Published in final edited form as:

Child Maltreat. 2008 November ; 13(4): 392–399. doi:10.1177/1077559508320058.

Multi-Sector Longitudinal Administrative Databases: An Indispensable Tool for Evidence Based Policy for Maltreated Children and Their Families

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Abstract

This paper describes the need for, practicality and utility of longitudinal, multi-sector, and multi-level administrative data to address key issues in child maltreatment prevention and intervention. The goal is not to alert the reader to a new technology, but rather to clarify its potential and overview the process of creating such a database. Changes in technology, including data storage, computational speed, transfer systems and software advances have made the creation of truly advanced multisector databases vastly easier than was the case even ten years ago. We argue that this meshes well with the emerging recognition that practice and policy should be evidence based. We are entering a time when child welfare policy can now be informed by a much more complete understanding of who we serve, how they are served over time, what other social service systems they encounter, and what outcomes they commonly experience.

Introduction

Administrative databases have been used in child welfare research and policy formulation for several decades (see APA, 1979). By administrative data, we mean agency records archived as a part of normal daily practice, principally computerized and generally longitudinal, including descriptive, service, and sometimes other (e.g. diagnostic, risk assessment) data. A database representing data from a single agency, such as a state child welfare agency, can answer many important questions, such as describing people served, what characteristics predict recidivism, etc. (Health and Human Services, 2006). However, the promise of such data when linked across multiple sectors is geometrically greater. A database which includes administrative records from multiple sectors (e.g. schools, law enforcement, child welfare, death records, census, etc.) can be used to address many more questions than any of these databases can answer in isolation. Previously restricted to isolated research centers or the use of only a few data sources, the construction and use of such multi-agency databases is now far more feasible due to advances in computer hardware and software. Put simply, very large linked databases can now be stored, managed and analyzed with greater ease. This is fortunate, because many questions necessary to the generation of evidence based policy (Pawson, 2007) can best be answered through the use of such datasets. These databases can also be referenced in combination with data drawn from individual surveys, interviews, or other more traditional research approaches, for example to negate problems heretofore encountered around poor recall of service use or events long past (Slack, Lee, Berger, 2007; Widom, Raphael, & Dumont, 2004).

With regard to the terms we employ, “administrative and “longitudinal” need little explanation, except that we use “longitudinal” to span periods of at least years and sometimes decades, rather than weeks or months. While shorter time spans are important for many questions, one of the benefits of existing administrative records is that longer time

spans can be studied within a shorter time frame. By “multisector” we mean datasets which combine variables from three or more different sectors of service and/or types of agencies. By “multilevel” we refer to the capacity to use the same core data to establish databases at individual, family, agency and geographic (usually tract or zipcode) levels. We use the term “evidence-based” (Drake, Hovmand, Jonson-Reid & Zayas, 2007; Rubin, 2006; Strauss, Richardson, Glasziou & Haynes, 2005) to refer to a multi-step process including (1) formulating a practice or policy relevant question in terms which are empirically answerable, (2) finding or generating the best available evidence, (3) evaluating the best available evidence and (4) applying that evidence in conjunction with professional judgment and client (stakeholder) values, wants and circumstances. As Solesbury (2002) states:

What works is not all that matters. To interpret the call for evidence-based policy and practice in these terms alone is to disregard a whole set of other important questions in policy development, like what is going on? What’s the problem? Is it better or worse than...? What causes it? What might be done about it? At what cost? By whose agency?

Several of these questions are terribly hard to address without being able to look across multiple agencies and over long periods of time. For example, families engaged in the child welfare system often face multiple issues that will not be served within a single agency. Who sees these family first? How does the implementation of managed care child welfare services change the proportion of families accessing mental health? How do community characteristics contribute to risk or service use? Are there changes in trends in problems that occur in families with child welfare contact? Many of these questions are innately best answered using multi-sector, multi-level and longitudinal data.

