Agency Discretion and Public Health Service Delivery

Pamela J. Clouser McCann

Objective. To study how changes in law shape the public health system.

Data Sources. State newborn screening laws and the National Newborn Screening and Genetics Resource Center (NNSGRC).

Study Design. A time-series, quasi-experimental design spanning the years 1990–2006 for all states and the District of Columbia was conducted. Analysis proceeded using a multinomial logit with a dependent variable of whether agencies lagged behind, were on target with, or led their newborn screening law. Explanatory variables of three different types of limitations on agency discretion plus relevant controls were included in the model.

Data Collection. State laws were coded for three types of discretion: whether an agency can choose a state's newborn screening panel conditions, whether an agency can charge and change newborn screening fees, and whether the agency can define their own newborn screening criteria. Each state's newborn screening law for each year in the dataset was coded with respect to the mandated number of conditions on a panel and compared with the NNSGRC dataset of actual newborn screening implemented in the state.

Principal Findings. States that *lack* condition discretion have 6.02 greater odds of lagging behind newborn screening law, but the *presence* of criteria discretion results in 7.50 higher odds of lagging behind the law. Condition discretion and fiscal discretion are associated with successful implementation. The presence of criteria discretion is a barrier for successful implementation.

Conclusions. Agency discretion can both hinder and facilitate program implementation. Thus, type of discretion determines implementation.

Key Words. Policy, screening, discretion, implementation, service delivery

States enact laws that set forth the contours of state public health department authority, including what regulations agencies can promulgate. Yet practitioners who work in these public health departments may miss opportunities for strategic policy development because they do not consider nuances of their power. Agency authority refers to the power that a state public health department has to interpret and implement state policy through their actions. Legislation thus provides the context for the operation of the public health

system (Wing 2003; Turnock 2004), but the specific ways in which this legal framework shapes public health practice remain understudied.

One public health program, newborn screening, has changed dramatically in the past decade demonstrating how changes in state legislation and agency authority influence the delivery of a public health service. Newborn screening, which entails testing an infant just after birth for certain disorders, is one of the largest public health programs in the United States and each state has newborn screening legislation (Mitka 2000; Therrell et al. 2006). A newborn screening panel is the list of disorders that a state screens. States differ in the number of conditions they include on their panels. This variation in the structure of newborn screening panels and authorizing legislation across states and over time provides a case study to assess the ways in which legislative context influences the operation of public health programs. Specifically, this project aims to understand how agency authority influences the implementation of panel changes for state newborn screening programs. Results from this study provide a template for understanding how aspects of authority help or hinder other public health programs.

THEORETICAL FRAMEWORK

Public health agency authority is formally determined by the discretion granted in authorizing statutes. Agency discretion is defined as the freedom to make choices while performing the duties of an office (Vaughn and Otenyo 2006). This freedom allows practitioners to apply their expertise to a problem at hand. If an agency is given discretion, the resulting outcomes may be very different from those preferred by the elected legislature. From the legislature's perspective, there is a tradeoff between capitalizing on the expertise of an agency and controlling policy outcomes. From the agency's perspective, discretion can be a double-edged sword—it may offer the freedom to use knowledge but also increase an agency's accountability.

Legislators modify discretion by writing laws with language that limits agency authority (Huber and Shipan 2002). At least three types of restrictions on discretion exist: limits on practitioner judgment, specific criteria for action,

Address correspondence to Pamela J. Clouser McCann, M.S., Joint Doctoral Candidate, Department of Health Management & Policy, School of Public Health, University of Michigan, 109 Observatory Street, Ann Arbor, MI 48109-2029; e-mail: pclouser@umich.edu. Pamela J. Clouser McCann, M.S., is also with the Department of Political Science, University of Michigan, Ann Arbor, MI.

and fiscal constraints (Kerwin 2003). Limiting judgment means that practitioners cannot use their expertise to change programs—the legislature must make those decisions. For instance, some legislatures specifically set the newborn screening panel for the state. Any changes to the panel must be made by the legislature, not by the agency. This constraint differs from restricting agency discretion through setting criteria for action.

