THE POLITICAL ECONOMY OF RURAL EMERGENCY MEDICAL SERVICES: A CASE STUDY AND ANALYTICAL FRAMEWORK

By

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TABLE OF CONTENTS

LIST OF TABLES

INTRODUCTION

Chapter one is an extension report prepared for local level policy makers involved in the delivery of emergency medical services (EMS) in Hillsdale County, Michigan. The report originated out of a request, from officials to the Kellogg Leadership and Local Government Education Project, for aid with a public policy crisis in the delivery of ambulance services in Hillsdale County. It attempts to outline the public policy issues associated with ambulance delivery and to, in more detail, describe the organization of ambulance services in Hillsdale County. The report is meant to be a starting point for discussions between extension personnel and local leaders to address their questions and concerns about Hillsdale County ambulance delivery.

Experience with the case study was used to formulate a proposal for a study of the political economic organization of rural emergency medical services. The proposed research would attempt to broaden the perspective from local level extension activities to a more theoretically rigorous analysis of rural EMS. Chapters two and three discuss a political economy and community economics theoretical perspective to investigate the institutional alternatives in EMS. Chapter two discusses, in detail, the public policy issues related to delivering rural emergency medical services. Chapter three proposes an analytical framework which integrates specific public policy issues discussed in chapter two in order to study the political economy of rural EMS. Some of chapter one, in that

it is the extension report delivered to Hillsdale County leaders, is repeated in later chapters as the issues illuminated by the case study are further explained and explored.

CHAPTER ONE

HILLSDALE COUNTY EMERGENCY MEDICAL SERVICES CASE STUDY

1.1 Introduction

An individual will need emergency medical services for emergency purpose at least twice in his or her lifetime. A population of 10,000 residents generates one true emergency call per day (U.S. Congress, 1989). Low call volumes are generally quite prevalent in the rural United States; small rural communities may receive less than one emergency call per day, making it difficult for rural ambulance services to support themselves financially. Almost 25 percent of rural residents live in areas that are federally designated as health manpower shortage areas (one or fewer physicians per 3,000 or 3,500 in population) (U.S. Congress, 1989). As the availability of health care decreases in rural areas as community hospitals close, EMS producers may play an increasingly important role in pre-hospital care, e.g., nonemergency transport or urgent primary care services.

Determining the appropriate nature of community pre-hospital EMS is a task far more complex than responding call-by-call when help is critically needed, particularly in rural areas. Community and governmental leaders face numerous constraints in the delivery of EMS to persons in sparsely populated areas. The inherent characteristics of EMS delivery combined with rapidly increasing health care costs and tightening fiscal conditions for local governments have made these constraints more acute in recent years.

Community and governmental leaders are faced with policy decisions regarding how to provide and produce EMS within their rural communities.

1.1.1 Hillsdale County, Michigan

Currently, six ambulance operators are the primary EMS providers within Hillsdale County: Addison Fire Department (Lenawee County, Michigan), Hillsdale County Rescue Squad, Reading Emergency Unit, George White Funeral Home, Wright/Waldron Fire Department, and Van Horne/Eagle Ambulance Service.[1] Two other operators occasionally serve the County as well, Pioneer EMS (Williams County, Ohio) and Hudson Fire Department (Lenawee County, Michigan).[2] Hillsdale County has subsidized the four major ambulance operators for 18 years: Reading Emergency Unit, George White Funeral Home, Wright/Waldron Fire Department, and Van Horne/Eagle Ambulance Service. Over the past few years these four ambulance operators have indicated to the ambulance committee of the Hillsdale County board of commissioners that their costs have exceeded their revenues; they claim they can no longer support the existing level of ambulance operations with their current method of financing. Each of the subsidized operators has requested a substantial increase in their current level of subsidy. The county however, has indicated that no additional funds to support EMS are available. The ambulance committee approached the Kellogg Leadership and Local Government Education Project (KLLGE) of Michigan State

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[1]The Hillsdale County Rescue Squad provides only backup ambulance service to the other primary ambulance operators. Since the Rescue Squad completed 79 runs in Hillsdale County in 1989, only 18 runs fewer than the Wright/Waldron service, it has been included in the study to provide a thorough illustration of EMS in Hillsdale County.

