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Hospital Size and Efficiency

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Introduction

The next twenty-five years offer the greatest opportunity ever for a major reordering of general hospital beds. This opportunity comes about because of the projected large increase in population and its shifting distribution, rural, urban, and suburban. In 1960, 70 per cent of the population was urban, but the trend toward a larger proportion in cities has been in process for years. Hospital construction, now running over $2 billion per year, will increase. Hospitals will be larger, and beds will follow population to the surburbs. Obsolescence will, at the same time, force renewal of central city hospitals.

Areawide planning for hospital facilities, on the increase in metropolitan areas throughout the country, is a reflection of the need to move effectively in the face of a heavy demand for more beds for an increasing population distributed quite differently. Interest in planning also has been stimulated by the expressed need of donors of capital funds, both government and private. Those providing capital funds for the large number of new hospitals being planned want efficiency, both in providing service to the public and in avoiding the unnecessary expense entailed in needless duplication of service.

While hospital construction has been one of the most popular charitable objectives, large donors need and have organized metroplitan-area agencies qualified to designate hospital-construction projects worthy of support.

The so-called modernization amendments to the Hill-Burton Act for the first time give priority to the need for replacement and reordering of beds in metropolitan areas. Also, additional major legislation aimed at that problem will undoubtedly be introduced in the Congress again this year.

Satisfactory administration of grants of capital funds depends on some designation of priorities for the sums made available within a metropolitan area. Here again the areawide planning agency has a function.

Planning is easier said than done. One aspect of the effort to visualize and plan for the future hospital system is the need to develop consensus on guidelines which will shape plans. For example, a guide which has been debated and is still at issue is the number of general hospital beds needed per thousand population. Yet it is impossible to develop a citywide plan without decision on that point.

A second needed guideline is the best size for the metropolitan general hospital. Indeed, not only are the areawide planning agencies making decisions on the basis of their best judgment, but, since most hospitals are considering expansion, some judgment as to the best size influences present construction. There are other guidelines at issue, but it is this latter question of hospital size which we will discuss.

The general hospital has developed very much as a reflection of community need, particularly need as measured by local physicians evaluating the facilities that they require to treat their patients. The public has been concerned that adequate facilities be available and, with the advice of the profession, has proceeded to provide them. A unique aspect is that no other necessary utility has been so largely financed through philanthropy. Such financing has not been easy, nor has it provided adequate capital funds. The Hill-Burton Act for construction of hospitals is a demonstration of public concern with providing hospital beds. A major point to be made is that the hospital physical plant has, up to this time, been meagerly financed in spite of much effort and good intent.

To maintain the present ratio of approximately 3.5 beds per 1,000 in general hospitals with the projected population growth for the next fifteen years will re-

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quire something like 150,000 general hospital beds. Coupling the cost of these beds and the cost for replacement of obsolete facilities guarantees a continued heavy demand for funds for construction.

There has been much discussion of whether other types of less-expensive institutional facilities will substitute for the general hospital bed or whether better-organized resources might permit care of a great number of the sick in their homes. Certainly interest in the use of such substitutes needs to be stimulated, and new methods of payment should encourage more use. However, there is little reason to expect a reduction in the demand for care in general hospitals. In fact, as seems likely, should the use of such hospitals measured in average days per thousand increase, more general hospital beds will be required.

This Symposium, in the face of much projected reordering of general hospital facilities, considers what may be the most efficient size for a metropolitan general hospital. Efficiency as here used has two dimensions, quality of service and economy of delivery. It is hoped that efficiency viewed in this broad perspective may be advanced by looking at the problem of general hospital size from a number of aspects.

This Symposium is directed toward examining the effect of the size of the general hospital upon efficiency in the delivery of care. The issue is unlikely to be settled; nor is there any expectation or desire that a specific size for the general hospital be set. Rather, it is an attempt to proportion the issue and assist the individual hospital and planning agency in evaluating this variable so vital for good planning.

Large Organization

THOMAS L. WHISLER, Ph.D.

Administrators, by and large, are interested in matters of organizational size and growth. Some are interested because they are working in large organizations and want to know if the problems that they face are peculiar to and inevitable in large organizations. These managers are also interested in developing an understanding of the advantages inherent in large size and in how to exploit these advantages.

On the other hand, administrators not now working in large organizations almost always expect that they will one day. They assume that their organizations are going to grow if they do their jobs properly. They want to know what dimensions of the organization must change with growth and what problems they must anticipate and, if possible, avoid.

I would like to comment on several theoretical aspects of organizational size and growth. I will focus on only a few aspects, because I think that our knowledge is quite limited. I am not even sure that what we know is true, but this is a matter that you will have to judge for yourself.

We need, first, to consider some problems of definition. What is a "large" organization? A "small" one? I find that people differ as to the definitions that they like and the measures that they apply. Some people measure organizational size in terms of the number of participants. Some measure it in terms of assets. I understand that in your industry you count beds. Other experts measure in terms of output —tons of steel, number of graduates, number of miles traveled, and so forth.

It is interesting to note that those who have made empirical studies on size measures find that, if one stays within an industry, the kinds of measures that we have mentioned all correlate highly. It does not matter which measure is used, provided one stays within the boundaries of a single industry.

However, these correlations among measures do not hold across industries. One reason is that technology differs among industries. So do other important factors. For example, product lines are different, legal and social factors differ, the degree of competition differs, and so on.

Granted that there are different and interchangeable indexes of size, the problems of defining "large" and "small" still remain. These terms turn out to be relative ones—relative to a particular industry or organizational class. What is large in one industry may be medium or small in another.

Those of us who theorize about organizations often wish that we had a definition that is industry-free, a generalized definition. We need to generalize. Consequently, we find ourselves, more often than not, using a people measure—a head-counting measure. We do this because we believe that differences in kind (if there are any) between little organizations and big organizations are associated with changes in the numbers of people rather than other things, like machinery, buildings, or assets.

Even with a people measure, we still do not find any uniform agreement on what is large and what is small. One authority asserts that a small organization is one characterized completely by face-to-face relationships. Such an organization (he says) would have between two and forty members.

A medium organization to this expert is one in which it is still possible for one member to get around to see all other members within some reasonable period of time and to interact with them. The membership would number between thirty and one thousand.

A large organization, says this authority, is one in which it really is not possible for any member to interact with everyone else in the organization. However, it is quite likely that most people in the organization still know who the key members are, even if they never see them. Such an organization (he is guessing) would run from around a thousand to ten thousand people.

Then he also has the category of "giant." This organization is so big that it is quite unlikely that everyone even knows who the key people are. The size runs from ten thousand people on up.

I am sure that other experts would quibble with these definitions. I prefer to avoid the issue, to consider instead the organizational changes that occur as an organization moves along the road toward bigness. I find it useful to speak of "small" and "large" as hypothetical and points on the size scale of organizations. I must leave it to you to decide where you lie on the scale.

I should also say, as a footnote, that the organizations that I will discuss are "hierarchies"—not the scientific and professional organizations with which

many of you are familiar and which usually are a key part of a hospital. I am going to talk about the hierarchy where authority is exercised, where levels exist, where departments are created, where efficiency is the watchword.