Child welfare is increasingly electronically archived, and the nature of this data is increasingly uniform among states, with each Statewide Automated Child Welfare Information Systems (SACWIS) being designed both to be responsive to existing reporting formats such as the Federal Adoption and Foster Care Analysis Reporting System (AFCARS) and the National Child Abuse and Neglect Data System (NCANDS). In addition, interoperability with other state systems (e.g. income maintenance) and on-the-ground applicability is encouraged by the federal government (Children’s Bureau, 2008). These trends support administrative data research in terms of development, cross-state comparability and the ease of within-state linkages.

Unanswered Questions

Some questions aren’t addressed because we don’t know what questions to ask or we fail to understand their importance. Other questions are not addressed due to technological or methodological difficulties. While there has been a great deal of interest in facilitating services to child welfare clients (DHHS, 2003), there has been little mapping of exactly what services our clients receive over time (Hovmand, Jonson-Reid & Drake, 2007). Indeed, a whole lexicon has sprung up, with terms like “collaboration”, “community-based”, “systems of care”, “continuity of care”, “one stop” and “wrap around” being in vogue at one time or another. Given the importance of this area in policy, there remain many key assumptions to be tested. For example, sometimes multi-agency collaborative efforts are mounted to reduce overlap and cost. There is an inherent and largely untested assumption that multiple sector service use is wasteful or indicative of system failure. For example, while it may be true that a juvenile court delinquency petition following child welfare report is negative, it may also be the case that the juvenile court judge is able to compel or leverage mental health services that subsequently assist the youth in better long-term outcomes. Both the ability to link multiple datasets and promising new methods of analyzing complex and dynamic system relationships (Hovmand et al, 2007), make it possible to follow cases

through systems to examine how referrals and services are or are not working and for what groups.

The Need to Meet Legal Mandates and Ethical Responsibility

Among many other things, federal child welfare reviews require that public child welfare agencies attend to the education, health and mental health of children in its care (DHHS, 2007a). This legal and ethical mandate to support child well-being is an intrinsic part of the doctrine of *parens patriae*, which forms the historical conceptual and legal basis for state child welfare services (Pfohl, 1977). In order to meet these legal and ethical standards, agencies require data on how their own agency services link or fail to link with other agencies serving their population. How should this be done? With regard to prior services, client recall is notoriously suspect, with some research suggesting recall error as being both random and worse, systematic, based on severity and type of client problem (Rhodes & Fung, 2004). Without accurate and time-ordered data, erroneous decisions may be made about which agency is the best agency to screen and provide for a given need. Data on outcomes or service use outside child welfare cannot be collected cross-sectionally by line workers. Most children receiving child welfare services receive them only for a few months (DHHS, 2007b), and workers cannot record services occurring after their interventions. It is difficult to imagine meeting such accountability demands without multi-agency and longitudinal data (Barth & Jonson-Reid, 2000). As an example, research combining special education and child welfare databases in St. Louis (Jonson-Reid, Drake, Kim, Han & Porterfield, 2004) found that a very high percentage of child welfare children were receiving special education services compared to low income comparison children, but that identification by special education generally occurred several years *after* first CPS contact. This finding led to a new initiative to link child welfare workers to early childhood professionals who can assist with early identification of delay at the earliest system contact.

The Need to More Comprehensively Study Rare Events

Many events are sufficiently rare that they are chiefly identified by starting with very large (administrative) data sets. Fatalities are one example. This general advantage of administrative data (large sample size) is improved when those rare events are tracked through multiple datasets. With regard to child fatalities, child welfare agencies do track events connected with a child abuse report, but do not track the far larger number of child fatalities (see Barth & Blackwell, 1998). Some childhood fatalities are clearly not due to maltreatment, such as childhood leukemia deaths. Other child fatalities not reported to child welfare may be due to neglect yet not be subject of a report, for example, death due to drowning in a tub while unsupervised. Multi-sector linkages (health, death records, etc...) allow us to analyze such events in more detail, and capture preventable fatalities beyond those recorded in child welfare agency databases. For example, Jonson-Reid, Chance & Drake (2007) combined child welfare with hospital and vital statistics databases, and found that most childhood fatalities were “accidental” in nature and occurred long after an initial child abuse or neglect report was made and child welfare involvement ended. Such findings can help agencies understand not only what outcomes occur, but when and whether or not alterations within an agency have a reasonable chance of offsetting such outcomes.

