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Psychological Research With Administrative Data Sets: An Underutilized Strategy for Mental Health Services Research

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Abstract

A key element in the identity of professional psychologists is their commitment to base practice on the best knowledge available about a problem being tackled. Although administrative data (e.g., records of provider billing and procedures) can often shed light on the dark areas of the complex U.S. health care system, psychologists make notably little use of them. Experience teaches that decisions must often be made despite the absence of “gold standard” knowledge from the well-designed, controlled studies learned in graduate school. Increased involvement of psychologists in work using administrative data can improve service provision but requires that psychologists adopt unaccustomed approaches to research. The authors discuss administrative data's strengths and limitations, recent progress made in using them, how psychologists can acquire and use low-cost information from administrative data, and examples of questions that can be answered.

Keywords

health services; Medicaid; Medicare; insurance; evaluation

Professional psychologists are called on to design, implement, and evaluate the delivery of mental health services to the public on the basis of the best available knowledge. Yet it takes time and resources to acquire and analyze the data needed to meet these responsibilities. These costs are often highest for some of the most fundamental questions: How well do existing practices serve large groups of people in need, particularly those whose multiple problems make them likely to seek care inconsistently and from multiple providers and, not coincidentally, make them least likely to participate in research based on primary data collection? Across a range of health-related fields, research using administrative data has been used to investigate these and other questions, but, thus far, the participation of professional psychologists in this research has been comparatively limited. Defined in general terms, these data are any computerized records generated in association with provision of a medical care service. The most important example of this type of research uses data generated when a third-party payer, either private or public, is billed for a service. Despite the significant limitations we discuss below, these data are in many respects uniquely well-suited to aid in the study of

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populations and topics of interest to psychologists. Particularly important are studies of disadvantaged populations in need of psychological care who might otherwise go understudied because of their social marginality, psychological symptoms, erratic help seeking, and comparatively low frequency of visits in the setting associated with major medical centers, where most clinical research is conducted.

In this article, we introduce the use of administrative data for research to the professional psychology audience and argue for the greater involvement of psychologists in work with this type of data. We review the use of administrative data in health services research, discuss practical issues in data management and acquisition, and review the types of research questions that administrative data are best suited to answer. Of particular importance, we discuss some of the reasons why psychologists have typically avoided conducting research with administrative data and the unique research contribution that psychologists could make using administrative data. As professional psychologists who conduct research using administrative data, we specifically illustrate our points with examples from our own work.

Research Barriers With Administrative Data: Why Don't Psychologists Use Them?

A perusal of health services research journals, such as *HSR: Health Services Research* or the *American Journal of Managed Care*, indicates that economists, sociologists, and public health researchers conduct studies using administrative data files but that psychologists are rarely involved in such research. We believe that several major barriers might explain why psychologists have not joined these other disciplines in the growing field of administrative data analysis.

Skills and Professional Culture

One major challenge can arise from the core skill set and culture of graduate research training in psychology. Administrative data set work can be challenging for students coming from psychology training programs that draw on models from the laboratory sciences, which stress the importance of precise measurement, strong experimental designs, and well-controlled conditions of data collection, rather than models from neighboring social sciences, such as sociology, political science, or economics. Investigators in these fields often work with large data sets built around expensive surveys and are rarely able to determine specific questions or data elements. Instead, they must investigate properties of the data set itself, accept proxy measures when necessary, construct and test the properties of scales that have been constructed from existing items that may not have been intended for that purpose, and use sophisticated statistical modeling as a rough substitute for the experimental controls more familiar to psychologists. Reliance on these alternative research approaches can be alien for those used to a research model in which constructs are studied using self-report scales with testable reliability and validity and control variables that are specifically selected by the investigator on the basis of theoretically derived models.

To become comfortable working with these data sets, psychologists may find it helpful to cultivate three cognitive orientations. The first is to try to recognize their potential, which, as we discuss, involves becoming familiar with the professional and organizational practices that leave “traces” in administrative data sets and learning to ask questions that can be usefully answered by examining patterns found there. The second is to accept from the start that administrative data have certain limitations, that compromises are inevitable, and that it can be both reasonable and valuable to strive for models that are “good enough” without being ideal. The third is to avoid any tendency to confuse this acceptance of limitations with an

indifference to the value of rigor, because it is often the case that the investigator must find different strategies for pursuing rigor when more familiar ones are unavailable.

