The Effects of a Lottery on Completion of Medical Records by Physicians

Richard William Beers
Western Michigan University

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THE EFFECTS OF A LOTTERY ON COMPLETION
OF MEDICAL RECORDS BY PHYSICIANS

by

Richard William Beers

A Thesis
Submitted to the
Faculty of the Graduate College
in partial fulfillment of the
requirements for the
Degree of Master of Arts
Department of Psychology

Western Michigan University
Kalamazoo, Michigan
August, 1980
Completion of hospital medical records by physicians is a frequent problem to hospital administrations. A performance based lottery was used to evaluate its effectiveness in reducing the number of medical records which were unfinished and considered delinquent. Thirty-three male physicians were included in this study. Physicians earned or lost lottery chances in weekly drawings for a dinner at a restaurant or gift certificate to a local store. Results show an immediate increase in rate of record completion which declines over the course of the eight week experimental condition. Age of records were inversely correlated to the rate of completion. The procedure was initially successful although its effectiveness diminished. Several procedural drawbacks may have influenced behavior such as additional response effort to retrieve the prize and difficulty in recording dates by office staff. Other methods of controlling performance are discussed.
ACKNOWLEDGEMENTS

I would like to thank Dr. Frederick Gault, Dr. Jack Michael, my committee members, for their guidance during my research. Their suggestions helped immensely to fine tune the experimental analysis. I especially thank Dr. J. M. Keenan, also a member of the thesis committee, for his continued support in doing behavioral research in different areas of application and his assistance in the proofreading of this manuscript. I would like to thank my father, Thomas Beers, Sr. without whose moral support, this study could not have been completed. Finally I thank Pam Noles and Frances Dodd whose extra efforts with the tables and graphics to make this manuscript readable, clear and easy to understand.

Richard William Beers
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INTRODUCTION

The growth of that medical knowledge which pertains to the symptoms of disease, surgery and post-operative procedures, has increased the need for more detailed documentation of patient care. This documentation, the medical record, includes all pertinent information accumulated about the patient during a particular period of hospitalization. A hospital should have a smooth flow in the servicing and recording of patient care if it is to provide maximum service. In addition, insurance company regulations and Medicare laws require complete documentation of services before payment to the hospital. Incomplete documentation may result in selective rather than complete reimbursement thus, insurance carriers may reimburse selectively for services provided.

Hospital accrediting organizations, the Joint Commission on Accreditation of Hospitals (JCAH, 1978) and the American Osteopathic Association (AOA, 1977), have placed particular emphasis on the handling and use of medical records. Accordingly, hospitals and these agencies have set standards for the collection and recording of this information. Noncompliance with the standards may result in a hospital receiving a lowered accreditation status (JCAH, 1978).

Frequently, physicians do not complete documentation of medical records within the time limits set by the accrediting agencies or the particular hospital. The result is that physicians may have a large number of incomplete records which cannot be processed by the medical...
records office. This backlog is one of the measures the agencies use to determine hospital accreditation status. Not surprisingly, when the time of a hospital's review approaches, it is common for the backlog to drop as the physicians complete large numbers of delinquent records. It appears that there is a lack of effective control between hospital administrators and physicians for necessary completion of records.

Typically, a physician uses the hospital as a location to perform necessary primary services (i.e., surgery, obstetrics), to check patient progress, order medication and therapy. The scheduling of the physician's time and efforts is controlled by the physician himself. He is not required by the hospital or outside agencies to spend specific amounts of time with a patient in surgery or in the hospital. This flexibility allows a doctor to have patients at different hospitals simultaneously. He also bills independently of the hospital. In reality, the physician, neither paid nor employed by a hospital, is a relatively autonomous central director of hospital consumer use.

**Physician Influence on Management**

The physician has the ability to influence hospital policy in three areas. First, he admits patients and can select a particular hospital. Physicians in private practice provide the major source of potential hospital income by referring their patients to a specific hospital. If a patient requires hospitalization, the need is typically identified at the physician's office, and a hospital is recom-
mended. To a large extent, each hospital depends upon these referrals in order to keep a high occupancy rate.

Second, physicians are members of policy making hospital committees such as medical records review, surgical practices and resource utilization. Third, hospital boards of directors typically have physicians as members. With these sources of control it is possible for doctors to generate policy in their own best interest and block policy which interferes with their own routines of practice, even if the policy is ostensibly intended for increased patient care. These sources of control can diminish the power of the formalized administrative structure.