The Need for Quality Data

Multi-sector data can sometimes help solve the dilemma of missing data within a single system. For example, perhaps parental education level is a key variable that is frequently missing in child welfare data, but also available in birth records of their children or income maintenance records or other sources. One can sometimes create a better measure of a given variable by using the same variable from different sources. In our work, we have often reduced the amount of missing data by more than half, simply by accessing similar fields in

multiple databases. Some forms of personal data (e.g. high school completion) can change over time, and so care must be taken to understand the limitations of such derived variables.

Data can also be absent from single-source databases by design. For example, fatality data (perhaps a child died in a fire) might be missing from child welfare databases because no abuse or neglect report was deemed appropriate. Such limitations to single-source administrative databases can be minimized in cross-agency databases. Work which has linked vital statistics (death records) to child welfare data have found that such preventable deaths are far more common among maltreated children (Jonson-Reid, Chance & Drake, 2007).

Finally, such data sources can help offset deficits in controlling for services use in other types of studies. For example, the National Study of Child and Adolescent Well-being relies on caregiver recall of services at the time of an interview (Dowd, Kinsey, Wheeless, Thisen, Richardson, Mierzwa, & Biemer, 2002). For a family that may be engaged in multiple services over time, recalling the detail of past services from numerous agencies seems unlikely. Further, developmental timing of maltreatment in early childhood compared to later and in combination with recurrence may be key to understanding certain outcomes in childhood, adolescence and adulthood (see English, Graham, Litrownik, Everson, & Bangdiwala, 2005; Kaplow & Widom, 2007). Prospective in-person sampling takes multiple years and brings with it inherent ethical issues in handling the measurement the existence of maltreatment and possible mandated disclosure of such information (LONGSCAN investigators, 2006). Retrospective recall is suspect (Widom, Raphael, & Dumont, 2004), particularly if asking someone to recall events in early childhood. This is another area in which administrative data may be linked to help improve the quality of data available to answer questions like how adult system outcomes may be related to events in early childhood compared to later in childhood or adolescence.

The Need to Assess Policy Change

Sometimes a policy change within one system has consequences for others. To assess such impact one needs both longitudinal data and data that can capture potential impact across relevant systems while controlling for confounding factors. For example, there has been substantial concern about the impact of welfare reform on child welfare caseloads (Geen, Fender, Leos-Urbel & Markowitz, 2001). Administrative data from multiple sources has been used in combination with survey data has been used to better understand issues like the intersection of welfare sanctions, employment and child welfare (Slack et al, 2007). Because of the pre-existing multiagency data archive in the study region, this could be done at very low cost and within a short period of time.

The Need for Real Time Responsiveness to Practice Issues

There is often the need on the part of administrators for real time answers. Data obtained from following a well-sampled community cohort over time can yield invaluable information but takes many years. When an agency administrator faces a budgetary crisis and must decide whether or not to make particular changes, he/she is unlikely to be able to rely on such data. Agencies have traditionally used their own internal data for such purposes, but this may not be sufficient. For example, an administrator might be concerned about continuing ability to fund child welfare services to cases that are not substantiated. Perhaps some policy makers see these as low risk or inappropriate referrals. Internal data can be used to show unsubstantiated reports have high child maltreatment reporting recurrence rates (Drake, Jonson-Reid, Way & Chung, 2003; English, Marshall, Brummel & Orme, 1999), but this may not be convincing to the policy maker who may assume the system itself just continues to be more likely to observe these families. By linking child

welfare administrative data to other agency administrative data, one can attempt to triangulate with other measures of risk or need. Tasks like this can only be done quickly if cross-sector data are already linked. Indeed, such studies show that unsubstantiated children are at high risk for negative outcomes unrelated to child welfare such as educational problems (Leiter & Johnsen, 1997; Jonson-Reid et al, 2004) and delinquency (Leiter, Myers & Zingraff, 1995; Bright, Jonson-Reid, & Williams, In press). For the administrator this then makes a stronger case for the idea that these families are not erroneously referred and need intervention.