Cognitive and Attitudinal Challenges

Other barriers may derive from cognitive or attitudinal challenges to seeing administrative data as containing potentially useful information. Viewing electronic billing records as valuable data with the potential to improve client care requires quite a shift in perspective for many psychologists. One challenge arises from a mixture of values, attitudes, and temperament. Drawing on our own experience, we suspect many psychologists distrust third-party payers whose billing procedures are viewed as a form of what some call “rationing by hassles” inimical to client interest. We find many clinicians dislike the complicated payment system characteristic of American health care financing. And, at least in some cases, there may be concern that this sort of research may end up putting career goals ahead of deeply held clinical values. We suspect that many would also acknowledge that they chose the person-to-person work of professional psychology precisely because they find the world of claims and bureaucratic rules boring, intimidating, or personally distasteful.

Why Should Psychologists Be Interested in Using Administrative Data for Research?

We believe that psychologists can make unique contributions to the use of administrative data sets for health services research and that the use of such data sets can allow them to make important contributions to the understanding of clinical issues that are of great concern to psychologists. Below, we briefly review the origins of this administrative-data-based research and discuss the types of research questions that it can address that are of greatest relevance to psychologists.

Review of the Use of Administrative Data in Research: Development of the Field

Interest in use of administrative data files for research grew out of efforts in the early 1970s to study significant and sometimes costly variations in the way medical services were provided in neighboring communities (Virnig & McBean, 2001). Labeled *small area variation effects*, these findings foreshadowed the contemporary movement for evidence-based care, inasmuch as they called attention to the influence of local practice styles on clinician decisions that were not justified by differences in outcome (Wennberg & Gittelsohn, 1973).

Several factors have contributed to the expanded use of administrative data by the research community. The reliability (Edouard & Rawson, 1996; Federspiel, Ray, & Schaffner, 1976; Fisher et al., 1992; Fowles et al., 1995; Horner, Paris, Purvis, & Lawler, 1991; Kashner, 1998; Schwartz, Perlman, Paris, Schmidt, & Thornton, 1980) and validity (Lurie, Popkin, Dysken, Moscovice, & Finch, 1992; Rawson & Malcolm, 1995) of the diagnostic and procedure codes they contain have been extensively investigated. (These codes are typically from the International Classification of Diseases system, currently in its 10th revision.) These developments have provided investigators with an interpretive context for findings and have led to the further refinement of analytic techniques and research strategies (Moses, 1991; Motheral & Fairman, 1997). Efforts to forecast and control costs of care, rationalize and integrate service delivery across sectors, and monitor the provision of evidence-based optimal care procedures as they are diffused through service systems have created a demand for data able to describe multiple dimensions of care for large populations (Federspiel et al., 1976; Krakauer et al., 1992; Lohr, 1990; Roos et al., 1989; Weiner, Powell, Steinwachs, & Dent, 1990; Whittle, Steinberg, Anderson, & Herbert, 1991). In a similar way, the threat to public health posed by infectious diseases has also focused attention on the need to study care provision at the population level.

Usefulness of Administrative Data Sets to Psychologists Studying Marginal Populations

Psychologists committed to serving difficult-to-treat, multiproblem populations must often do so even when there is no definitive research to guide them. Many of the same characteristics that make it hard to provide good services to clients can also make it hard to recruit and retain them in controlled trials and observational studies located in medical centers. It can be argued that psychologists know the least about the care given to the clients who most need our help.