**Balance of Consequences**

To understand more fully the reasons for the problems in controlling physicians to complete medical records by the hospital, a close inspection of the relationships between the behavior and the consequences of both physicians and administrators is needed. Brethower (1967), Petrock (1978), and Rummler (1972) suggest analyzing the balance of consequences as a method for understanding performance problems.

Characteristics and dimensions of consequences are labeled with symbols described in Table 1 (Petrock, 1978). Tables 2 and 3 show the balance of consequences for controlling the prompt and delayed completion of medical records.
As can be seen in Tables 2 and 3, the majority of reinforcers for noncompletion of records and punishers for prompt completion are personal, immediate and certain, the kinds of consequences that exert the most powerful control of behavior. On the other hand, reinforcers for prompt completion and punishers for noncompletion are delayed and mostly uncertain to occur, resulting in a less effective control over the desired behavior. For desired behavior to become more manifest, a change in either decreasing punishers or increasing reinforcers for desired behavior is needed.

There are several positive consequences of completing a medical record for a physician. Information on the record may be helpful to the doctor (or hospital) later if the patient is readmitted, either for its value on surgical techniques, diagnosis, progress notes or other general patient history. By completing a record, the physician puts an end to repeated requests for him to complete the charts which may have accumulated and avoids losing practicing privileges at the hospital.

Additionally, the risk of possible malpractice suits may be avoided. A patient's record may be subpoenaed. If legal action has been taken, no additions to the record can be made even if it is to the benefit of the patient. The chances of a patient instituting a malpractice suit are low, and the consequences are far removed from the time when a record should be completed. However, the ramifica-
# TABLE 1

## CONSEQUENCES OF BEHAVIOR
### FUNCTIONAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>CHARACTERISTIC</th>
<th>DIMENSIONS</th>
<th>SYMBOL</th>
<th>DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal</td>
<td>P</td>
<td>A consequence that directly affects the behavior of the person in the job situation.</td>
<td></td>
</tr>
<tr>
<td>Impact</td>
<td>Organizational or Other</td>
<td>O</td>
<td>A consequence that directly affects the behavior of others or the organization as an entity and not the behavior of the person in the job situation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I</td>
<td>A consequence that follows the behavior soon after it is displayed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D</td>
<td>A consequence that does not follow the behavior soon after it is displayed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C</td>
<td>A consequence that is contingent upon and predictably follows a behavior.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>U</td>
<td>Consequences that are random. They are not contingent upon and do not predictably follow a behavior.</td>
</tr>
</tbody>
</table>

### TABLE 2

**BALANCE OF CONSEQUENCES FOR PROMPT COMPLETION OF MEDICAL RECORDS**

<table>
<thead>
<tr>
<th>Punishing Consequences</th>
<th>Reinforcing Consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PIC</strong> Interfere with physician's current patient care.</td>
<td><strong>P/ODU</strong> Documented information may be helpful later to physician or others.</td>
</tr>
<tr>
<td><strong>PIC</strong> Less time for outside physician activities.</td>
<td><strong>PDU</strong> Physician avoids losing practicing privileges.</td>
</tr>
<tr>
<td><strong>PIC</strong> Less time for patients in physician's office.</td>
<td><strong>PDU</strong> Physician receives fewer demands for completion by hospital.</td>
</tr>
<tr>
<td><strong>P/ODU</strong> Physician is involved in fewer malpractice suits due to the lack of documentation.</td>
<td><strong>ODU</strong> Better hospital/community status.</td>
</tr>
<tr>
<td><strong>ODC</strong> Better accreditation status for hospital.</td>
<td><strong>ODU</strong> Better accreditation status for hospital.</td>
</tr>
</tbody>
</table>
TABLE 3

BALANCE OF CONSEQUENCES FOR DELAYED COMPLETION OF MEDICAL RECORDS

<table>
<thead>
<tr>
<th>Punishing Consequences</th>
<th>Reinforcing Consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDU  Physician increases chances of losing practicing.</td>
<td>PDC  Hospital provides reminder service to physician.</td>
</tr>
<tr>
<td>PDC  Physician receives increased demands for completion by hospital.</td>
<td>PIC  Physician has more time for patient care.</td>
</tr>
<tr>
<td>P/ODU Increased chance of malpractice suit for physician and hospital.</td>
<td>PIC  Physician has more time for leisure activities.</td>
</tr>
<tr>
<td>ODU  Bad public relations of hospital.</td>
<td>PIC  Physician has more time for patients in office.</td>
</tr>
<tr>
<td>ODC  Hospital may receive poor accreditation status.</td>
<td>PDU  There are better relations between physician and hospital.</td>
</tr>
</tbody>
</table>
tions of a lawsuit have a potentially punishing effect; physicians may lose their business and equity in a lawsuit. Thus, prompt completion may protect against the possibility of a lawsuit based upon undocumented service. A complete medical record describes the majority of the relevant information involved in a case and, assuming the proper methods were used, clears the physician's liability. An incomplete chart adds to the possibility of charges of improper methods and mismanagement by the hospital and malpractice on the part of the physicians.