Let me take a few minutes to review what small and large organizations have in common before we ask ourselves how they differ:

1. They are *organizations*, both of them—multiperson cooperative systems—whether they are little or big.
2. They are characterized by the existence of a general common goal toward which all members work.
3. They exhibit specialization of effort—different people are doing different things at the same time.
4. They both have co-ordination problems.
5. They also have computation problems—figuring out the best way to get the jobs done.
6. They have problems of communication and control.
7. They have the problem of assuring that participants in the organization receive according to what they give.

Now, how do they differ?

It turns out that it is very hard to factor out what we would call "pure" size differences. Other things tend to change at the same time that size changes. For example, it is quite common that as organizations get larger they tend to spread out geographically. It is, however, possible to do one without the other, and the consequences differ.

Larger size may also be associated with a larger range of outputs, but these can be independent of one another. Age and size are also frequently related, although it is possible to get older without getting larger.

In my comments on size and growth I will try to keep these multiple causes separate, giving each its due, for it is size and size change in which we are primarily interested.

I have a modest list of dimensions along which I think change occurs as an organization grows from small to large:

1. One of these is *control structure*—the pattern of authority and control in organizations.
2. Another factor is *departmentalization*—the way in which activities are grouped into sections, divisions, departments, and so forth.
3. The degree of *task specialization*—how many different kinds of jobs there are in the organization.
4. The complexity of *computation problems*.
5. The complexity of the *communication system*.
6. The size of the *administrative component*—that chunk of the organization involved in administering.
7. The *span of control*—the number of people reporting to a supervisor. I am particularly interested in the span of control at the top-management level.
8. Last, we have the factor of *survival power*—the odds that the organization will still be here next year.

I would like to look at each of these factors briefly and make some comments and explanations.

In relation to the control factor, as organizations become larger, control structures become more decentralized, simply because they have to. There is absolutely no way of avoiding it. Communication and computation loads become overwhelming, if you try to maintain the same central control that you had when you were small. This decentralization can occur either by default, wherein you simply lose control through communication and decision overload, or it can result from systematic planning. Owners and managers do not like to decentralize, and, of course, I do not blame them. It is risky. Therefore, they will decentralize only to the extent that they find unavoidable.

Usually, if you are the top executive, you begin to decentralize by delegating cautiously, getting a trusted lieutenant or two to work with you. This partially explains the growth of the managerial group as organizations get bigger. But, even as you delegate, you seek to retain as much control as possible through the use of standard procedures and rules. These invisible monitors function as substitutes for face-to-face control but usually decline in effectiveness as the organization grows. In fact, they frequently tend to get in the way and are not enforced. So, in one way or another, as size increases, so does the degree of decentralization.

We now come to the matter of task specialization, the process of chopping up large tasks into smaller ones and making each smaller one a full-time job for someone. As very small organizations start growing, it pays dividends to fractionate tasks. As growth continues, at some point specialization gives way to replication; that is to say, we frequently begin adding more people to do the same thing that other people are already doing. We do not continue the specialization process forever because it does not pay off forever. The actual point of changeover depends chiefly on the nature of the technical equipment you use in your particular industry and the character of your client or customer markets.

There are factors affecting the degree of specialization other than simply size and growth, a particularly important one being the complexity of output—of goods or services. Increasing the complexity of output will probably increase organization size, but its primary effect will be to increase the degree of specialization.

Another factor that influences the degree of specialization is the amount of contracting-out that you do. As you can influence the size of your organization, you can likewise influence the variety and num-

ber of specialists that you have by contracting-out. Those of us who work with organization theory have perhaps taken too little account of managerial action of this kind, being more interested in merger than in spin-off or contracting-out.

Finally, I should also mention that specialization is a function of how dispersed you are geographically. If you spread out more and more as you grow, you get quite a retarding effect on specialization. Dispersion in and of itself tends to reduce the degree of specialization.

Referring to size once again, we will say that, if you can hold everything else equal (which is one of the hardest jobs in the world), you will find that at first you become more specialized as you grow but later on that process stops and, in some cases, may reverse.

I have been talking about specialization as a process of differentiating more jobs of individuals. But task specialization is also related to the way in which you departmentalize and to the way in which you aggregate tasks into departments, especially major departments.

At some point on the growth curve, however, we see the emergence of what we call "parallel departments." When this occurs, activities are arranged so that each department contains the same functions or most of the same functions as every other department. Typically, these parallel departments are oriented either to different kinds of output or to different client groups, or they are in a different geographical area. In the retailing industry, for example, you will find departmentalization by store (in the chains). Each store has essentially the same functions under its control as the next store. This is parallel departmentalization. This also happens now and then in other kinds of industries as they get larger and larger. You see the creation of parallel departments as a means for dealing with problems of communication and computation that are the curse of large size.

Now let us take a look at the administrative component—those in the organization who administer. They are often called "overhead" or "non-productive labor" by accountants. But they are always there, just the same.

There is a relationship between size and administrative component. As size increases, the administrative component naturally increases also. However, it does not increase proportionately; at least, it should not. If you have an organization of one hundred men, with seven of them engaged in administration, you should expect that the size of your organization could double without requiring the number of administrators to go to fourteen. Possibly it should be eight or nine. In other words, as you increase in numerical size, the proportionate increase in the size of the administrative staff decreases.

Again we are assuming that only size changes—nothing else. It often happens, in the real world, that as you grow you spread out geographically or you expand your range of services. These changes cloud the picture. Research evidence indicates that dispersing geographically causes the administrative component to grow more than proportionately. The same result occurs if you begin to expand the range and variety of services that you offer. Thus size (or growth) affects the administrative component one way, geographical dispersion and complexity of output the opposite way.

We come now to the matter of span of control, which has been kicked around the organizational literature since many of you were children, maybe even longer. In other words, how many people should the top executive have reporting to him or how many does he have reporting to him?

Our research indicates that the span of control of top management increases with size. In other words, the larger your organization, the more people there will be reporting to you. This, of course, should not be too surprising if you recall earlier comments on size in relation to the administrative component and to decentralization. Span of control and decentralization are obviously related. The larger the span of control, the more decentralized you are.

While size affects the average span of control in an organization, so, too, do those familar (by now) factors of output complexity and geographical dispersion. Our studies indicate that, once again, they work in the opposite direction; that is, an increase in output complexity or in geographical dispersion will tend to reduce the span of control. A manager who tries to estimate the effects of growth on the span of control will thus have his estimation efforts complicated if growth is accompanied by dispersal or by an expanding range of services.

The changes that I have been discussing are closely related to changes in computation and communication problems that occur as organizational size changes. By "computation" I mean simply figuring out the best way, or the quickest or cheapest way, to get something done (and then refiguring every time something unforeseen occurs). This is what many of you spend most of your time doing. Someday you may give a lot of this computation over to computers, but at the moment this is a prominent part of your daily activity.

The computation problem becomes an overwhelm-

ing one for the individual manager very early in the growth picture. The history of small businesses is replete with cases in which the individual who founded the business is unable to bring himself to shift from being the only computer in the organization to an arrangement whereby he shares the computation problem with others. He soon finds himself beyond his capacity. What started out as a great success can flounder and die. Successful solution of the computational-overload problem requires delegation to computational subcenters. A problem too big for one man becomes feasible for a group of managers.

Delegation, unfortunately, often introduces problems of goal conflicts; that is, the subcenter may solve its own part of the problem beautifully but not always in the best interests of the organization as a whole. It turns out that computation involves not only solution of problems but making an initial definition of them. This definition reflects the goals of the definers. Thus each organization faces the dilemma of having to delegate in order to overcome computational overload, but delegation itself introduces problems of goal conflict.