Biases introduced by common research strategies are significant. In major clinical trials, clients with complicated clinical presentations, treatment needs, comorbidities, or unstable living situations are often deliberately screened out (Haberfellner, 2000; Miller, Strickland, Davidson, & Parrott, 1984). Even researchers conducting naturalistic, observational studies face particular hurdles in studying some client subgroups. Alienated, withdrawn, or distrustful clients, as well as those wary of the stigma associated with mental illness, drug use, or HIV, are inevitably challenging to recruit and retain (Schubert, Patterson, Miller, & Brocco, 1984). Patients from subgroups with cognitive impairment may not be able to provide informed consent, particularly in the context of the increasingly high standards used for research with vulnerable human subjects, and consent modification (Wirshing, Wirshing, Marder, Liberman, & Mintz, 1998) or procurement of proxy consent can be burdensome and sometimes impossible (Delano & Zucker, 1994). When consent can be obtained, cognitive impairments may interfere with the client's ability to report on aspects of his or her care. Even among samples of socially marginal clients successfully recruited into studies (e.g., Rabkin et al., 1997), attrition can be high, particularly among sicker or more disabled patients. A standard strategy to deal with this problem is to compare sociodemographic characteristics between eligible versus excluded clients or between eligible clients who are successfully recruited versus those who are not. But these controls often cannot capture important clinical differences. For example, when the interviewers for a recent extensive study in psychiatric epidemiology, the National Comorbidity Study, reapproached initial refusers and offered cash incentives, they found initial refusers had high levels of psychopathology (Kendler, Gallagher, Abelson, & Kessler, 1996).

Organizational factors also introduce study biases. Smaller, resource-poor, and community-based clinical settings may find research teams too intrusive. When researchers are studying clients with low-frequency conditions, the inefficiency of recruiting in smaller and nonurban settings often means clients treated in these settings do not appear in major studies. Similarly, absent the use of sophisticated two-stage recruitment designs, clients without a stable source of care are comparatively unlikely to appear in study samples.

For the reasons outlined above, several types of research questions may not be effectively addressed using traditional research approaches yet lend themselves well to the use of administrative data sets. These include assessing issues such as which demographic or other characteristics are most likely to be associated with a population with a particular comorbidity (e.g., severe mental illness and HIV) and what service-use patterns are found in such a population (e.g., see Walkup, Crystal, & Sambamoorthi, 1999). Researchers using typical research approaches would be hard pressed to obtain a representative sample of such a group. Similarly, administrative data sets can address questions such as the demographic or diagnostic predictors of specific types of treatment usage patterns, such as early dropout from treatment, because individuals who have dropped out of treatment will generally not be available for recruitment for a traditional study (Lu, Yanos, Minsky, & Kiely, 2004).

Other Possible Uses of Relevance to Psychologists

Several other types of questions of relevance to psychologists can also potentially be addressed with relative ease by using administrative data sets. A question that can effectively be addressed using administrative data sets relates to the important issue of the impact of the length of a

hospital stay on readmission. Cost-conscious reductions in the length of inpatient stay in psychiatric settings may be based on the assumption that less expensive outpatient care can meet the clinical needs of patients with shorter stays. To determine if this is really happening, researchers can analyze administrative data to calculate the proportion of recent discharges who are readmitted within some set time frame (e.g., 30 days). The relationship between the length of stay and readmission rates can then be assessed.

Racial and ethnic disparities in mental health care have received substantial attention from researchers using administrative data sets (e.g., Zito, Safer, dosReis, & Riddle, 1998). Researchers that attempt to address such issues via traditional means will likely rely on either clinical impressions of performance and practices or retrospective reports from clients about the services they received. In either case, these approaches are likely to be subject to numerous cognitive biases. Administrative data sets can effectively overcome this shortcoming of traditional research by providing clear-cut evidence on differences in the types of services received by people in different racial or ethnic groups. Although a major focus of existing research has been on disparities in the use of pharmaceutical services, psychological services can be studied. For example, research can assess if the proportion of people with diagnosed depression who receive psychotherapy differs by race within a given service system.

In a different but no less important arena, administrative data sets can be used to address issues of service cost that can be relevant to determining how service delivery should be prioritized. Agencies must now sometimes bid to contract for services, receiving a set dollar figure for each person covered in the contract. In this circumstance, an agency that supplies lots of high-quality specialty services for high-need clients (e.g., those with serious mental illnesses or HIV) will find that these costly clients gravitate to them, leaving their competitors to serve less costly patients. If agencies serving high-cost and low-cost clients receive the same dollar figure for each person, the agency serving high-cost patients will be at a disadvantage. A strategy for mitigating this problem is *risk adjustment*, that is, using existing cost and utilization data from administrative data sets to determine a higher payment rate for more expensive patients, reducing the disincentive to serve them. One recent study compared two strategies for predicting future service use and costs. One strategy used clinical data (symptoms, quality of life, and diagnosis) from a traditional study (Sernyak & Rosenheck, 2003), and the other strategy used administrative data describing previous utilization. The administrative data proved to be better predictors than the clinical data were.