For the physician, completing medical records is time consuming with little immediate payoff. Record keeping interferes with current patient care and related professional interests which control his behavior in the hospital. On the other hand, by not completing records, the physician has additional time at his disposal for more direct patient care in the hospital, at the physician's office, and for other outside activities. It appears that the ability to schedule one's own time during the day has a powerful reinforcing effect. Many physicians may choose to spend time which could be spent completing records along other dimensions which provide more personal satisfaction.

Another reinforcing effect generated by noncompletion is that at some point the medical records director or an administrator may contact the physician and inform him of charts which are, or soon will
be, past the time due to be completed by the hospital. This may develop into a free reminder service for the physician, so that he does not have to come into the medical records office until notified by the hospital. This may serve as a reinforcing consequence for waiting. If the reminders are constant, he may avoid the medical records staff because of the punishing interactions.

It appears that the most motivating consequences for physicians who do not systematically work on their discharged patients' records are those which are punishing. Physicians may lose their practicing privileges in the hospital until the incomplete charts are finished. Without completing charts, the physician is vulnerable to malpractice suits based upon lack of documentation of services. It should be mentioned that it is possible for only one overdue record to cause a physician to lose privileges.

The prevalent technique of punishment, loss of privileges, is not as effective as possible because it is not systematic. There are at least three methods available to the doctor to circumvent this procedure. First, those who have lost practicing privileges may admit patients through the emergency room, whether or not there is an emergency situation, for the hospital does not take part in deciding emergency status. Second, a physician in a partnership or professional corporation may have another physician admit the patient and transfer the patient back to him after admission. Finally, a physician is fre-
sequently able to admit patients to other hospitals in the community. It is not unusual to find that hospitals do not have inter-hospital agreements for restricting a delinquent physician from admitting patients at alternate hospitals, since the competition between hospitals for filling bed space is constant and intense.

Consequences which control the hospital administration's need for complete medical records are much more straightforward and with fewer conflicts. Complete medical records, relieve the hospital of the politically expensive event; the suspension of practicing privileges. This increases hospital income, a desirable result. Better relations between administration and physicians also occur, since neither the administrators nor physicians look forward to the prospect of the administration invoking the lost privilege rule. Up-to-date records mean that the hospital will have a better standing with the accreditation review agency. Finally, completed records may improve relations between the hospital and the community in general.

Punishing consequences directed toward the hospital for incomplete charts include malpractice suits, decrease in value of the hospital's reputation, lowered accreditation status, strained relations between physicians and administrators, and the possibility of physicians taking patients to other hospitals with the attendant loss of revenue.
Previous Methods

Some procedures have been previously used to attempt to reduce the number of backlogged medical records and the amount of time physicians take to complete records. Weekly reminders of suspension notices were used to keep physicians' record completion rates constant (Reeder, 1970). Physicians with incomplete records seven days after patient discharge were sent postcards informing them that in seven additional days they would lose their hospital privileges if the record(s) were not complete. Perpetua (1975) and Creason (1975) sent amusing postcards to doctors' offices, detailing the amount of work to be completed, prompting physicians to come to the medical records office and finish them. Beers, Wiler, and Keenan (1976) suggested the use of a number of concurrent discriminative stimuli and reinforcers in a one-time reduction of medical records delinquencies. One hospital reorganized its medical records office and created a "floater" position. The floater was assigned to look through all of the current patients' charts each day and marked the parts of the chart which needed completion (-----------, 1975).

The effectiveness of these procedures varied. Weekly reminders and amusing postcards caused a temporary drop in the number of overdue charts but had little long-term effectiveness. Physicians who receive these notices may throw them away before they have been opened thus avoiding contact with the information. The medical records office also spends extra time in filling out the postcards, which adds to the cost of the procedure.
The use of a floating medical records technician appeared to have a great deal of effectiveness, though no performance data were presented. This procedure reportedly changed the system and physicians' behavior so that no physician lost privileges for failure to keep charts up-to-date. It reduced overdue delinquencies by identifying deficiencies while the patient was still hospitalized. It reduced the amount of last-minute dictations by doctors who were avoiding losing their privileges and apparently increased the consistency of record information. One drawback with the procedure is that it required an expensive reorganization of the medical records staff.