Communication systems in very small organizations are often what we call open-channel networks, where everyone can, if he wishes, communicate with everyone else. This open-channel communication helps to get the job done, as well as developing a feeling of belonging. The "unrestricted" network has great advantages.

The unrestricted network, unfortunately, becomes unfeasible as organization size increases. Information overload quickly develops at all receiving points, so filtering and priority systems are developed. Communication efficiency tends to fall because feedback loops are reduced. Messages are sent, but often the sender never knows whether they arrive and, if they arrive, whether they are understood. If feedback loops were not kept to a minimum, the channels would become overloaded. We would, in fact, be close to an open-channel, unrestricted network.

So, communications efficiency tends to dwindle as size increases. Furthermore, restricted networks can encourage game-playing. Information is power, and an individual seeking power can learn to manipulate information, relatively free from the probing finger of the feedback loop. If he occupies a key spot in the network, others in the organization find themselves vulnerable and dependent on him. Even if he plays openly and honestly, mistrust may develop. For example, it is my observation that nobody in a hierarchy ever feels that he gets as much information as he needs in order to get his job done. It does not seem to make any difference where he is in the organization. If you talk to the janitor or to the machine operator, you soon find that he believes that nobody ever tells him anything. "They" do not tell him anything because he does not amount to anything in their eyes, he thinks. (In fact, he often believes that even his union does not tell him anything any more.)

The top executive seems to believe that, although he is responsible for everything in the organization, in reality he has very little idea of what is actually going on because nobody will ever tell him. A standard story concerns the president who arrived at the plant gate one morning in his Cadillac only to find a picket line announcing that the plant was on strike. Up to that point, he had not heard that anybody was unhappy. He was caught by surprise because of a communication failure.

And, if you talk to middle managers, you quickly find that they live in the worst of all worlds. Their subordinates never tell them anything, and neither do their superiors. They believe that they are trying to solve the really difficult problems of the organization without anyone's trying to keep them informed.

Perhaps all of us in large organizations feel that we are underinformed, at least about some things. It is impossible to tell everyone everything, but we have trouble accepting this. We feel vulnerable and uneasy. The introduction of computers will, I think, tend to increase the efficiency of both communications and computation. As a by-product they also tend to centralize control in organizations, given the basic bias of managers for not giving away any more authority than they have to. In this respect computers begin to make large organizations look a lot more like small ones.

The last item that I mentioned in my list of factors that change in the growth of little organizations to big ones has to do with survival power. Very small organizations are vulnerable to risk—they live in a risky world and tend either to get bigger or smaller, to grow or to die. Large organizations, more often than not, have sufficient resources and techniques to enable them to survive unexpected blows that would destroy the little organization. The small organization has the advantages of flexibility and tight internal control; it can move fast, shift fast. Its growth rate is almost certain to be higher than that of its bigger competitors, if something unexpected does not happen. If it does happen, and it is beneficent, growth is even more rapid. If the unexpected event is malignant, it is "curtains."

I would like now to say a few words about what I have found, in general, to be managerial attitudes toward growth.

My observation has been that most managers

want their organizations to grow. Growth becomes a mark of organizational effectiveness and of managerial effectiveness. Growth enhances survival power. Growth provides attractive career potential to outsiders that you might want to bring in. Growth attracts those who lend or give money. I am not talking about size but about growth. A manager will say, "This is a great organization." "How," you ask, "is it great?" More often than not he will cite its high growth rate. I believe that this attitude is consistent with the norms of our achieving society.

In this respect, I am not astounded by the fact that the federal government is becoming larger and larger. After all, the people who run it and spend their careers in it, I think, have the same motivations as anyone else in organizational work. They demonstrate effectiveness by seeking to become bigger.

I believe this managerial attitude toward growth to be pervasive. The other day I asked a manager from a large corporation who was visiting down here, "How are things going?" He replied, "We will know when the next annual report comes out." I then asked him what he looked for, and he replied, "Well, I hope that we will show at least a 2 per cent growth." My assumption has always been that a company is in business to make money. We always assume that to be the business goal. However, what this manager is striving for is growth. How often we see reports in the financial pages that a certain company experienced a growth in sales but, at the same time, a decline in profits. I sometimes wonder if managers buy growth even at the expense of profit.

The reason that I emphasize this managerial attitude is that I think it explains the subject matter for this morning and for your meeting. In my research I have become more interested lately in the process of growth than in size as such. Most companies that I have studied either grow by expanding internally or by merger. There is a lot of merging going on in the organizational world today, probably because it is a quick way to grow.

The choice between internal expansion and merger has some interesting organizational implications. I am not going to talk about them this morning because, insofar as I know, you hospital people never merge. At least, you do not do very much of it, and I don't understand why. That is the fastest way to get big and, at the same time, one of the fastest ways to develop big organization problems. This is an interesting subject that we might discuss at another time.

Finally, I believe that managers find large organizations more interesting and challenging places in which to work than small organizations. Not only is it more fun to make them grow, but it is more fun to be in them when they are big. Despite the fact that we often hear people say that they would like to be with a nice small organization, the small organization usually is not overwhelmed with topnotch people seeking to enter it. Where do our brightest graduates go? They go into large organizations. That is where the fun is—and the money.

I might conclude by saying a few words about managerial strategies for coping with large size. I have already mentioned some of these strategies. One is task specialization. Another is to develop parallel departments and to delegate substantial autonomy to them, while retaining some sort of key control—usually financial control in profit-seeking organizations. These efforts seek to substitute indirect for direct controls over people.

But, in these computer days we are beginning to see a reversal, a trend toward returning to more direct control by top-level management. Managers seek to achieve this control by investing in what they hope will turn out to be "sophisticated" computer-control systems. Installation of computers, unfortunately, produces a negative effect on attitudes. This effect tends to be localized in those who lose power in the process of computerization. One finds only the most positive attitudes in those who are designing computer systems to achieve more effective ways of running large organizations.

I suppose that if I were looking down the road toward what will happen in relation to strategies in the long run, it will be to use on-line computer systems to control day-to-day operations. Many of the things that managers spend time on now will be done by computers. Managerial attention will be shifted toward clients and customers. The result will be, I believe, an increase in the average size of organizations in the future in all fields of endeavor, including hospitals.

But in these large organizations with sophisticated control systems, there will be the ever present danger that the managing game will become so fascinating that the primary focus of serving the client and the customer will become blurred. Should this be allowed to happen, the large organization will become simply a large target for criticism and for regulation.

Well, I have not said anything that I am absolutely sure is true, and I am absolutely sure that I have not said anything new. I would, however, like to hear from you.

Economies of Scale

MILLARD F. LONG, Ph.D.

First of all, let me say that I am an economist and not terribly knowledgeable about the problems of hospitals. Therefore, my task, as I see it, is to give you a little background on today's problem, that is, "Economies of Scale," and also to express in economic terms the questions before this conference. Unfortunately, the information presently available is not sufficient to provide definitive answers to these questions. But, as one of our University of Chicago professors has said, "To state the question correctly is to be 50 per cent of the way to the answer." I shall try to state the questions correctly and will leave to other speakers the job of answering them.

The notion of economies of scale is not very complex. To illustrate what is at issue, consider Table 1.