When a legislature sets program criteria, it sets the boundaries of a program. In newborn screening, this is when a legislature specifically defines newborn screening, for example, as testing for disorders that cause mental retardation and are treatable. Some legislatures may choose to set criteria in legislation but afford practitioners the discretion to use their judgment to change a program within those boundaries. A newborn screening agency, in this instance, would be able to change the disorders included on their panel, but only in accordance with the criteria for newborn screening provided by the legislature. Finally, fiscal resources are a straightforward check on discretion. When an agency receives funding through the legislative process, there can be delays, decreases in allotments, etc. An agency with other few restrictions can be limited through fiscal means.

Public health practitioners seek discretion to deal with unforeseen circumstances, the heterogeneity of individuals, and evolving science and technology (Lipsky 1980; Shumavon and Hibbeln 1986; Gostin 2000). Restricting agency discretion reduces practitioners' ability to be flexible as they implement their programs and increases barriers for implementing future changes. Less discretion is hypothesized to be associated with difficulties in program implementation.

This study seeks to understand how discretion relates to policy implementation.

- Hypothesis 1 is that states with the discretion to specify their panel disorders (condition discretion) are expected to have fewer implementation difficulties than states without this discretion. A public health agency with condition discretion can use its expertise to tailor its state's panel according to evolving science and technology and their population.

- Hypothesis 2 is that states with fiscal discretion are less likely to have problems implementing the conditions mandated than those states that lack fiscal autonomy. In newborn screening, fiscal discretion translates into the ability to increase fees charged to hospitals and other entities for newborn screening. Agencies with this type of control over their fiscal resources have one less barrier for implementation.

- Hypothesis 3 is that criteria discretion is associated with a lower likelihood of implementation difficulties. Agency-level officials can utilize their own criteria in cases where a state statute does not require that a disease fulfill certain criteria before addition to the newborn screening panel.

Aside from bureaucratic discretion, there are other sources of variation in the likelihood that a state faces implementation difficulties. The age of a state's legislation and laboratory type are expected to be negatively associated with implementation problems. The number of policy changes a state has experienced, the number of years since 1990, the number of births (which directly affects the number of specimens analyzed in the state), and the advent of a new technology called tandem mass spectrometry are expected to increase the likelihood that a state has difficulties with implementation. In particular, this technological advance allowed states to screen new conditions as well as multiple disorders on the same sample. After tandem mass spectrometry, legislatures had the opportunity to incorporate higher numbers of conditions into their statutes than before the technology became available.

Methods

To evaluate the influence of agency discretion on a state's implementation of newborn screening panels, this study utilizes newborn screening programs as the unit of observation. The dependent variable is whether a state experiences problems with implementation. Implementation difficulties are conceptualized as a state that implements a smaller panel than that dictated by law (the agency lags behind the law). A lag means that a state screens fewer conditions in practice than its law stipulates (and a leading state screens for more). The dependent variable of implementation is coded as -1 (lag), 0 (screens for exactly the same number defined), and $+1$ (lead). The project employs a time-series, quasi-experimental design spanning the years of 1990 through 2006 for all 50 states and the District of Columbia (yielding 867 total state-years).

Annual observations of newborn screening panels for each state were obtained from self-reported data collected by the National Newborn Screening and Genetics Resource Center (NNSGRC). In addition, archival review of each state's laws over the time span of the study was conducted. Each law was coded for the presence or absence $(1, 0)$ of condition discretion, fiscal discretion, and criteria discretion. For instance, a law that specifically dictated

Table 1: Variation in Discretion in State Newborn Screening Statutes

Discretion/Constraint	*Statutory Language*

Condition discretion present
  Fiscal discretion present
  Criteria discretion present
	All newborns born in this state shall be screened for congenital and inherited disorders in accordance with rules adopted by the department. Iowa Code Annotated, 2005