Revoking practicing privileges also generates an increase in record completion. Given a time limit and the threat of a punishing consequence, many physicians work on the deficient charts within the hospital's time limit, but charts tend to be completely processed shortly after, rather than prior to, the deadline. Hospitals also have difficulty in enforcing this time limit in some cases. For example, specialists, who have been invited at great expense, to practice in the hospital with a favored status, may ignore the criterion. The lack of enforcement in the case of one such physician may eventually decrease the effectiveness of the procedure with all physicians.

Of the four previous methods, only the "floater" procedure has reportedly generated substantial change in behavior. It appears that physicians are more likely to record the medical record information when the need is identified on current patient's records rather than
after the patient has been discharged. It is possible that the procedural changes in the medical records office caused prompt but temporary record completion by physicians due to warm-up effects. Such a change may not provide sufficient incentive to maintain that performance over long periods of time.

The previous methods can be divided into two categories; the use of discriminative stimuli without explicit consequences and the use of punishing consequences. Discriminative stimuli alone have been shown to produce only temporary changes in behavior. Consequences applied to behavior after the discriminative stimuli have been produced are needed. The lack of success in the use of prompts (discriminative stimuli) alone to produce reductions of backlogs and an increase in "on time" completion of patient records is an illustrative example. Taking away practicing privileges, although a strong consequence, does have features which can be counter-productive. It provides feedback only for undesired behavior; such feedback is infrequent and is directed toward the undesired behavior. Research has shown that providing frequent feedback and positive consequences on desired behavior increases the frequency of the desired behavior (Shook, Johnson, and Ulhman, 1978).

One type of incentive system which has been used to change topographies of desired behavior with employees and staff is the lottery. Nord (1969), Pedalino and Gamboa (1974), and Lawler and Hackman (1969) have used lotteries as incentive systems to reduce absenteeism.
and tardiness with employees in industrial settings. Skinner (1973) suggested contingent consequences in the form of prizes to be used in applied settings to increase rates of appropriate behavior on the job. Iwata, Bailey, Brown, Fosbee, and Alpern (1976) used a performance lottery to improve quality of work by institutional staff in a residential facility for the multiply handicapped using the opportunity to rearrange work schedules for the next week as a reinforcing event. Michael (1977) used a lottery to increase attendance and completion of academic work by low achieving high school students with phonograph records as reinforcers. All but one of the previous studies have used performance based lotteries in settings where the subjects were working as employees in addition to the lottery. The procedures were initiated by management and were inescapable. The single exception, the school lottery (Michael, 1977), was a procedure which could be avoided altogether by not attending school.

Results of these studies indicate that a performance-based lottery procedure might be effective in reducing backlogged charts and cause physicians to promptly complete charts. A lottery might be an effective yet inexpensive method of producing maintained prompt record completion. In addition, the change in conditions might show differences between physicians' rates of completion.
METHOD

Subjects and Setting

The setting was a midwest hospital with a capacity of 200 beds. An average of 100 patients per week were discharged. The hospital was located in a city which had two other hospitals, one with larger facilities. Thirty-three current physicians, all male, had hospital practicing privileges. A new head administrator had been retained seven months prior to the onset of the study. The medical records office was staffed by a director, six medical records technicians and six transcriptionists, all female. The director of medical records, the only female working at an administrative level, was one of the longest employed persons at the hospital.

The office was located in the farthest wing from the main hospital entrance, away from the main personnel traffic flow. Dictating equipment had been installed to assist the physician. Another machine was connected to both house phone and outside phone lines making it possible for doctors to add or correct file information without having to be present in the medical records office.

An accreditation review was to be conducted two weeks after the study was completed.

The hospital administrator had approved the project prior to the collection of baseline data.
Response Measurement

Definition. Throughout the experiment, measures were taken on the following dependent variables:

Record completion - an instance of a physician completing a previously unfinished section of a medical record for which he was responsible either by adding previously unrecorded information or affixing his signature to appropriate unsigned material.

Age of record - the length of time required to complete the chart, calculated by subtracting the date of discharge from the date of the observed physician's record completion. When two physicians worked concurrently on a chart, the overlapping latency was subtracted from the physician with the longest time.

Observation procedures. Data from two baseline conditions were collected before the intervention because of a change in data collection procedures. Under both baseline conditions, physicians were not told of any observation procedures nor was any mention of an upcoming change in procedures made. Hospital regulations required that only the hospital administrator give his permission to collect data for this type of research.