TABLE 1

Inputs		Output		
Capital	Labor	1	2	3
100	100	100	100	100
200	200	190	200	210
300	300	270	300	330

Assume that 100 units of capital and 100 units of labor can be combined to produce 100 units of output, which may be hospital services or some other commodity. If inputs are doubled—that is, instead of using 100 units of capital and 100 units of labor, 200 units of capital and 200 units of labor are employed—what will happen to output? The second output column in Table 1 indicates one possible result—a doubling of output. This situation is called "constant return to scale." If, with the doubling of inputs, the increase in output is something less than 100 per cent, as indicated in the first output column, the economist would classify the process as one exhibiting diseconomies of scale. As shown in the third column, the output may rise more than proportionately with the increase in inputs; this would be called "economies of scale."

In a particular production process, economies of scale may prevail at first, only to be followed by diseconomies as size increases. Small hospitals may find that average costs fall as the hospital grows, then level off, and finally begin to rise as the hospital continues to expand. In hospitals, as in many production processes, there is probably a substantial range over which there are constant returns with the growth in output being proportionate to the growth in inputs.

While the notion of economies of scale is simple, its application to problems of hospitals is not so simple. Furthermore, the empirical studies that have attempted to measure economies or diseconomies of scale in hospitals have not provided unambiguous answers.

Thus far, I have talked only about hospital costs, but to the community whose interests are involved the relevant costs include more than hospital costs. For example, even if hospitals did have economies of scale and the quality of care increased with size, we would not suggest that for the city of Chicago there be only one hospital. Or, to make my example more extreme, we would not recommend one hospital to serve the whole United States. The reason the single hospital is not optional is that some of the relevant costs have not been taken into account. To find the correct solution, travel costs, and what I shall call "inconvenience costs," must also be taken into consideration to determine the optimal size of a unit. In fact, I hope to show that the optimal size of a unit will fluctuate, depending on density of population, available transportation, and other factors.

The studies done at the University of Pennsylvania indicate that, in respect to hospitals, travel costs are important, especially if we include not only the patients' and doctors' travel time but also the time of the people who visit the patients, the hospital staff, and so forth. In relation to travel costs, it is quite clear what happens as the average size of units is increased. As units become larger, costs rise. For example, if Chicago were to be served by half the present number of hospitals of doubled size, then, of necessity, travel costs would increase for, on an average, the hospital will be farther from the patients' homes, farther from the doctors' offices, and so forth. Travel increases with the size of units.

Now, there are other costs included in costs of care besides travel costs. What I am thinking about now is a little hard to see, especially in relation to how they vary with the size of unit, but they do vary. If you are interested in this, I can readily demonstrate it for you at the end of my talk. However, as of the

present time, I will merely ask that you take my word for this.

On the other hand, inconvenience costs—that is, the costs associated with a hospital's being full when a patient desires to enter—decrease with the size of units.[1] Now, when a hospital is full and must tell a patient that he must wait two weeks for accommodation or, if it is an emergency case, crowds facilities or dismisses a patient early, this is an inconvenience. Perhaps the worst kind of inconvenience would be if the hospital were forced to tell the patient to go to another institution because it was too crowded to care for him. The frequency with which this kind of phenomenon will occur depends upon the size of the hospital. In a community with 3,000 beds, it will happen least frequently if the beds are in a single unit; more often if there are two units of 1,500 beds; and still more often if there are six units of 500 beds.

All these costs are summarized in Figure 1. Travel costs per case rise as the average size of hospitals increases. On the other hand, the inconvenience costs about which I have just been talking fall as the size of the unit is increased. I do not know whether they offset each other. This is a problem of empirical measurement about which too little is known.

With regard to hospital costs, the evidence indicates that the cost per case rises in larger units. Does this really show diseconomies of scale in hospitals? The crude figures require correction in two ways.

1. Labor costs are a high proportion of total costs in any hospital. Larger hospitals tend to be in larger cities and to pay higher wages to nurses and other help. Therefore, these costs appear to be higher. If, instead of dollars, a physical measurement of input is employed, such as number of nurses per patient, this bias can be corrected.

2. While the main product of hospitals is patient care, they also produce other things. Specifically, some hospitals provide training and undertake research; these activities tend to be concentrated in larger hospitals. To get the correct measure of costs per case, we must eliminate the costs of training and research. As you know, hospital cost accounting is not so advanced that this is easily done. As the costs are mixed together, it is hard for the investigator to decide how to separate them. Even after this correction, studies have shown that larger hospitals have higher costs.

The remaining problem is that case mix differs by hospital size. Larger hospitals tend to have a larger proportion of more difficult and costly patients;

[1] That the frequency with which this occurs falls with size is a problem in statistics; instead of proving it here, I shall ask you to take my word for it.

smaller hospitals tend to treat problems that are relatively simple. Investigators have tried to deal with this problem in two different ways. One study of British hospitals introduced a vector of variables for case-mix differences. The results show that over the middle range of hospital sizes there is no discernible change in costs per case. In other words, the hospital cost curve is relatively flat. Had some of the extremely small hospitals and some of the very large hospitals not been removed from the sample, the results might have been different.

A much cruder procedure, but one used more extensively in connection with United States data, is to attempt to measure quality differences by looking not at output differences but at input. From the annual volume of *Hospitals*, the investigators took the number of services that the hospital was rendering: types of X-ray procedures, social services, and so forth.

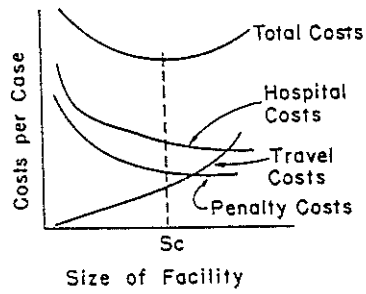


FIG. 1

When this is done, the diseconomies of scale apparent in the crude data disappear. On the other hand, it is difficult to judge whether hospital costs actually decline as size of unit increases. The safest position, at the moment, seems to be that, in hospitals, roughly constant costs prevail, at least in the middle range of sizes. For the extreme observations, that is, very large hospitals or very small hospitals, costs may well be higher than for hospitals in the middle range.

The hospital costs curve in Figure 1 reflects these considerations. I probably should have drawn the curve much flatter in the middle range. As unit size increases from some very low level, there is probably some falling in cost. For hospitals that are very large, costs probably rise. In the middle, the costs are more or less constant for a considerable range of sizes.

I would now like to integrate all my comments on costs. The optimal size hospital is the one that minimizes the average cost of service to the community—costs are defined to include, in addition to hospital costs, travel and inconvenience costs. In

Figure 1, this point is indicated as *Sc;* of course, it would be very unlikely if this optimal unit size would be the same as the unit size which minimized hospital costs.

Travel costs depend upon density of population and adequacy of the transportation system and will differ by area of the country. So will the hospital and inconvenience-cost functions. This means, of course, that the optimal size hospital will also differ by region and that we should not expect that one size of hospital will be best in different regions. In fact, even

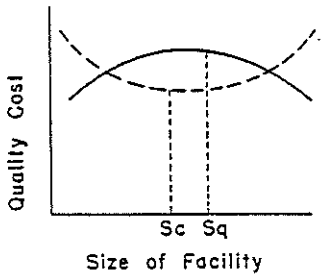


FIG. 2

within a region, such as Chicago, costs will probably be minimized by having different-sized units. Central city hospitals should be larger, for example, than suburban hospitals.

