that while it is sufficient to have a highly sophisticated staff for the innovation of low-risk services either within hospitals or health departments, the sophisticated administrator is the critical element in the innovation of high-risk services. Though considerable agreement exists that low-risk services should be provided and that the structure of the organization itself may be sufficient to promote this provision of services, the highly sophisticated administrator essentially provides leadership in regard to the high-risk services if these are to be innovated. This conclusion based on the data at hand may be overly strong but certainly suggests an area for further study.

Further examination of Tables 7 and 9 shows that formalization enters the predictor equation third for health departments, reflecting the same variable in hospitals, whereas the third variable into the equation for prediction of high-risk services in hospitals is again the perceived performance of the organization. Training of the staff and cosmopolitanism of the administrator are the two most critical variables in predicting overall innovation of high-risk services in health departments as indicated by their beta weights, .52 and .27, respectively. In the final overall significant equation, formalization and perceived performance of the organization are the most important in predicting the R^2 for hospitals as reflected by their beta weights, $-.239$ and .237, respectively.

One conclusion that might be drawn from these data is that while there are definite commonalities between hospitals and health departments in the characteristics which lead them to innovate either low-risk or high-risk services, it is at the same time important to hospitals that they maintain a high degree of perceived performance. It is possible, of course, to view performance as a dependent variable itself and a function of the number of services provided. However, if one assumes that an organization perceiving itself as having high performance will strive to maintain this performance by continuing to be innovative in the area of health services, performance can be seen as a causal variable. In that sense, performance appears to be much more important to hospitals than to health departments.

The two most critical variables in predicting the overall R^2 for health departments in the high-risk area are training of the staff and the cosmopolitanism of the administrator. Together these ac-

count for about 49 percent of a total 56 percent predicted variance. Formalization, cosmopolitanism of organizational members, and the perceived performance of the organization account for 17 percent of an overall predicted 21 percent of the variance and are the three most important predictor variables in hospitals.

Discussion and Conclusions

What can be said about program innovation in a comparative set of hospitals and health departments? Were there differences between the types of organizational variables that affect the innovation of high-risk versus low-risk programs? Were differences in innovation largely a function of the fact that the organization was a hospital or a health department?

The results indicate that organizational size is a critical variable in program innovation as it relates to high-risk services in hospitals and low-risk services in health departments. However, surprisingly enough, size was not a critical factor in the innovation of high-risk services in health departments and low-risk services within hospitals.

While the role of organizational size is not well understood, the above would suggest that the very nature of the two organizations is different vis-à-vis the community. Health departments implement high-risk programs such as patient care conferences, case finding, and information and referral services regardless of department size because their traditional role is to provide services only where such services are not already provided by other community resources. Since these high-risk services are usually not provided by other health agencies, it thus becomes the responsibility of even small health departments to provide such services. In contrast, these high-risk activities are not traditional hospital functions. It is therefore only the large hospitals, where sufficient resources are available, that undertake high-risk types of activities.

The designation of such programs as occupational therapy, speech and learning therapy, and mental-health inpatient services as low-risk reverses this pattern. Hospitals, for example, are more likely than health departments to have such services regardless of size. It is with this type of services that health department size is important because size tends to provide the necessary economies of scale

for implementation. For example, only a large health department can justify the inclusion of an occupational therapist in its staff.

In a sense, health departments, by implementing high-risk programs independent of size, suggest a more community-focused organization responding to the particular health needs and demands of the community. Hospitals, on the other hand, take the opposite position and develop a floor of low-risk services that are provided independent of organizational size and implement high-risk programs only in large-scale organizations where sufficient resources are available to support such activities. These findings are consistent with other findings (Kaluzny et al., 1971) in which it is shown that, unlike those of hospitals, the health care programs implemented by health departments do not demonstrate any systematic pattern of implementation, but tend to reflect individual community circumstances.

When we focus on variables within organizations (excluding size), composition variables represented by cosmopolitanism and training of the staff are critical to the innovation of low-risk services in both hospitals and health departments. This variable set is again important to the innovation of high-risk programs in health departments; however, personal variables of the administrator as measured by his own cosmopolitan orientation are an added ingredient to program innovation. A similar pattern is presented for hospitals, except that structure as reflected by less formalized rules defining individual activity within the organization replaces the composition variables, and satisfaction with organizational performance is added as the significant variable.

Thus, it would appear that a pattern emerges for both types of organizations and for both types of innovative services. Composition variables are central to innovation in both hospitals and health departments for low-risk services. These variables are also important to the innovation of high-risk services in health departments except that the personal variables of the administrator become critical for this type of service. On the other hand, structural variables replace composition variables as the primary factor in innovation of high-risk programs in hospitals while again the personal characteristics of the administrator present themselves as a critical variable.

These findings add to the growing body of literature that assesses factors affecting organizational innovation. However, as with most research, more questions are raised than are answered. Several

are suggested here as implications for further research. First, empirical attention needs to be given to the concept of innovation as a process. It is quite likely that the process will be influenced by a number of variables on a differential basis. For example, as Wilson (1966) suggests, organizational complexity may positively affect the degree to which innovative concepts are conceived and proposed, but it may have a negative influence on actual implementation. Thus, the nature of the causality must be explicitly introduced, making necessary the conduct of longitudinal studies on a number of organizations.

Second, the study of innovation needs to be broadened to include other predicting variables outside the organization as well as the consequences of such innovation. While this analysis has focused primarily on the organization as the unit of analysis, it is important to consider in greater detail the context of that organization. This research would focus on community and interorganizational variables such as political climate, community decision-making patterns, and the nature and number of interorganizational programs. With regard to the implications of program innovation, consideration also needs to be given to their effect on organizational structure and function. For example, does innovation affect the perception of organizational performance? Do the rate and kind of innovation affect the structure of decision making within the organization?

Third, the study of attributes needs further attention. Although the current data point out the utility of such study in analyzing innovation, attention needs to be given to further methodological refinement in measurement procedures and in the consideration of relevant attributes (Zaltman and Lin, 1971). Moreover, the perception of attributes by organizational participants and how it affects organizational innovation at various points in time is also in need of research.

Finally, while we have been primarily concerned with assessing variables that relate to different types of program innovation and various types of organizations, our findings have obvious bearing on the development and application of change strategies in health care organizations. The results strongly argue against any view of organizational change and/or innovation as a relatively homogeneous phenomenon. The data presented here seem to indicate that factors tend to have a differential effect for different

types of programs and for various types of organizations. Any efforts to intervene in an attempt to introduce new programs must take into account these variations.

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This research was supported by Health Services Research Center of the University of North Carolina through Research Grant HS–00239 from the National Center for Health Services Research and Development, Department of Health, Education, and Welfare.

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