The Need to Answer Questions at Different Levels of Analysis

Not all questions are about individuals. Some are about families. Some are about agencies. Some are about communities. Agency-based data can usually be parsed and recombined at any of these levels. The majority of the work required to construct a database at each of these levels is common to all (obtaining, cleaning, linking, etc...), and relatively little additional work is required to frame the data at different levels of analysis. For example, work done in Missouri, California, Illinois and Cleveland have been partly or principally focused on assessing communities or impact of community characteristics on child welfare variables using multiagency, longitudinal administrative data (Coulton, Korbin, Su & Chow, 1995; Drake, Jonson-Reid, & Sapokaite, 2006; Freisthler, Needell, & Gruenewald, 2005; Goerge, VanVoorhis & Lee, 1994). Administrative datasets including addresses can be easily converted to geographic datasets, using whatever boundaries are desired (neighborhood, tract, zipcode, county, etc.) then linked to community data like census information.

Evidence Based Policy: The Need to Contextualize and Triangulate

Academic research is only useable in evidence based policy to the degree it answers questions of interest to policy makers. One of the key advantages of administrative data is that it naturally contains constructs specified by and (hopefully) of interest to the field (Drake & Jonson-Reid, 2007). As multiple datasets are linked, individuals are represented by increasingly large numbers of such variables, and these variables can be cross-checked against each other or against instruments administered directly by researchers. This benefit accrues not only in purely administrative research, but in research using traditional methods (e.g. surveys) which are supplemented by administrative data. For example, an individual's history of victimization can be measured in a variety of ways such as police, hospital, child welfare, vital statistics records and self-report. To the degree that the same finding emerges consistently across disparate datasets in different regions (Drake, Jonson-Reid & Kohl, Under Review), such triangulation provides increased confidence in the validity of the measures as well as the applicability to policy.

Creating a Multisector, Longitudinal Administrative Database

Fading Technical Barriers

Pioneers in the construction of linked databases were conducting studies and creating such repositories in the early 1990's (Barth & Jonson-Reid, 2000; Coulton, Korbin, Su & Chow, 1995; Goerge, VanVoorhis & Lee, 1995). Such early systems often used dedicated, expensive and sometimes unreliable servers, platforms which were programmed and maintained in ways unfamiliar to non-computer specialists. Analyses techniques that were often not well known in the social sciences and difficult to obtain or use in software packages. Data which, ten years ago, required a server can now easily be housed in a microcomputer that will cost less than \$3000.00. As we write this, we are looking at a portable hard drive which holds four times the data our late 1990's (\$20,000) server could

hold. We do not suggest that such portable devices be used for such data because of the security concerns, but use this to highlight the huge advance in technology.

In the late 1990's, we obtained our data on large tape spools and executed complex matching programs on hundreds of thousands of records which took several weeks or months to run. Improved technology has made such clumsy data transfer and epic runtimes inconceivable now. Secure and speedy internet transmission of data has become a normative practice. Data management can be accomplished quickly using the same software as one might use for analysis (e.g. SAS). Further, GIS software like ArcView or MapInfo have made geocoding and linkage of community level information much more user friendly, with first-pass (automatic – not manual) hit rates in datasets from some urban areas exceeding 90% in our studies (Drake, Lee, & Jonson-Reid, Under review). While linkage of such data still requires substantial computer programming and cleaning, it is no longer too expensive or complex to be accomplished outside a large dedicated center.

Data and Questions

We create these datasets to answer questions, but the questions that can be answered are dependent on the presence and quality of available data. First, one has to identify what data sets are available, what is recorded in the datasets, and how long data are kept. This requires meeting with agency administrators and then probably additional meetings with the staff within the agency that enters and or manages the data. Merely receiving a listing of variables is not enough, you need to understand which elements are routinely used, how they are derived, and those most likely to be non-missing.