I would also like to raise the question of quality of care and how it might vary with the size of hospital. Again, I only wish to state the problem in an economic framework. The solid line in Figure 2 shows how quality might change with the size of hospital. If the unit is very small, the quality falls; if the hospital is very large, impersonal handling of patients may reduce quality. Again, as with costs, there may be a large size range over which quality is unaffected. In any case we can imagine the relationship between quality and size being much as I have drawn it.

The dotted line in Figure 2 represents the total cost curve from Figure 1. There is no reason to suspect that the size of unit which minimizes costs (*Sc*) will be the same as the size of unit which maximizes quality of care (*Sq*). It may well be that the size of hospital which maximizes quality of care is somewhat larger than the size of hospital which minimizes costs. Possibly the relationship will be the other way round. What I would like to point out is that they are not likely to be the same. In this situation we must recognize that to get higher quality we shall have to pay for it in terms of larger-sized units with higher costs.

But quality can always be improved if we are willing to pay for it. We can build better roads that will reduce the number of accidents; however, we may not judge it worth the cost. So it is with the hospitals. We shall have to judge, as we do now, whether the extra quality is worth the extra costs. The community should make this decision, depending on what they think is worth paying for. In fact, the decision may have to be made by hospital administrators, hospital boards, or regional planning agencies. But it is the solution to this joint problem of quality and costs which will determine the optimal size for hospital units.

Now, I want to tell you that I have merely tried to state for you some of the problems and some of the questions that economists have in relation to economies of scale and also, in turn, the problems that it raises for hospitals. The answers to these questions rest on some empirical measures which still have to be determined.

There is considerable study being done on these questions, and possibly ten years from now we will be able to specify the cost curves and point out to the community the alternatives that are open to it in the health field.

Hospital Size and Structure

DUNCAN NEUHAUSER*

The purpose of this paper is to develop a general theory of hospital size and internal structure.[1] This theory is simply stated as follows: Community characteristics, historical circumstances, and environmental characteristics define hospital size; size, in turn, defines the internal structure of the hospital, including such factors as division of labor, scope of services offered, costs, decentralization, the use of formal controls, and so on.

There are three distinctive size groups of hospitals with different structural characteristics:

1. Small hospitals, roughly from 0 to 100 beds, are characterized by uncertainty in the demand for their services, low division of labor, and few formal controls.
2. Medium-sized hospitals, centering around from 100 to 300 beds, are characterized by stability and what may be called, for the lack of a better term, "administrative ascendancy."
3. Large hopitals, those of 300 beds or more, are characterized by "professional ascendancy."[2]

TABLE 1

CORRELATIONS BETWEEN VARIOUS MEASURES OF HOSPITAL SIZE*

Measure of Size	Average Daily Census	Total Expense	Total Personnel
Number of beds	+.99	+.95	+.97
Average daily census		+.96	+.98
Total expense			+.97

* Based on a sample of 350 United States hospitals chosen because they were participating in the Management Review and Hospital Administrative Services programs of the AHA at the end of 1965. Data are from the 1960 Guide Issue of *Hospitals*. All correlations are statistically significant. See also Wolf Heydebrand, "Bureaucracy in Hospitals: An Analysis of Complexity and Coordination in Formal Organizations" (unpublished Ph.D. dissertation, Department of Sociology, University of Chicago, 1965), p. 112.

A number of different measures of size, all highly interrelated, can be used, including beds, census employees, and total costs (see Table 1).

* The author is heavily indebted to the American Hospital Association and its Research Division for the use of their data and data-processing equipment. This research has been supported by USPHS Grant No. HM-00476.

[1] This paper, its tables, and graphs refer only to non-federal, short-term general and other special hospitals.

[2] The terms "administrative ascendancy" and "professional ascendancy" are recognized as having inherent emotional connotations. They are used here partly because they are descriptive of a set of size-related phenomena and partly for lack of better terms.

The Community and Hospital Size

Some correlations between community characteristics and hospital size are shown in Table 2.[3]

The first thing to note is the high correlation (+.98) between the population of the county in which the hospital is located and the total number of acute hospital beds in that county. This suggests that community size sets an upper limit on hospital size.

TABLE 2

COMMUNITY CHARACTERISTICS, HOSPITAL SIZE, AND THE TOTAL NUMBER OF HOSPITAL BEDS IN THE COMMUNITY*

Variable	Variable	Correlation (r)
Population	Total acute beds in community	+.98
Population	Individual hospital size (beds)	+.27
Per capita income	Individual hospital size (beds)	+.45
Number of active M.D.'s in community	Individual hospital size (beds)	+.26
Number of active G.P.'s in community	Individual hospital size (beds)	+.24
Radio of G.P.'s to total active M.D.'s	Individual hospital size (beds)	−.56
Hospital age	Individual hospital size (beds)	+.50

* For same sample as in Table 1. Data from *Distribution of Physicians in the U.S. by State, Region, District, and County, 1965* (Department of Economics, Division of Socioeconomic Activities, American Medical Association, Chicago). The community refers to the county in which the hospital is located. All correlations are statistically significant.

This correlation sets the base line for the other correlations shown in Table 2 and indicates that the county is a reasonably good measure of the hospital catchment area for our purposes.

The correlation between community size and the size of any individual hospital is much lower (+.27) but still statistically significant. As community size increases, hospital size increases. Community size sets an upper limit on hospital size, and hospitals as a group expand to fill this upper limit. The size of an individual hospital is better explained by other characteristics, such as per capita income (+.45), hospi-

[3] The data in Table 2, like those in Table 1, are drawn from approximately 350 acute hospitals, chosen because they participated in both the Management Review and Hospital Administrative Services of the American Hospital Association as of December, 1965. This is by no means a random sample.

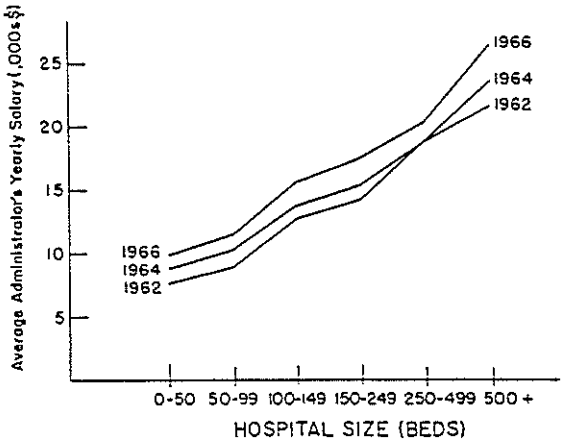
tal age (+.50), or the ratio of G.P.'s to total active M.D.'s in the county (−.56). The absolute numbers of G.P.'s and M.D.'s are not good predictors of hospital size.[4]

The ratio of G.P.'s to total M.D.'s in the county is the best predictor of hospital size. This is partly due to the fact that G.P.'s are in small towns where the small hospitals are. That this is not the complete explanation is indicated by the much lower correlation between individual hospital size and community size (+.27). Another explanation is that the G.P.'s go where the specialists do not want to go. Specialists may gravitate to large hospitals in high per capita income communities.

GRAPH I

AVERAGE ADMINISTRATOR'S SALARY AND HOSPITAL SIZE, ILLINOIS

(n = 155)



SOURCE.—Illinois Hospital Association, Report No. 35, February, 1966 (Mimeographed).