Baseline I

Baseline I was 14 weeks long, during which time the following data were recorded:

1. date of patient discharge
2. date of record available for medical records
3. date record available to physician for dictation
4. date dictation was completed by physician
5. date record available for physician signature
6. date signature of physician completed
7. date chart was determined complete by medical records
8. physician number

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These data were collected by placing a small sheet of paper with numbered lines in the record. At the end of each of the seven checkpoints, the medical record technician put the date and physician number on the appropriate numbered line. When the chart was completed the sheet of paper was put in the technician's desk, picked up by the experimenter and recorded on a computer.

Baseline II

The procedure in Baseline I became difficult for the medical record staff to use because of the extra time required to fill out the sheets in addition to their other work, and a new procedure was devised and used during the Baseline II and Lottery phases. Following a nine-week period of no data collection, a new procedure for recording was used for two weeks. Any work completed (either with physician dictation or signature) was placed in a box which was checked twice a day by the technician. She recorded:

1. patient number
2. physician number
3. date record picked up

Lottery.

Following Baseline II, each physician was sent a letter from the director of medical records informing him that a lottery was starting and included a copy of the lottery rules. Posters were placed in the medical records office, one with a list of eight numbers beside which the winners names were placed as they were drawn.
For each medical record a physician completed, a slip of paper (lottery chance) with the physician's number was placed in a glass jar. On the day before the weekly drawing, any physician with incomplete charts 0 to 15 days old (since patient discharge) received an additional 10 chances. Physicians with incomplete charts over 15 days old had two of his tickets removed from the jar and did not receive the bonus tickets for that week. Those physicians who did not have two tickets in the lottery did not get additional tickets for that week, nor were they penalized on subsequent weeks. Drawings were held weekly, and a feedback sheet with name of the winning physician and physicians' probabilities was placed in each physician's mailbox in the records office.

The prize for winning the lottery was $25 in goods or services at a local store or restaurant. In addition to the weekly drawings, a grand prize was given. At the end of the seven-week lottery, all of the lottery tickets were collected and from them a grand prize winner was selected. The grand prize winner received $40 in goods or services at a local store or restaurant. Prizes were arranged by the hospital's materials manager after the winner had made a selection.

Experimental Design

An "AB" design was used. The study was to include a reversal, but conditions resulting from an impending accreditation review precluded data from being collected during the reversal.
RESULTS

Of the total 33 physicians, 28 completed record work during Baseline I. Fourteen physicians (003, 200, 225, 300, 304, 306, 307, 308, 312, 324, 329, 333, 334, 427) completed at least seven medical records during the two week Baseline II and Lottery conditions. These physicians are included in the analysis. Physician 125 won a lottery during week 6 and the data are also included in the analysis.

As shown in Figure 1, mean weekly completion rates, for all physicians were 2.73 records per week for Baseline I, 4.43 for Baseline II and 4.86 for the Lottery conditions. Record completion rates increased 62.27% between Baseline I and Baseline II while the increase in completion rates from Baseline II and Lottery condition was 9.71% indicating little effect of the independent variable. Two physicians (307, 324) had Baseline II data which consisted of one week of completing 25 and 31 records respectively followed by a week of completing 1 and 0 records respectively the following week. This increased the average of Baseline II by 61.09% from 2.75 without those two data points to 4.43 records per week. Figures 2 and 3 show individual performance for physicians 307 and 324 respectively.
FIGURE CAPTION

Figure 1. Rate of record completion and age of records by total physicians.
FIGURE CAPTION

Figure 2. Rate of record completion and age of records for Physician 307.
FIGURE CAPTION

Figure 3. Rate of record completion and age of records for Physician 324.
Mean age of records per week was calculated by dividing the total number of days of all records by the number of physicians completing records each week. Values for all physicians across the three conditions were 8.66 days per record for Baseline I, 10.28 days for Baseline II and 14.06 days for Lottery. There was an increase in age of records between Baseline I and Baseline II of 18.71% and an increase between Baseline II and Lottery of 36.77%. These changes indicate that physicians were completing older records during both Baseline II and Lottery as compared to Baseline I, with the Lottery values almost double that of Baseline II.

Six physicians won the weekly lottery prizes, and one physician won the grand prize drawing. Physician 225 won the weekly drawing twice, during the second week and fourth week of the lottery. Figure 4 shows the performance of Physician 225. Five physicians who won a lottery (125, 200, 225, 308, 427) had both increased rates of completion and age of records values in Lottery condition as compared to Baseline II. Six additional physicians (300, 307, 312, 324, 329, 333) including two lottery winners (324, 329) had decreased completion rates. Excluding physicians 312 and 333, they also had decreased values in age of records when comparing Baseline II to the experimental condition. The remaining four physicians (003, 304, 306, 331) who did not win lotteries had increased values during the experimental condition of both completion rate and age of records. Table 4 shows

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FIGURE CAPTION

Figure 4. Rate of completion and age of records for Physician 225.
the mean weekly completion rate and mean weekly age of records by physician across the three conditions.