You also need to have a thorough understanding of the interrelationships between variables. For example, in some datasets a single exit code from a service must be constructed by looking at several individual variables rather than a single code. This is often because different fields were created for different agency reports rather than a single research project. Typically fields that are required for regular reports or somehow tied to funding are the most reliable. If you have the option, however, its often best to request all fields of interest since if you are putting multiple data sources together you may be able to later replace missing values from other data sources. Data must be cross-checked and rigorously reviewed to assure that the data are valid. You also must understand the storage periods for data. Sometimes datasets have been archived for many years, but sometimes agencies regularly purge files or overwrite files. You must also understand the parameters of your continued storage and use of data if the original agency has a specific policy to purge files.

Getting The Data

Once you determine that there are several agencies that archive data of interest, then you must consider access and ownership issues. The process of establishing the relationships with agencies is beyond the scope of this article, but is key to successful implementation. Goerge (2008) provides an informative case study of the process of collaboration to achieve such a data archive. It is not possible to create such archives without including identifying data (you need such data to link across agencies) so you will also need to have a rigorous security system and confidentiality process in place before even asking for access.

Data protection and sharing is both a part of the collaborative process with specific agencies and governed by external policy and university human subjects policies. Some agencies will consider themselves as HIPAA agencies meaning that procedures must meet their agency's interpretation of national standards for Personal Health Information (DHHS, 2007c) others will not. Some agencies will have their own IRB process and others will rely on your university or research organization process in conjunction with approval by their agency

administrator. Most public agencies are able to share information providing you can demonstrate you can protect and appropriately use that data and that the information is important to improving their own services. It is typically not very difficult to insure that you are asking questions of both relevance to the agency and the researcher. In some cases, legislation prohibits agencies from sharing information with each other directly, so having a third party “trusted broker” (such as a university-based researcher) link the data is the only way to assess interagency issues. Because of this, you may have to have an agreement that only aggregate data will be shared back to the contributing agencies. This process can take considerable time.

Data Management

Get a good data manager that is able to communicate with social scientists. You will find that time spent in data management will outweigh time spent doing analyses by a factor of at least ten or twenty to one. Data management challenges are legion and varied. For example, many agencies archive data at the person/event level meaning that a new record may be generated for every system contact. You then have to unduplicate and transform records into a longitudinal format that follows a person. Worse, single contacts may generate multiple records, as is often the case in datasets designed for billing purposes. Data must be cleaned not only within a dataset but between data sets. For example, some systems are statewide but some are local. A person in one county may move and be served in another county and then return. You will need to integrate the records sequentially and create rules for ties. As you add records you may find conflicting information that needs resolution like different birthdates. If you are planning to do this over time, there will also be updates to be done over the years. Data fields and structures can change so it requires careful review each time data are received from an agency. Rules which are developed to handle such situations must be carefully recorded. Further these rules have to be negotiated with the researcher, so you need a data manager that is willing and able to learn enough about the systems and your interests to develop a usable product.

When analysis is finally done, statistical consultation may be required. The field of longitudinal and geospatial analyses has really grown and begun to be more common in social science literature. Certain thorny statistical issues, such as clustering and other threats to independence of observations, are relatively common. The bar is being constantly raised regarding appropriate approaches to analysis.

Barriers and Limitations

Most of the barriers and limitations to success with data of this type have been discussed or alluded to above. Agencies vary by type and region in the amount of data recorded, the quality of that data, and the length of time the data are kept. Regulations regarding protection of confidentiality vary considerably. While we discuss the utility and promise of such complex longitudinal databases, we are by no means suggesting there are not pitfalls or barriers to their creation and use.

Perhaps the most obvious limitation of administrative data is that many key constructs and variables are not commonly recorded. This can render such databases unusable for addressing some substantive issues. For example, many agencies do not electronically archive results of risk assessments or psychological evaluations, levels of client cooperation or satisfaction, counts of or kinds of specific treatment services provided, etc. Sometimes researchers can be instrumental in encouraging the inclusion of previously unrecorded data elements. Statewide efforts to redress these shortcomings should be encouraged. In any case, the inability to answer some questions does not detract from the ability of administrative sources to answer other key questions.