Another area where administrative data sets can be of particular use is in examining the impact of a service system change (e.g., the introduction of managed care) on service-use patterns and outcomes. Such changes typically occur in a manner that makes it impossible to administer the pre- and postchange measurements that would be applied in a traditional research approach. Retrospective accounts of how changes have affected services would then rely on clinician or client perceptions that might exaggerate the extent to which the change has impacted services. The use of administrative data can allow for an objective assessment of the impact of such “natural experiments” by assessing variables such as service use, length of stay, or client characteristics before and after the system change (e.g., Dickey et al., 2003).

Assessing the Quality and Limitations of Administrative Data Files

Many psychologists who are interested in using administrative data sets may simultaneously have concerns about the quality of such data. Below, we address some of the major limitations of administrative data and some of the manners in which the quality of such data can be evaluated.

Detection Algorithms

An important tool in ensuring the validity of administrative data set research is the construction of detection algorithms, which are designed to identify categories of patients. In essence, these are formulas applied to administrative data that require indicators of various characteristics to consider a given client to have a condition or to have received a procedure. For example, in one study (Lurie et al., 1992), the authors applied a formula to identify people with schizophrenia that required at least one inpatient or two outpatient claims with a diagnosis of schizophrenia in a 2-year period. Because providers create these claims, the figures produced give information on treated prevalence rather than community prevalence. When a client does not come in for care often, there are fewer opportunities for a diagnosis to be assigned or for related procedures to be used.

Sensitivity and Specificity

A logical and increasingly common approach to examining the quality of data provided by detection algorithms involves using the framework commonly adopted for medical tests in which the sensitivity and specificity of an algorithm used to identify a particular type of item of data (e.g., a client with a condition) are calculated. In this framework, a comparison source of information, such as a medical record diagnosis or the outcome of a structured diagnostic interview, is stipulated to be a “gold standard.” All clients in the gold standard data source and in the claims data source are classified as either having or not having the disorder in question, producing a 2×2 table with true positives, false positives, true negatives, and false negatives. Sensitivity describes the ability of the detection algorithm to classify diagnosis positive clients (on the basis of the gold standard) as diagnosis positive (on the basis of the claims). Good sensitivity identifies as many true cases as possible. Specificity describes the ability of the detection algorithm to classify diagnosis negative clients (on the basis of the gold standard) as diagnosis negative (on the basis of the claims). Good specificity produces a comparatively pure group, with few, if any, clients without the disorder included.

Common sense dictates a pragmatic approach to managing trade-offs between sensitivity and specificity, always focusing on the nature of the question being asked and the goal of the research. The importance of sensitivity is sometimes illustrated by reference to a smoke alarm. A homeowner wants to be as certain as possible that no real fire is missed, even if it means the alarm sometimes goes off when the toast gets burned. High sensitivity is worth some loss in specificity. The importance of specificity can also be illustrated by metaphor: If an aptitude or performance test is intended to identify qualified astronauts, then it is very important to make sure no unqualified person goes into space, even if it means some people who probably are qualified miss the chance. The cost is just too high for a false positive (i.e., an unqualified person wrongly thought qualified). In this case, high specificity is worth some loss in sensitivity.

In the ideal case, it is possible to test how well a detection algorithm works by comparing it with some independent, high-quality source of information. For example, in the study of HIV/AIDS, a sensitivity analysis can be conducted using HIV/AIDS registries maintained by state departments of health. A file match can be constructed between AIDS registry information and Medicaid eligibility files and the resulting files stripped of identifying information to ensure confidentiality (Bartnyska, Schactman, & Hidalgo, 1995; Hidalgo, 1990; Sambamoorthi, Warner, Crystal, & Walkup, 2000; Walkup, Wei, Sambamoorthi, & Crystal, 2004). Then the detection algorithm can be applied to the claims files and the results compared with the registry information. Registry-identified cases not picked up by the algorithm are considered false negatives.