A third explanation is that the uncertain and fluctuating case loads of small hospitals call for the services of generalists. For example, consider a small hospital with two doctors. On one day there may be four deliveries and no surgery, and on another day there may be four surgical cases and no deliveries. If both these doctors were specialists, the obstetrician would be swamped one day and unemployed the next day. The surgeon would be unemployed the first day and overworked the next. On the other hand, two general practitioners could divide the work load between them and keep reasonably busy on both days.

It is, therefore, probably efficient for small hospitals to be staffed with G.P.'s. Larger hospitals can provide the specialized facilities and stabilized case load which make the use of specialists efficient. This reasoning leads us to expect to find a lack of specialization within small hospitals. As Professor Whisler indicated, age is an important factor in explaining organizational size; older hospitals are bigger hospitals.

Hospital Size and Structure

It is well known that the scope of services provided by the hospital increases with size. The larger the hospital, the greater the number of patients who need these special services on a given day. At the same time, each type of service requires a minimal case load over which the costs can be spread.

The greater the scope of services the greater the division of labor, and the greater the complexity the harder it is to control the organization. This is reflected in the fact that the administrator's salary increases with hospital size (see Graph I). Administrators' salaries have been increasing over time, which is nice to know if you are or aspire to be an administrator.

TABLE 3

HOSPITAL SIZE, OCCUPANCY RATE, AND AVERAGE LENGTH OF STAY*

Bed Size	Occupancy Rate (Per Cent)	Average Length of Stay (Days)	No. Hospitals
0– 49	68.50	6.58	90
50– 74	77.59	6.68	128
75– 99	76.95	7.02	71
100–149	79.25	6.79	146
150–199	84.30	6.97	71
200–299	85.38	7.60	109
300–399	86.24	7.92	80
400+	86.72	8.60	72

* Hospital Administrative Services, "Special Comparison National Size Groups" (American Hospital Association, September, 1965; Mimeographed). Based on data on 767 participating hospitals for the six-month period ending June 30, 1965.

As hospital size increases, occupancy rates and average length of stay increase (see Table 3). The low occupancy rates of small hospitals reflect fluctuating and uncertain demand for their services. The longer average length of stay reflects the more complex care provided in larger hospitals. Quality of care, as measured by accreditation, increases with size, at least up to a point. This is shown in Table 4. Non-accredited hospitals are, on the average, much smaller than accredited hospitals.

Expense and revenue per patient day both increase with size, reflecting, in part, the increased complexity of care provided in large hospitals. Some indication of the relationship between efficiency and size can be seen by looking at the difference between expense and revenue by size.

Table 5 shows the absolute and percentage differ-

[4] The absolute numbers of G.P.'s and total practicing M.D.'s are both highly correlated with community size.

ence between expense and revenue per patient day. The smallest hospitals cannot obtain enough revenues to cover their costs. Medium-sized hospitals (150–399 beds) take in considerably more revenue than expenses. The largest hospitals do not have this large a margin.

Undoubtedly, if a hospital is to survive and grow in a time of inflation and rapidly changing technology, it must have revenues greater than expenses. The deficit shown for small hospitals implies that these small hospitals must get much larger, fold up, or be subsidized. Medium-sized hospitals will prosper, having the funds to rebuild, expand, and add new technological innovations. These medium-sized hospitals provide a service which people are both willing and able to pay for.

The uncertain and fluctuating demand for small-hospital services is reflected in their uncertain financial position. Medium-sized hospitals have skilled and trained full-time management, and perhaps this is reflected in their sound financial position. In large hospitals the demands of the professionals for education, research, and charity patients for teaching use up the excess revenue, presumably in order to enhance the quality of care. It is possible that these large hospitals do not provide the amenities and patient comforts found in medium-sized hospitals—amenities which patients are willing to pay for.[5]

TABLE 4

ACCREDITATION (QUALITY) AND HOSPITAL SIZE

	Size of Accredited Hospital (Beds)	Size of Non-accredited Hospital (Beds)
Mean size	182	41
Median size	153	40

SOURCE.—1961 Guide Issue of *Hospitals*, p. 386. For all short-term general and other special hospitals. Students of Professor Thompson at Yale found a correlation of −.89 between hospital size and a quality index based on the scope of facilities and educational programs offered by the hospital (D. J. Magid and M. C. Quadland, "A Study of Cost Variation among the Thirty-five Short Term General Hospitals in Connecticut" [June, 1966; Mimeographed]). In my sample of 350 hospitals the correlation between bed size and scope of services offered is +.72 (1960 data).

[5] It has been argued that hospitals with excess revenues are not serving the public to the extent that they could, while hospitals which run a deficit are doing a particularly good job. If considerations of efficiency are excluded, this may well be true at the present point in time. In the long run, the outcome may be different. If the hospital with excess revenues plows back the surplus into improvements which will affect patient care in the future, and the hospital with a deficit goes bankrupt and closes, then, in the long run, the former is doing a better job than the latter. The voluntary hospital which does not plow back excess revenues into improving patient care, but lets it accumulate indefinitely in "reserves for contingencies," is undoubtedly doing a disservice to its community.

Hospital Size and Departmental Costs

The relative importance of different hospital department changes with hospital size, as indicated by the varying percentages of total operating expenses devoted to the major departments (see Table 6). First, note that the relative size of the administrative component declines with size. In the smallest hospitals, administration accounts for 12.1 per cent of costs, while in the largest hospitals it accounts for only 9.6 per cent. One reason that small hospitals have relatively larger administrative costs is that the administrator in the small hospital carries out tasks which are not ordinarily considered as "administration," such as care, admitting patients, order-patient ing supplies, direct supervision, and perhaps even sweeping the floors.[6] The small-hospital administrator has to be a Jack-of-all-trades and a generalist.

TABLE 5

HOSPITAL REVENUE AND EXPENSE PER PATIENT DAY

Hospital Size (Beds)	Revenue*	Expense†	Difference	Differences as a Per Cent of Revenue	No. Hospitals in Sample
0– 49	$32.94	$33.37	$−0.43	−1.3%	90
50– 74	34.59	33.94	0.65	1.9	128
75– 99	36.31	35.89	0.42	1.2	71
100–149	38.01	37.54	0.47	1.2	146
150–199	39.76	38.52	1.24	3.1	71
200–299	41.45	39.46	1.99	4.8	109
300–399	44.22	42.14	2.08	4.7	80
400+	43.49	43.06	0.43	1.0	72

* Revenue is adjusted patient revenue per patient day. It excludes tuition, sales to non-patients, various fees, and income from investments, gift shops, vending machines, etc.

† Expense is total operating expense per patient day, including depreciation.

SOURCE.—Hospital Administrative Services, "Special Comparison National Size Groups" (September, 1965; Mimeographed). Based on data from 767 hospitals participating in HAS for the six-month period ending June 30, 1965. Other studies have shown that costs per patient day increase with size. See Walter J. McNerney *et al.*, *Hospital and Medical Economics* (Chicago: Hospital Research and Educational Trust, 1962), chap. xlii, and Joan H. Hayes, *Factors Affecting the Costs of Hospital Care*, Vol. I: *Financing Hospital Care in the United States* (New York: Blakiston Press, 1954), chap. vi.