Researchers must also be cautious in regards to the use of variables without careful examination of their validity and reliability. A kind of psychosis seems to ensue sometimes when the desire to address the constructs represented by the data outweighs reasonable scientific caution. We would caution all to recall the old programmer and data manager acronym GIGO (Garbage In, Garbage Out). This is why any administrative data research should begin and end with checking with the agencies that use and input the data.

Administrative records may be called into question due to concerns about the validity of worker recall. Many such records, however, are based on forms that must be filled out within a short time after a service or assessment. They are, therefore, as current as case files would be. While there are undoubtedly workers that fail to complete paperwork in a timely manner it would then be incumbent on the researcher to find out how widespread this is and what variables such practice impacts. For example, many key types of data (presence and date of a child maltreatment report, type of report made by the person calling in, etc.) are not particularly susceptible to worker recall distortion as they are entered directly into a computer. Further without real time data collection during services it is difficult to imagine how some time lag could be avoided. For example, with the exception of physical data (blood pressure, height and weight) even physicians sometimes wait until after a full day of seeing patients to dictate specific treatment information.

Ethical issues also exist, mainly with regard to confidentiality. How these issues are handled will depend largely on the databases and source agencies involved. As referenced above, FERPA, HIPPA, agency and university IRB's will all impact how data is requested, managed and stored (Erlen, 2005). We have found that agencies will have their own needs and wants regarding these issues, and that the best course of action for the researcher is to incorporate their concerns first, making sure that resulting security protocols are acceptable to the researcher's own IRB. Helpful guidelines for data sharing are available from various federal agencies, for example from the Centers for Disease Control (CDC, 2008). De-identification should be done when possible, but complete de-identification is not possible when future data will inform (and therefore must be matched to) current databases. De-identified "use" databases, and identified "core" databases can minimize this problem, with identified information being zealously guarded (e.g. on disk, in locked cabinets in locked offices). A clear understanding of how the data will be used must exist. Agencies will generally only give permission for particular applications. New research projects or questions based on the existing databases must be done only with the consent of contributing agencies.

Historically, client consent has not been sought for the use of such data by agencies or researchers restricting their analyses to such administrative data. This can be framed in the context of the "Common Rule" (e.g. Title 45, Health and Human Services Code of Federal Regulations, Part 46) particularly in the concept of "beneficence", which stresses that the good of a research endeavor must outweigh potential harm. Research and assessment of data within agencies is a longstanding and recognized ethical necessity, supporting accountability. Cross-sector databases allow the opportunity to extend that accountability while presenting few new risks to clients (e.g. identifying data is merely codified and linked, not created new). Indeed, one could argue that the absence of agencies' being accountable across systems presents a greater ethical issue than is embodied in the creation of such databases. Using linked electronic data is also arguably much less invasive than surveys or interviews. For example, a child who is subject of a single report prior to age six may not recall such an event as an adolescent or adult. Understanding how outcomes may vary for such a case compared to those with recurrent maltreatment or other services is key to assessing needed changes to programs and services (Barth & Jonson-Reid, 2000). It would be unethical to approach a person with no knowledge of such a prior trauma to gain access

to their data as this might place the individual at risk of psychological harm. On the other hand, protections in written protocol need to be in place to insure linked information does not return to the agencies that provide the original data and be potentially used to deny future services. Here it may actually be easier to assure this does not occur by having the data managed by researchers outside the agencies rather than within.

Conclusion

We are moving into an age where the default expectation is for instantaneous access to information. With regard to the availability of multisector, longitudinal data, the question of tomorrow will not “Why is it needed?” but “How can it not exist and how do we use it wisely?”. Serving the needs of maltreated children and their families is a complex, long-term and multi-faceted task. We feel that the increasing recognition for the need for Evidence Based Policy, combined with current technology and data availability are providing ideal conditions to finally provide the necessary tools to advance a rational child welfare policy (Barth & Jonson-Reid, 2000; Goerge, 2008).

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