A correlation coefficient value of \(-.42\) was calculated from Baseline I values of age of records and rate of completion while Lottery values equalled \(-.76\), indicating an inverse correlation between the two independent measures.

During the seven weeks of the Lottery, there was no instance in which the number of physicians earning bonus lottery tickets (i.e., with all charts less than 15 days old) was more than the number of physicians losing two tickets (with at least one chart over 15 days old), as shown in Table 5. During the second week and last week of the Lottery, the number of physicians earning bonus tickets (15) was almost equal to those losing tickets (18).
<table>
<thead>
<tr>
<th>Physician</th>
<th>Baseline I</th>
<th>Baseline II</th>
<th>Lottery</th>
<th>Week Physician Won</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rate</td>
<td>Age</td>
<td>Rate</td>
<td>Age</td>
</tr>
<tr>
<td>003</td>
<td>0.50</td>
<td>4.93</td>
<td>7.50</td>
<td>11.75</td>
</tr>
<tr>
<td>125</td>
<td>0.21</td>
<td>9.75</td>
<td>0.00</td>
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<td>200</td>
<td>3.57</td>
<td>1.39</td>
<td>4.50</td>
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<td>1.00</td>
<td>8.50</td>
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<td>3.50</td>
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</tr>
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<td>427</td>
<td>4.29</td>
<td>8.22</td>
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### TABLE 5

**PHYSICIAN LOTTERY PERFORMANCE**

Weekly Number of Physicians Earning Bonus or Losing Tickets

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<tr>
<th>DATE</th>
<th>BONUS</th>
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</tr>
<tr>
<td>12/03</td>
<td>15</td>
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</tbody>
</table>

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DISCUSSION

Not all of the physicians were used in data analysis. Eighteen physicians were excluded because each of them completed less than seven charts during the Baseline II and Lottery conditions. They represented approximately 3% of the total cases handled by the hospital during the data collection periods.

The increase in rate of completion between Baseline I and Lottery amounted to 78.02%, and only 9.71% between Baseline II and Lottery. Baseline II values are significantly affected by the small sample size and two examples of high rate behavior. Physician 324 completed 31 charts in one week, which was over 1\(\frac{1}{2}\) times more than the same physician's next highest value (17 charts) during Baseline I. It must be noted that this high value was not due to chance. During all phases of the experiment, other Medical Records procedures were still in effect and a high value indicates that this physician was under a special contingency to complete these records, namely threatened with loss of privileges. Physician 307 may have been under a similar set of circumstances, although his Lottery completions for week 5 equalled 33 charts (Figure 2). Thus the Baseline II values for the two physicians are equal to 61.09% of the total value of all the physicians. Discarding those values increases the difference between Baseline II and Lottery from 2.75 to 4.86 respectively. This represents a difference in means of 76.73%.

There was an immediate increase in performance during the first
two weeks of the experimental condition by all physicians. This may show an effect of antecedent control of behavior. The publicizing of the lottery could have been responsible for such an increase. Likewise, at the end of the lottery there was a decrease in performance. The Medical Records director announced at the start of the experiment that there would be eight weekly drawings. Thus, the end of week 7, with one lottery left, the chances of winning were markedly less than at the beginning and the announcement may have caused a drop in later performance.

This indicates that the initial increases may have been due to the novelty of the lottery, or rather the change in conditions. This possibility is not supported by the change in age of records over the same time period. As rates increase it would be expected that the age of records should initially increase followed by a systematic decline in age values across time. During Lottery however there was instead an inverse correlation between the two measures; the fewer the records completed, the older the age of the records and the more charts that were completed the less old the ages were.

A plausible explanation for the inverse correlation is that when given the choice between older and newer medical records a physician is more likely to finish the older chart because the consequence of losing hospital practicing privileges occurs only with older records. It is more likely that when fewer numbers of records are completed, those with potential for the most immediate consequence (older charts) will be completed first.
There is a possibility that the increase in rates during the lottery condition was a function of another uncontrolled variable, such as the hospital accreditation review which followed two weeks after the completion of the lottery phase. No doubt a return-to-baseline condition would have resulted in a more definitive conclusion, but the hospital administration ruled out this possibility.