Condition constraint	The listing of tests for heritable disorders may be revised to include conditions as deemed appropriate by the cabinet based on the recommendations of the American College of Medical Genetics. Title XVIII Public Health, Chapter 215.155, Kentucky Revised Statutes Annotated, 2006
Criteria constraint	The board of health shall use the following criteria to determine whether or not to test infants for conditions which are not specifically enumerated in this subsection: (I) The condition for which the test is designed presents a significant danger to the health of the infant or his family and is amenable to treatment; (II) The incidence of the condition is sufficiently high to warrant screening; (III) The test meets commonly accepted clinical standards of reliability . . . ; (IV) The cost-benefit consequences of screening are acceptable . . . Title 25, Part 10, Colorado Revised Statutes, 1998
Fiscal constraint	The [Department of Health shall] have the authority to charge and collect fees for the administration of the newborn screening program . . . as follows: 1. A fee not to exceed $15 will be charged for each live birth . . . 2. As part of the department's legislative budget request . . . the department shall submit . . . the annual costs of the uniform testing and reporting . . . Florida Annotated Statutes, 2007

the disorders that a state should screen in their panel was coded as lacking (a code of 0) condition discretion and a law that provided the public health agency with the authority to pick the disorders on their panel was coded as having (a code of 1) condition discretion. These three types of discretion are the main explanatory variables.

This project examined all 50 states from 1990 to 2006 and identified all three limits on discretion in state newborn screening statutes (see Table 1). A statute that lacks all three constraints and contains broad agency authority is Iowa's 2005 statute, where the state health department sets the rules by which the program operates. In comparison, Kentucky limits how new conditions are added to their panel, Colorado's statute details the exact criteria the board of health must use to change their panel, and Florida's statute stipulates details of the program's fiscal arrangements.

The remaining variables in the empirical model include controls for policy change, type of laboratory, number of births, age of the law, time, and

technological change. The number of policy changes for the newborn screening program in a state (Change) was determined by the number of policy changes from program initiation year to the time of the analysis divided by the total number of years available for a policy change. The type of laboratory (Lab) was coded 0 if the newborn screening laboratory is a public health laboratory and 1 otherwise (includes academic and private laboratories). Each state's number of births (Birth) was obtained from the National Vital Statistics System's Birth data collected by NNSGRC. A review of legislative history for each state's specific statutes determined the age of a state's newest legislation in years (Age) and an indicator variable (YRS90) was added to control for the influence of time on the outcomes of interest.

In addition, a crucial variable to include as a control in this analysis is a specific newborn screening technological advance, tandem mass spectrometry. Tandem mass spectrometry was developed externally to state newborn screening programs (an exogenous shock). Since North Carolina began the first public health laboratory-based tandem mass spectrometry operation in 1999, its use in newborn screening has steadily increased over time (Frazier et al. 2006). Tandem mass spectrometry advanced the field of newborn screening by changing the manner in which screening was accomplished. Public health agencies with tandem mass spectrometry could screen for different conditions and numerous disorders on the same sample. For this study, then, it is important to take this factor into account in the analyses. A dummy variable operationalized this technology and split the sample between the years 1990–1998 and 1999–2006 (coded 0 and 1 in that order).[1]

Because of the nature of the data collected (repeated observations on states for each year), a panel model was constructed using the unit of analysis as the state-year. Each state's data on whether they experience implementation difficulties, the types of discretion present in the newborn screening law, and the various control variables were collected for each year in the dataset. The likelihood of implementation problems was modeled as a function of the three types of discretion with controls. Individual measures of the types of bureaucratic discretion were utilized. A multinomial logit model was used and followed the equation: Probability of lagging or leading (compared with being on target with state law) $= b_1 Condition_{i,t-1} + b_2 Fiscal_{i,t-1} + b_3 Criteria_{i,t-1} + b_4 Change_{i,t} + b_5 Lab_{i,t} + b_6 Age_{i,t} + b_7 Birth_{i,t} + b_8 YRS90_{i,t} + b_9 MSMS_{i,t} + e_i$ using the trichotomous dependent variable (with lagging [-1], being on target with [0], or leading [$+1$] a state's law), where i refers to the state, and t the year. Estimation was conducted using *Stata* Version 10.0 (Stata Corp, 2007), with robust standard errors.[2]

RESULTS

Descriptive statistics indicate that the size of newborn screening panels increased from 1990 to 2006. The average number of conditions analyzed on newborn screening panels increased from 5 disorders in 1990 to 31 disorders in 2006. Of the 867 state-years in the full data set, 46 were years when states screened for fewer conditions than their mandate stipulated, 120 were state-years exactly on target with the mandated number of conditions, and 701 were years when states screened for more conditions than mandated by their newborn screening law.