The largest change in relative department costs occurs in "nursing" and "medical and surgical" costs, which go from 33.3 per cent in the smallest hospitals to 24.7 per cent in the largest hospitals. As the hospital increases in size, more and more work of the "generalist" nurse is taken over by "specialists," such as dieticians, social workers, laboratory technicians, therapists, interns, residents, OR and delivery-room personnel. Ancillary costs thus tend to increase with hospital size.[7]

[6] See D. E. Saathoff and R. A. Kurtz, "What Administrators of Small Hospitals Do," *Modern Hospital*, August, 1962.

[7] This problem of substitution between hospital departments causes severe problems in making departmental cost

To summarize, the small hospital is the home of the generalist—the generalist-administrator, the nurse, and the general practitioner. The use of generalized tasks is one good way of coping with fluctuation and uncertainty in the demand for services. As hospitals increase in size, the generalist becomes less important and there is increasing division of labor.

Hospital Size and Survival

What happens to hospitals, by size, through time? To attempt an answer to this question, we looked at all 57 acute hospitals in metropolitan Chicago in existence in 1945 and traced their histories over a twenty-year period of 1965.[8] Hospitals started after 1945 were not included. Because this is an urban area, these findings may not be generalized to rural areas. By choosing an urban area, we obtained a group of hospitals which are close enough together to be somewhat in competition with one another for patients, personnel, and funds. Assuming "survival of the fittest," this might indicate something about optimal size.

TABLE 6

DEPARTMENTAL OPERATING EXPENSE AS A PER CENT OF TOTAL OPERATING EXPENSE PER PATIENT DAY BY HOSPITAL SIZE

Department	Small Size (0–50 Beds) (n=90)	Medium Size (150–199 Beds) (n=71)	Large Size (400+Beds) (n=72)
Administrative and General	12.1%	9.9%	9.6%
Dietary	11.1	10.1	10.1
Housekeeping, Laundry, Plant	12.7	11.9	11.6
Nursing, Medical and Surgical	33.3	27.5	24.7
Pharmacy	5.3	4.7	4.2
OR, Delivery, Anesthesia	1.7	7.4	7.0
Radiology	7.2	6.5	5.7
Lab	5.6	7.1	6.4
Interns and Residents	.....	1.7	2.5
EW, OPD	.....	.....	1.8
Depreciation	5.1	4.6	4.7
Other	5.9	8.6	11.8
Total	100.0%	100.0%	100.0%
Operating expense per patient day	$33.37	$38.52	$43.06

SOURCE.—Hospital Administrative Services, "Special Comparison: National Size Groups," AHA. Excluded are direct costs associated with nursing education, maintenance of personnel, research, or other miscellaneous non-operating expenses. Dollar figures based on total operating expense per patient day. Part of these differences may be due to differences in definitions. For cost breakdowns of other size groups see the original source.

By our definition (see note to Graph II), only two hospitals decreased in size. These two hospitals were the largest in the 1945 sample and are unique enough to require special comment. The largest hospital in Chicago, both in 1945 and today, is Cook County Hospital. In 1945 it had 3,400 beds; today it has 2,747 beds, a decline of over 650 beds. Is this an indication that very large hospitals are inefficient? Perhaps, but it is hard to prove from one example. It is doubtful that the quality of care provided by Cook County Hospital is any better than that provided in many other Chicago hospitals of much smaller size.

The other hospital that decreased in size between 1945 and 1965 is also unique, because it is the result of a merger. In 1945 Presbyterian Hospital and St. Luke's Hospital were two separate entities, having 522 and 432 beds, respectively. They merged in 1957 and went from an original combined total of 954 beds in 1945 to 839 beds in 1965.

A summary of the information in Graph II disclosed the following facts: The smallest hospitals have the highest "death" rate. One-third of all hospitals of less than 100 beds closed their doors. Those hospitals having from 0 to 50 beds which survived grew enormously, by 467 per cent. It seems that small city hospitals must grow enormously or disappear. Since 1945 other small hospitals have sprung up to take their place. These small hospitals probably serve a distinctive group of doctors who cannot get staff privileges elsewhere.

Medium-sized hospitals were the most likely to

comparisons between hospitals. Because this substitution varies systematically with size, it is difficult to study departmental economies of scale.

[8] I am indebted to the assistance of Mrs. Joanna Kravits of the Center for Health Administration Studies for her help in the preparation of these data.

[9] Two problems with these data should be noted. First, the 1945 size figures are probably not completely accurate. They were often listed in round numbers, such as 100 or 200 beds. For this reason the size classifications used here are slightly different from those used in the other tables. This means that several size changes from, say, 200 beds to 195 beds, are counted as "same" rather than "decreased" in size. I believe that this size-classification system provides the most accurate description of what happened.

remain the same size and are the most stable. Note that one 251–300-bed hospital closed its doors. This can be explained by the fact that the neighborhood became blighted and the hospital could not find enough patients to remain solvent. Perhaps another explanation is that this hospital did not make the transition from medium-sized community to large-sized teaching hospital. It was situated next to a teaching hospital which has prospered during this time, which indicates that the changing neighborhood may not have been the only factor.[10]

The larger hospitals (301–650 beds) all grew, and both of the largest hospitals, as has already been indicated, decreased in size.[11]

Hospital Management and Size

Information about the educational experience of the hospital administrator is shown in Table 7. Two sources are used because they classify the information in somewhat different fashions. The upper half of this table uses information obtained from the 1960 Guide Issue of *Hospitals*. The lower half of the table uses information from the State of Illinois in 1966.

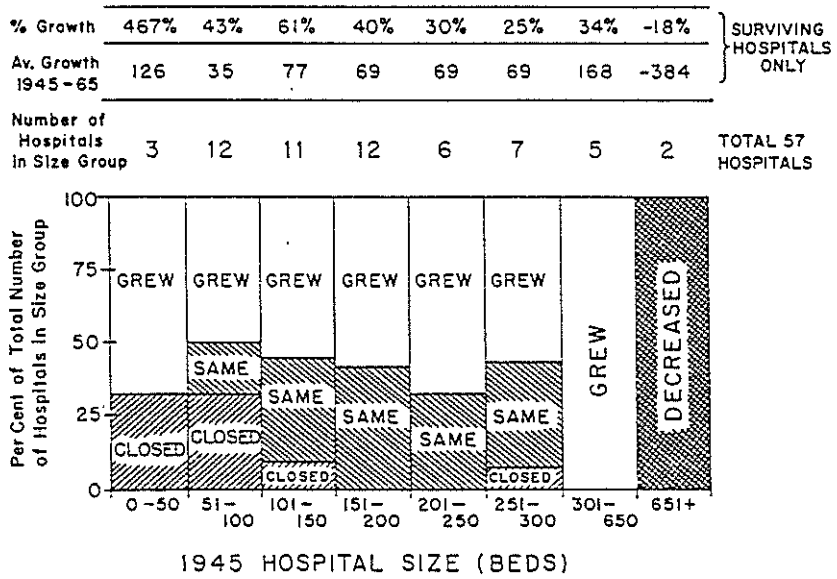
The small hospital is usually administered by an R.N., M.D., or non-college graduate. Small hospitals cannot afford the services of specialists in administration but rely more often on R.N.'s and M.D.'s who are undoubtedly also involved in patient-care activities. This is another indication of the use of generalists in small hospitals. Medium-sized hospitals are most frequently run by graduates with a Master's

[10] More detailed analysis of hospital growth patterns should be done before reliable conclusions can be drawn. Another factor which should be considered is the location of these hospitals, although the Chicago data can be explained without reference to location.