The timing of accreditation reviews, spaced approximately two years apart, appears to be a fixed interval schedule of consequences. Such a circumstance would develop a pattern of avoidance responses in which the rate of behavior increases slowly at first followed by rapid increase in this rate. As can be seen in Figure 1, the rate of behavior declines over time during Lottery. The absence of the characteristic behavior pattern "FI scallop" indicates that the upcoming hospital review did not account for the increase in record age or record completion rate.

The use of a lottery as a method for decreasing the age of medical records is of dubious worth under these circumstances. While average rates of behavior increased, it was not sustained. The most significant example is Physician 225 who won the lottery once on Week 2 and again on Week 4. As can be seen in Figure 4, record completion declined to 0 on Week 3, yet increased on Week 5. In fact of the seven opportunities for increased performance, only three times was there an increase or maintenance of the completion rate by individual physicians. Even with these 3 examples, the increased rate dropped after the second following week.
A hospital regulation required that every medical record be complete within fifteen days of discharge. As can be seen in Table 4, none of the physicians had reduced age of record values from over fifteen days in baseline to under the fifteen-day limit during the lottery. Eight physicians (003, 125, 304, 306, 324, 331, 333, 427) used in the data analysis had increased age of record values from under fifteen days to over fifteen days during the lottery. The increase in average age of records during the experimental condition indicate that physicians were completing older records. The increase in age averages could also mean the physicians were taking longer to complete a chart. Because of inadequate design, the data collection system could only identify the ages of those records which physicians completed. This second possibility is represented by physicians with low values in average age of records (200, 312).

**Data Collection Drawbacks**

The data-gathering procedure was cumbersome for medical records technicians. At the end of the week a technician checked to see which physicians had incomplete charts over 15 days old by looking in all the physicians boxes, as part of compiling a delinquent physicians list for the administration. Those physicians with no "old" charts were given bonus tickets, and those with "old" charts lost two tickets that were in the lottery jar. This required a large amount of time to make up the bonus tickets, cut them, and to find two numbered tickets of those physicians losing tickets for that week. The technician also
reported that tasks were boring to complete. Had the procedure been effective in increasing prompt record completion, the cost of taking a technician off the current job tasks to run the lottery may have been worth the loss of 4–6 employee hours per week, though projected downtime for the technician is difficult to ascertain from the present data.

The data collection system was not a reliable one. During the last ten-week period, 1,321 patients were discharged from the hospital. Of that total, 719 patient's records were recorded as complete by the data system, a completion rate of 54%. If this was a true indicator of physician completion rate, the medical records office should have been filled with stacks of incomplete records. A visual inspection of the office showed that no large quantity of records was evident. Some of the records had been completed before they were checked by a medical records technician and could avoid being included in data system, so lower values may not have been included. On some days when there was a large influx of records that required processing, some of the records were not recorded on the lottery data system. Another case of nonrecording of the dependent variable occurred if the technician assigned to the project was not working on a particular day. A more effective method for data collection and reliability would be to program the lottery on a computer so that additions or deletions could be made before printing out the tickets. Designating another person (preferably the experimenter or aide) to take over the
recording tasks would also improve the method if the confidentiality of the files were not violated as a result.

**Procedural Drawbacks**

The lack of consistent increases of record completion by all physicians during the lottery condition indicates a weakness in the strategy of the present group contingency. Four physicians (306, 312, 324, 329) completed fewer records during the lottery condition than during Baseline I, and physician 300's rate stayed the same. Improvements in the experimental contingency are needed to achieve the desired effect.

It appears that the prizes were not reinforcers for the physicians since the performance after the delivery did not increase the rate of completion over the eight weeks. The lottery procedure might have been more effective if the value of the prize had been higher. To be effective lotteries should provide opportunities to win an item or money that is not normally acquired by the participants. The prize was a potential additional $25 to each physician and was in that sense unique, but either a higher value or $25 in a predetermined prize might have increased the reinforcing characteristics of winning the lottery.

An additional response effort was inadvertently added which may have decreased the effectiveness of winning. After winning the prize, the physician was required to contact the materials manager of the hospital so that arrangements could be made for payment of articles or...
meals purchased. Two physicians (427, 225) who won the first two lotteries did not check with the manager until the fourth week of the lottery. Another physician who won a drawing failed to contact the materials manager to pick up his check. He complained that provisions had not been made to accommodate him before he went to the restaurant where he had expected to use his winnings. This additional effort no doubt decreased the reinforcing effects of winning the drawing by requiring additional responses on the part of the winner to obtain the prize. A better method would have been for the materials manager to contact the winning physician as soon as the drawing was held, or have a certificate (or money) available in medical records as soon as the drawing was held. Whenever the winning physician came into the records office, he could then pick up the prize more quickly.