Multivariate analyses confirm the importance of discretion on the implementation of newborn screening policy changes. In Table 2, the discretion variables are estimated as the predictors of whether a state lags behind, is on target with, or leads the number of conditions dictated by the state legislature. Model 1 analyzes the entire sample of state-years, model 2 considers those years before tandem mass spectrometry, and model 3 focuses on the years after tandem mass spectrometry. All coefficients are reported, but only theoretically and statistically significant findings are discussed.

As expected by hypothesis 1, state health departments that are not given the authority to name their own newborn screening panel are more likely to lag behind their state's newborn screening law. In the full model, the odds of lagging compared with being on target with a state's law are 6.02 times as great for agencies that lack condition discretion $(1/\exp(-1.796))$. There are two reasons for this result. First, state agencies that have this autonomy can change their panel as they gain relevant knowledge, not in response to their legislature's demands. The second possibility is that state agencies that lack autonomy to use professional judgment have less incentive to acquire or refine their expertise.

Surprisingly, condition discretion and criteria discretion have opposing influences on whether a state implements screening for fewer conditions than dictated by its law. States with criteria discretion have 7.50 higher odds of lagging behind compared with being on target with their mandate $(\exp(2.015))$. In contrast to hypothesis 3, the autonomy to set program criteria is a barrier for successful implementation. This result may be due to the underutilization of agency authority or that a lack of guidelines results in programmatic delay for expansions.

In model 1, the types of discretion do not appear to significantly predict whether a state leads its mandate in comparison with being on target with its law. Instead, the age of the newborn screening legislation, time, laboratory type, and change history are the influential explanators. For instance, the odds

Table 2:   Implementation and Discretion

Explanatory and Control Variables	Model 1: Full Sample Coefficient (SE)	Model 2: From 1990 to 1998 Coefficient (SE)	Model 3: From 1999 to 2006 Coefficient (SE)
Probability of lagging behind mandate			
Condition discretion present	− 1.796 (0.734)*	1.299 (1.461)	− 1.340 (0.937)
Criteria discretion present	2.015 (0.626)***	1.072 (0.625)^	1.868 (0.776)*
Fiscal discretion present	0.022 (0.499)	− 0.383 (1.219)	− 1.267 (0.691)^
Age of legislation	− 0.178 (0.083)*	− 0.549 (0.238)*	− 0.119 (0.077)
Years since 1990	− 0.087 (0.087)	− 0.323 (0.164)*	0.176 (0.128)
Number of births	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Laboratory type	− 2.693 (0.946)**	− 34.889 (0.7338)[†]****	− 2.100 (1.113)^
Change history	0.058 (0.066)	0.471 (0.341)	− 0.019 (0.078)
MS/MS	2.937 (0.861)***	—	—
Constant	− 0.997 (0.569)^	− 1.533 (1.597)	− 0.768 (1.541)
Probability of leading mandate			
Condition discretion present	− 0.385 (0.349)	− 0.941 (0.506)^	0.601 (0.593)
Criteria discretion present	0.294 (0.257)	0.562 (0.343)^	0.032 (0.447)
Fiscal discretion present	− 0.049 (0.312)	0.659 (0.450)	− 1.454 (0.515)**
Age of legislation	0.058 (0.016)****	0.058 (0.021)**	0.071 (0.026)**
Years since 1990	0.151 (0.044)***	0.109 (0.054)*	0.412 (0.088)****
Number of births	0.000 (0.000)*	0.000 (0.000)*	0.000 (0.000)^
Laboratory type	− 1.795 (0.260)****	− 2.312 (0.356)****	− 1.169 (0.528)*
Change history	− 0.098 (0.040)*	− 0.159 (0.070)*	− 0.144 (0.059)*
MS/MS	− 0.086 (0.501)	—	—
Constant	1.176 (0.299)****	1.468 (0.371)****	− 1.903 (1.155)^
N	867	459	408
Wald chi square (DF)	174.89 (18)****	5805.33 (16)****	80.06 (16)****