[11] [EDITOR'S NOTE.—At this point, some discussion took place and Mr. Pierre deVise pointed out that the bed figure for Cook County Hospital in 1945 was an estimate. Cook County Hospital actually started counting its bed capacity only a dozen years ago. He suggested that this is one reason why it might have decreased in size. Professor Herbert Klarman said that other very large municipal hospitals have been declining in size and that he suspected this would be true also for Cook County Hospital.]

GRAPH II

ALL HOSPITALS IN THE CITY OF CHICAGO EXISTING IN 1949 BY SIZE GROUP AND CHANGE IN SIZE FROM 1945 TO 1965



SOURCE.—1945, 1965 Guide Issues of *Hospitals*. This is based on the 57 hospitals in the metropolitan Chicago area in existence in 1945. The ten hospitals starting operation after 1945 are excluded. Those hospitals defined as "grew" had a large enough increase to move them from one 50-bed size classification to another. Those hospitals defined as "same" did not change their size enough to move them out of their original 50-bed size classification. If the hospital became smaller, so that it moved into a smaller 50-bed size classification, it "decreased" in size.

For example, a hospital which went from 125 beds to 175 beds "grew," while a hospital which went from 125 to 135 beds stayed the "same." Although the larger hospitals have been aggregated in Graph III (301–650 beds and 651 beds), the same definition based on 50-bed size groups is in effect.

The two largest hospitals which decreased in size are (1) Cook County Hospital, which went from 3,400 to 2,747 beds, and (2) Presbyterian–St. Luke's. In 1945 these hospitals were separate; St. Luke's had 432 beds and Presbyterian had 522 beds. They merged in 1957 and shrank from a 1945 total of 954 to 839 beds by 1965.

Metropolitan Chicago was chosen in order to compare a group of hospitals whose proximity to one another would tend to put them into competition. Because of the small number of hospitals involved, it would be unwise to infer statistical significance to the figures shown in Graph II.

degree. and the physician-administrator is most frequently found in the largest hospitals. In large hospitals physicians are more likely to be employed as directors of medical education or as full-time chiefs of service. The nature of these positions involves them in managerial decision-making.

It is interesting to note the relationship between the amount of "excess revenue" shown in Table 5 and the per cent of hospitals administered by Master's program graduates. It is my hypothesis that program graduates are more oriented toward fiscal

TABLE 7

EDUCATION OF THE ADMINISTRATOR BY SIZE OF HOSPITAL

UNITED STATES, 1959 ($n=370$)*

Education of Administrator	0–99 Beds	100–199 Beds	200–299 Beds	300–399 Beds	400+ Beds
R.N.	23%	18%	7%	4%	4%
M.D.	4	3	3	4	27
Other	73	79	90	92	69
Total	100%	100%	100%	100%	100%
No. hospitals	147	101	58	28	26

ILLINOIS, 1966 ($n=155$)†

Education of Administrator	0–49 Beds	50–99 Beds	100–149 Beds	150–249 Beds	250–499 Beds	500+ Beds
Master in hospital administration	18%	34%	65%	56%	63%	38%
Other academic degree	36	37	16	38	30	54
R.N. or no degree	46	29	19	6	7	8
Total	100%	100%	100%	100%	100%	100%

* SOURCE.—1960 Guide Issue of *Hospitals* for same sample as in Table 1.
† SOURCE.— Illinois Hospital Association, *op. cit.*

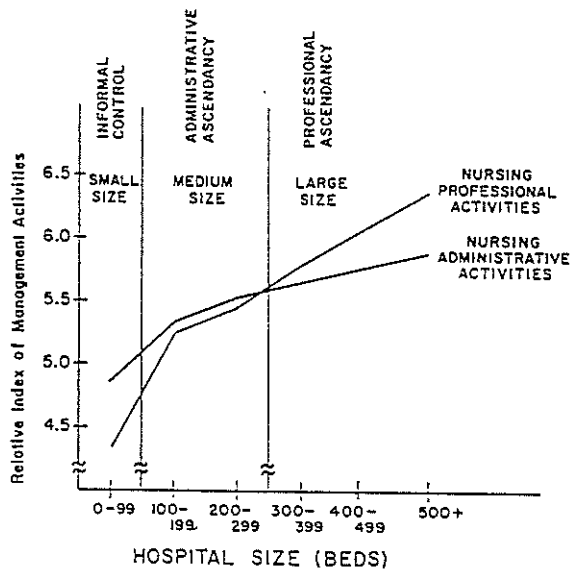
responsibility and solvency. This is part of what was meant by "administrative ascendency."

As organizations increase in size, they increasingly rely on formal policies, rules, and regulations to control the organization and to hold it together. The use of formal management activities or controls in hospital by size is shown in Graph III.

Two types of activities indices are shown—professional and administrative. Administrative activities are defined as those relating to cost control and are in the form of written rules, such as "There is a policy manual which says how to order supplies and equipment," "There is a formalized staffing plan," and so on. The professional activities include both education or patient-care activities and are carried out by a group, such as "There is a committee to evaluate the quality of care," "There are regular staff meetings for all R.N.'s," and "There is a regular ongoing education program for graduate nurses."

Graph III shows that both types of formal activities increase with size. Small hospitals are very low on both types of formal controls. There is a general feeling that formal preprogrammed written rules do not work well under conditions of uncertainty. In both small and medium-sized hospitals there are relatively more administrative controls than professional controls. In the largest hospitals there are relatively more professional activities. This is consistent with

GRAPH III



Data from 245 hospitals participating in both HAS and Management Review programs as of December, 1965. Activity scores are based on indices of nursing activities in the Management Review questionnaires. These two indices are relative to each other in that the mean index numbers are set equal to each other.

Professional activities are defined as (1) committee or group participation in decision-making, (2) related to educational activities, or (3) quality of care. Administrative activities are defined as (1) written rules and regulations and (2) related to cost control and efficiency.

Only questionnaires completed by the administrator himself are used here. There is probably some tendency for small hospitals to exaggerate their responses in order to "look good." Nursing has been used because it is the single largest hospital department.

the concept of decentralization in large organizations. Decentralization is reflected in the increasing importance of decision-making at lower organizational levels and professional responsibility.

Why is there a lag in the development and use of professional activities as size increases? Hospital-administrative-service cost data indicate that pro-

fessional activities are costly to maintain in small hospitals. For example, maintaining an elaborate training program for graduate nurses in small hospitals is expensive and relatively few small hospitals have such a training program. Large hospitals can spread the cost of such a program over a bigger patient load.

Summary

The theoretical framework used here can be restated as follows:

1. Small hospitals (0–100 beds) are characterized by uncertainty both in numbers and types of patients demanding service. This uncertainty is also reflected in low survival rates and fiscal insolvency. This uncertainty calls for generalized tasks and a reliance on informal controls. As measured by accreditation, small hospitals provide, on the average, a poor quality of care.

2. Medium-sized hospitals (100–300 beds) are stable, fiscally solvent, and have skilled administrators. Cost- and efficiency-related managerial activities are relatively more important.

3. Large hospitals (300+ beds) have the greatest degree of specialization and professional orientation. Physicians are more frequently involved in management, and fiscal soundness is sacrificed to the demands of teaching and research. There is decentralization of responsibility, and professionals are brought into the decision-making process through the use of committees.

This is one way of looking at hospitals. There has been some evidence presented to suggest that hospitals can be too small or too large, but the evidence presented here should not be considered conclusive.