If the procedure had generated a clear-cut desired effect, another long-term problem may have arisen. Lotteries that maintain long-term responding appear to have theme and prize value changes when initial response rates drop off (-----, 1976). This would require the hospital either to increase the size of prizes or rearrange the schedule to maintain desired completion rates.

This lottery differs from state lotteries in that it is not a self-supporting project. Annual expenditure for a project such as this experiment would cost in excess of $1,300 for the awards alone. Because Medicare and Medicaid are not able to make sure that every record is complete, the hospital is usually paid whether a document
is finished or not. Under these circumstances, the present cost of late records is fairly insignificant from the hospital's point of view. Accrediting agencies review hospital performance at the most once a year. To get records completed requires an enforcement of the loss of privileges rule across the board only on a yearly basis. That procedure costs considerably less in dollar output and personnel time and does not warrant continuing the present lottery.

The present lottery had problems similar to the one used by Michael (1977). In that procedure, children could earn lottery tickets for which the winner won record albums. Those findings indicate that attendance and in-class work completion were not appreciably affected by the procedure, possibly because the designated reinforcers (record albums) could be obtained elsewhere with less effort. The present study has similar features that may have affected the success of the program, in that physicians are able to get the same quality meals or items without the lottery and get them more efficiently than through the lottery procedure.

**Personnel Reactions to Procedure**

At the beginning of the lottery, the medical records director reported that several physicians complained about the lottery as a method to get physicians to complete work; that it was an unethical procedure, and that none of the physicians had been consulted before the start of the procedure. It appears from these reports that the physicians found the procedure aversive because of its obvious design
to control behavior in an apparently punishing fashion. The medical records director reported these comments were not made after the first week of the lottery.

Another interesting reaction to the lottery was that of many nurses. The medical records director reported that some nurses and other hourly employees of the hospital felt that giving physicians $25 prizes for "doing work they are supposed to be doing anyway" was unfair. The criticisms were based upon the size of the prize and the fact that hourly employees didn't get a chance to have access to the lottery. These reactions indicate that $25 prize may act more powerfully as a reinforcer for hospital employees. This is not surprising since $25 represents a large percentage of a day's wage for hospital employees, but is a small percentage of many consulting physicians' fees.

It should be noted that attempting to relieve the problem of delinquent record completion is not an encroachment on the accepted standards of ethics for physician practices. It is simply an effort to solve a performance problem counterproductive to present standards of health care delivery.

The addition of another person (especially a person from outside the hospital) to collect performance data in the medical records office may have caused some consternation on the part of the physicians. A form of this type of behavior was observed firsthand when the experimenter was introduced by the administrator to a physician
as "the person running that lottery." Having another person in the medical records office was viewed by the director as an imposition on her staff for a project that was viewed as nonessential to the performance of the office. Further research should investigate the validity and accuracy of the data monitoring system.

Alternative Strategies

Further research could be helpful in aiding this performance problem. Using a "floater" might be the most effective method if an additional consequence was presented promptly to the physician for either completing or not completing records. The lottery procedure might be more effective if used in conjunction with the floater position. Another method might be to give authority to accrediting agencies to close hospitals to further admissions until records are complete. This would add to the hospital's effectiveness in enforcing the loss of privilege rule.

One method, possibly the most effective in attaining desired physician performance, would be to have the medical records office trained in positive reinforcement techniques. Having technicians as well as the Director give positive attention to physicians contingent on improved performance could be the most cost effective procedure.

There is a lack of complete performance data in the medical records office. As a result, the only feedback given to physicians is the information on delinquent performance. A weekly performance report on all physicians' record completion performance should be esta-
lished and given not only to the hospital administration but also to individual physicians as well.

Publishing these data and providing positive reinforcement in the form of praise by the medical records department to physicians would change the emphasis from providing certain consequences and feedback from inappropriate performance to desired performance.

With these data, goals for improved performance could be established. Eldridge, Lemasters and Szypot (1978) found that setting performance goals, providing performance feedback and contingent praise reduced waste in a manufacturing setting. In addition the subjects reported that they preferred this procedure to a previous strategy, which had given feedback only for undesired performance. Although the project used employees as subjects, it seems reasonable to expect that physicians would respond in a similar fashion. Further research should be done to investigate the effectiveness of these methods in the hospital setting.


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Michael, J. L. Personal communication. Department of Management, Western Michigan University, Kalamazoo, Michigan.

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