Notes. Dependent variable = − 1, 0, +1 lagging, on target with, leading state mandated number of conditions on a newborn screening panel. Baseline category = on target with mandate, coded as 0.
^$p<.10$, *$p<.05$, **$p<.01$, ***$p<.001$, ****$p<.0001$.
[†]The coefficient on laboratory type in model 2 is due to the presence of 11 public health laboratories and 0 nonpublic health laboratories before the advent of MS/MS technology for those states that lag behind the mandate. The covariate remains in the model due to the importance of laboratory type for leading states in comparison with the baseline of being on target with the mandate.

of a state implementing more conditions than state law dictates (leading) increase by 6 percent with each year that the newborn screening legislation goes without amendment and the odds of leading are higher for states using public health laboratories.

The results for hypothesis 2, that fiscal discretion decreases the likelihood that a state would lag behind state law, in model 1 are not statistically significant. Models 2 and 3 split the sample due to the exogenous shock of the advent of tandem mass spectrometry.[3] A comparison of the early and later years of newborn screening reveals interesting differences in the influence of

fiscal discretion. Before the advent of tandem mass spectrometry technology, the coefficient on fiscal discretion does not reach significance. After tandem mass spectrometry, agencies with fiscal discretion are both less likely to lag behind and less likely to lead in comparison with being on target with their mandate. This result indicates that financial autonomy helps programs successfully implement legislative changes but does not lead to agencies over-reaching their legislature.

DISCUSSION

This project considers how different types of public health agency discretion influence implementation of newborn screening state laws. The results reveal that when public health agencies have the discretion to name their own panel of newborn screening conditions and charge their own fees, they are less likely to lag behind the state's newborn screening law. The presence of criteria discretion, on the other hand, increases the probability that a state will lag behind its law.

This study goes beyond the traditional finding that discretion is important for public health agencies. Constraining discretion can be both beneficial and harmful to successful implementation. For instance, restricting the autonomy of agencies by establishing criteria for action aids program implementation. This constraint provides specific boundaries within which practitioners can function. Alternatively, the lack of discretion to use practitioner judgment (i.e., condition discretion) and fiscal limitations are a barrier for successful implementation. The specific constraints chosen by a legislature are crucial to implementing newborn screening panel changes. Practitioners who lack the freedom to use their judgment in deciding their panel were sluggish to react to new legislative changes, possibly due to the decreased incentive for expertise. Agencies with condition discretion, though, are able to keep up with scientific and technological change.

Using newborn screening as a case study, it is plausible that substantial autonomy is beneficial for public health policies that require practitioner knowledge. Agencies, though, should not be given free reign to implement public health programs. Instead, discretion should be constrained in ways that encourage efficient, accountable action—by providing clear criteria for programs. In this case, agencies with the discretion to set their own criteria were more likely to lag behind their state's newborn screening laws. Gostin asserts that the "clear criteria for the exercise of public health powers" is necessary for "public health work" (2000, p. 322). Whether programs that lacked criteria

discretion were underutilizing their authority or fumbling without guidance was not assessed in this study and is in need of further study.

Policy makers must consider the distinction between different constraints on agency discretion. Conventional wisdom in politics is that legislators should control agencies by limiting their discretion. It may be possible to constrain agencies by limiting only certain aspects of their discretion. Using newborn screening as an example, the language in a policy can define criteria for action but allow for expert choice in other aspects of a program.

Public health practitioners need to develop a better awareness of and appropriately utilize the boundaries of their discretionary authority. For instance, if a program's authorizing statute does not provide specific criteria for a program, the agency should work toward developing these in a public forum, either through legislative advocacy or through a public consensus-building process. In addition, if state statutes constrain professional judgment, practitioners should work with legislative staff to propose new language that increases discretion related to expertise but sets specific limits on the exercise of this authority. In sum, practitioners need to be directly involved in policy making by providing information about downstream implications of various language choices.