In mental health, there is no gold-standard equivalent to an HIV test. Instead, psychologists are in the position of comparing a claims-based diagnosis with some kind of high-quality

clinical judgment. Not surprisingly, findings regarding concordance are not uniform but appear to be influenced by the comparison standard used, as well as characteristics of the disorder(s) and procedure(s) studied. For example, agreement with a medical record is very high for schizophrenia, typically greater than 90% (Kashner, 1998; Rawson, Malcolm, & D'Arcy, 1997; Walkup, Boyer, & Kellerman, 2001). To our knowledge, only one study has examined the validity of claims for psychiatric conditions. As mentioned earlier, Lurie et al. (1992) used an algorithm for identifying schizophrenia that required either one inpatient or two outpatient claims with the diagnosis in a 2-year period. They then compared this classification with a classification made by experts who were reviewing clinical information on the patients and found their algorithm was highly specific but not as sensitive as it might be.

Case identification using algorithms is bound to be imperfect. However, it is increasingly common for researchers to settle on an algorithm, which is then used in several investigations working with similar data sets (e.g., Blank, Mandell, Aiken, & Hadley, 2002; Walkup et al., 1999). This uniformity means that even when the algorithm introduces some error or misclassification, comparisons may still be informative. For example, if an algorithm correctly identifies 9 out of 10 of patients with schizophrenia at Site A and 9 out of 10 of patients with schizophrenia at Site B, and Sites A and B are of approximately the same size, then a finding that there are more patients with schizophrenia at Site A than at Site B can probably be trusted, so long as there is no systematic difference in the mistakes the algorithm makes in one site rather than the other.

Certainly anyone using claims for research would prefer to be able to include a diagnosis based on a structured diagnostic interview, but two considerations can help put the advantages of primary data collection in perspective. First, even the costly strategy of trying to study hard-to-reach clients by conducting a community-based epidemiological study does not fully overcome the problems inherent in studying people with more severe problems. The National Comorbidity Survey (NCS) is generally considered to represent the highest standards of psychiatric epidemiology. The NCS team found that for disorders such as schizophrenia or schizoaffective disorder, the diagnoses given by subjects' interviewers did not agree well with clinical diagnoses based on reinterview with the subject and a data review by a senior clinician (Kendler et al., 1996). By contrast, confirmation of diagnosis was well-predicted by variables available in many claims-based studies, such as hospitalization or neuroleptic treatment.

Second, anyone who has worked as both a clinician and a researcher, as we have, knows that clinical work confers some diagnostic advantages. The clinician whose diagnosis is represented in the claim may have more and better information than can easily be had by a research interview. Often she or he has known a client for years or, if not, may be able to talk with others who have. When a clinician gathers information from clients or from family members who are hoping for good treatment, they have incentives to be frank about stigmatized matters that they may conceal in a one-time research interview, even when the interviewer is skilled. Administrative data sets can provide the researcher with access to this type of information.

Examples of Available Data Sets

We now turn to the practical consideration of where a psychologist may obtain access to an administrative data set of potential use. Claims-based data sets available for the types of analyses discussed in this article generally fall into two categories: (a) publicly available data sets that can be obtained from U.S. Centers for Medicare and Medicaid Services (CMS) (formerly the Health Care Financing Administration) and (b) private claims data sets from either specific health service systems or private insurance agencies.

The major types of publicly available data sets that have been used to address health services research questions are state Medicaid claims files and national Medicare claims. These data

sets are available for purchase by any researcher who is able to demonstrate a strong scientific rationale for using them and the capability to handle the data responsibly and confidentially. Which data sets are available for purchase, current pricing, and procedures for applying for data purchase are described in detail on the CMS Web site (<http://cms.hhs.gov/data>). The application procedures may seem elaborate and intimidating, but CMS is aware of this and has funded a technical assistance program that provides detailed, easy-to-use help for those committed to obtaining the data. The primary resource is the Research Data Assistance Center (ResDAC), which offers free assistance to researchers interested in using Medicare and Medicaid data. ResDAC provides comprehensive hands-on assistance by telephone or e-mail that can help demystify the elaborate procedures required to obtain public data sets from CMS. Part of the ResDAC mission is to facilitate access, and staff members understand that most people going through the application process for the first time have many questions and may initially require basic or introductory information. Because this is an emerging area of research, the staff may not always know the answer to questions that have not been tackled before, but they will investigate and eventually offer a response. For researchers interested in moving into research with administrative data sets, perhaps the best investment of time and money is to attend one of the intensive annual workshops for researchers run by ResDAC. These are offered frequently at various sites across the country. They teach practical approaches to not only how to obtain Medicaid and Medicare data but also how to manage and analyze the data once they are obtained. Many involve interactive learning and offer those attending an opportunity to conceptualize and conduct a small project in the course of the training session. Detailed information on ResDAC and the services that it offers is available on the ResDAC Web site (<http://www.resdac.umn.edu>). In our experience, ResDAC has been an invaluable aid in facilitating the process of obtaining and using Medicaid and Medicare data.