This study only scratches the surface of public health law's importance for public health practice and has limitations. For instance, newborn screening is a specific program within state public health agencies. This focus offers the benefit of following a set of changing statutes over time, but it does not consider how overlapping and inconsistent laws influence public health practice. Additional studies outside of newborn screening should consider the influence of different types of discretion of program structures and outcomes. Furthermore, this study does not consider the influence of discretion and expansion in newborn screening on population health outcomes. Recent scholars have highlighted concerns about whether screening for more disorders actually improves population health (Botkin et al. 2006; Tarini, Christakis, and Welch 2006; Tarini 2007). As newborn screening programs evolve, a careful consideration of the likelihood and impact of false positives, the availability of resources for follow-up and support, and knowledge about the natural history of tested disorders must be undertaken (Botkin et al. 2006; Tarini 2007).

CONCLUSIONS

The structure of agency discretion is a crucial factor for public health practice. Understanding the intersection of implementation, discretion, and technology is important for policy makers and practitioners.

ACKNOWLEDGMENTS

NOTES

1. The robustness of the results to this choice was checked, and the significance and substantive value of the discretion variables increases with later dates.
2. Panel logit models and models with clustering for state and year were analyzed with the same substantive results.
3. Interactions of the theoretical variables of interest with the tandem mass spectrometry variable yielded similar substantive results.

REFERENCES

Botkin, J. R., E. W. Clayton, N. C. Fost, T. H. Murray, M. A. Baily, B. Wilfond, A. Berg, and L. F. Ross. 2006. "Newborn Screening Technology: Proceed with Caution." *Pediatrics* 117 (5): 1793–9.

Frazier, D. M., D. Millington, S. McCandless, D. Koeberl, S. Weavil, S. Chaing, and J. Muenzer. 2006. "The Tandem Mass Spectrometry Newborn Screening Experience in North Carolina: 1997–2005." *Journal of Inherited Metabolic Diseases* 29 (1): 76–85.

Gostin, L. O. 2000. *Public Health Law: Power, Duty, Restraint.* Berkeley: University of California Press.

Huber, J. D., and C. R. Shipan. 2002. *Deliberate Discretion? The Institutional Foundations of Bureaucratic Autonomy.* Cambridge, England: Cambridge University Press.

Kerwin, C. M. 2003. *Rulemaking: How Government Agencies Write Law and Make Policy.* 3rd Edition. Washington, DC: Congressional Quarterly Press.

Lipsky, M. 1980. *Street-Level Bureaucracy: Dilemmas of the Individual in Public Services.* New York: Russell Sage Foundation.

Mitka, M. 2000. "Neonatal Screening Varies by State of Birth." *Journal of the American Medical Association* 284 (16): 2044–6.

National Newborn Screening and Genetics Resource Center. 1990-2006. "National Newborn Screening Information System." Genetic Services Branch and the University of Texas Health Science Center at San Antonio [accessed regularly from February 1, 2004, through August 21, 2008]. Available at http://www.genes-r-us.uthscsa.edu/ with earlier years available from NNSGRC as hardcopy manuals.

Shumavon, D. H., and H. K. Hibbeln. 1986. *Administrative Discretion and Public Policy Implementation.* New York: Praeger Publishers.

StataCorp. 2007. *Stata Statistical Software: Release 10.0.* College Station, TX: StataCorp LP.

Tarini, B. A. 2007. "The Current Revolution in Newborn Screening: New Technology, Old Controversies." *Archives of Pediatrics and Adolescent Medicine* 161 (8): 767–72.

Tarini, B. A., D. A. Christakis, and H. G. Welch. 2006. "State Newborn Screening in the Tandem Mass Spectrometry Era: More False-Positive Results." *Pediatrics* 118 (2): 448–56.

Therrell, B. L., et al. 2006. "Status of Newborn Screening Programs in the United States." *Pediatrics* 117: S212–52.

Turnock, B. J. 2004. *Public Health: What It Is and How It Works.* 3rd Edition. Boston: Jones and Bartlett Publishers.

Vaughn, J., and E. Otenyo. 2006. *Managerial Discretion in Government Decision Making: Beyond the Street Level.* Sudbury, MA: Jones and Bartlett Publishers.

Wing, K. R. 2003. *The Law and The Public's Health.* 6th Edition. Chicago: Health Administration Press.