Private claims data sets maintained by insurers or service agencies may also prove to be a valuable source of information for the types of research questions discussed in this article. Although these data sets are not necessarily open to all researchers and may not be as large as the Medicaid or Medicare claims data sets available from CMS, they may be more easily accessed in other ways and may be more directly relevant to some of the questions of interest to researchers. For example, claims data from a health service agency may not be limited to information on public payers but may also carry important information on the provision of services to individuals with private insurance or no health insurance. Service data may go into more detail with regard to the types of services being offered than Medicaid claims do. Similarly, data from private insurers may provide important information on subgroups other than those eligible for Medicaid or Medicare.

Although there is no sure-fire approach for gaining access to claims data from private agencies, there are several possible opportunities for psychologists to obtain entry in this area. Psychologists who are affiliated with a service setting may be able to make a strong case to administrators for the use of internal data sets to address questions that are of relevance to the service system but that may also be of scientific merit. Some organizations with an academic affiliation may also be willing to make data sets available simply to offer opportunities to increase the research productivity of the institution. One of us (Philip T. Yanos) has been able to pursue exciting research opportunities using the administrative claims available through a health care system affiliated with his academic setting (see Yanos et al., 2004; Lu et al., 2004).

Before private agencies are approached about the use of their data, several practical issues should be considered. First, support for the technical challenges of data management and data analysis is not likely to be comparable to that found for public sector payers. Therefore, private agency data sets may not be the ones to use to master the skills needed to analyze administrative data sets effectively and so may be of more use to those who already have some experience.

Second, researchers should be aware that some agencies might be concerned that findings obtained from analyses of their data may in some way be damaging to their organization. An ideal administrator will, of course, want to identify and fix problems with service delivery, but it is easy to understand the concerns of someone who may have the shortcomings of his or her work exhibited. At the same time, a researcher cannot ethically be a party to misrepresenting an organization. Researchers should therefore consider how to approach the use of data diplomatically and with a consideration for which issues may be sensitive for the organization while staying focused on the important scientific questions they wish to investigate. In some cases, it may simply be a matter of how to frame the issues that will be studied. A third practical consideration is the need to work with the management information system (MIS) staff that typically manage the databases. Researchers may need to work actively with MIS staff to convert data into analyzable formats. Conversations about conversion should take place at a comparatively early stage of the project. Time is wasted when careful negotiations result in a set of acceptable research questions that cannot be answered because variables cannot be adequately operationalized with the existing system. Researchers should therefore be careful to establish good working relationships with MIS staff to facilitate this process. Because their labor is not cost free for an organization, there will probably be limits on the time MIS staff members can give you. Payment for their time should be considered when funding is adequate.

The Health Insurance Portability and Accountability Act (HIPAA), placed in effect in April 2003, has certain implications for the use of administrative data for research purposes that should be considered. We note, however, that contrary to what some may believe, HIPAA does not preclude the use of administrative data for research purposes. A properly limited data set does require the removal of so-called facial identifiers such as names and social security numbers. One's organization may or may not be considered an entity covered by HIPAA, but reliable information on this question can best be obtained from one's institutional review board.

Conclusion

We conclude that use of large administrative data sets can provide information valuable to psychologists, particularly those dedicated to the care of socially marginal populations with multiple needs. Their proper use requires attention to their distinctive features, including their inability to answer some questions. White-washing the real limitations and problems of large data set research would be a disservice. However, ignoring their real value is equally unwise, we believe. As with so much of science, sound judgment and frankness about study limitations are required. Also required are training and an ability to learn from experience. We believe (and have learned from our own experience) that with a moderate investment of time and training, psychologists can make an important contribution to this type of research and address questions of importance to the field.

Biographies

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