[2]The Pioneer and Hudson ambulance operators make approximately 20 to 30 calls per year into Hillsdale County.

University's Cooperative Extension Service to assist the committee with addressing the ambulance situation.

1.1.2 Study Objectives

The primary objective of the research is to investigate the political and economic structure of EMS within Hillsdale County. The research explores:

1. the cost and revenue patterns, financing methods, and institutional characteristics of the four major ambulance operators subsidized by Hillsdale County;

2. the cost and revenue patterns, financing methods, and institutional characteristics of the two additional ambulance operators providing service to Hillsdale County;

3. the institutional characteristics of ambulance operators in the surrounding counties of Williams, Branch, and Lenawee to provide comparative information;

4. an aggregate analysis of the provision of EMS within Hillsdale County; and

5. some potential alternative institutional arrangements in the provision of ambulance services.

1.1.3 Study Methodology

The research approach used in the investigation is the case study. Case study research employs interviews, documentation analysis, surveys, literature review, and observation. Five of the six primary ambulance operators were interviewed in-person using an interview guide; key informants for each operator were interviewed an average of three times for approximately two hours each. As available, ambulance operations records were obtained to supplement the information obtained during the interviews. Internal records for the sixth ambulance operator were obtained in lieu of interviews. Telephone interviews were conducted with 10 ambulance operators serving counties in close proximity to Hillsdale. As well, key informants in the Hillsdale EMS system were

interviewed: the medical control authority, medical personnel, state police and sheriff dispatchers, and State of Michigan Department of Emergency Medical Services personnel.

Case studies provide a microscopic picture of a given situation. Every attempt was made to obtain accurate and detailed information. Due to variety in record keeping methods and levels, some estimation was necessary.

1.1.4 Research Report Outline

This report first describes the major issues involved in EMS delivery. Second, the report outlines the institutional characteristics of EMS delivery within Hillsdale County, as well as the pricing, financing, and cost structures for the individual ambulance operators and the county as a whole. Finally, a number of institutional alternatives to the current system of EMS delivery are outlined.

1.2 Emergency Medical Services

An EMS system is "the resources used to deliver medical care to those with an unpredicted immediate need outside a hospital or other emergency facility" (Werner and Smith, 1988). For the purposes of this study, EMS is the ambulance operations (including personnel, equipment, etc.) used to delivery emergency and nonemergency pre-hospital care.

The delivery of EMS involves public choice regarding key components of the EMS system. Public choice is driven by political and economic factors within EMS and the institutions and individuals involved in the EMS system, including state regulatory institutions, the local medical control authority, medical personnel, local government officials, EMS producers, and/or citizen/consumers. These system components include

the overall level of EMS care, access to the EMS system, response time, transport of nonemergency requests, control and oversight, institutional organization, and finance. There are no generally accepted standards for the components of an EMS system. This research focuses primarily on the institutional organization and finance of EMS. Any changes in the system of EMS delivery may effect other components of the system as well. Thus, representatives from the entire system should be consulted when considering a change in any component of the EMS system.

The production of EMS is subject to economies of size. For example, a small community with a two-ambulance system, operating at or near capacity, cannot meet a 20 percent increase in demand with a 20 percent increase in capacity. Purchasing a new ambulance and adequately staffing that ambulance requires a 50 percent increase in capacity (U.S. Congress, 1989). EMS requires high initial capital costs for ambulances, specialized medical equipment, and communications equipment. The major factors influencing operating costs are system size, and personnel and staffing policies: part-time vs. full time, paid vs. volunteer, length of duty shift, and shift rotation systems. Trained labor is a key resource input to the supply of EMS; there may be limited availability of trained personnel for dispatching, administration, and medical technicians. Rural areas may realize high unit costs due to low call volumes and high operating expenses. The average cost per run for an ambulance service may be calculated by dividing the total annual costs of the operation by the total number of runs for any given year. The higher the costs and/or the lower the number of runs, the higher the unit cost. By expanding service area to increase call volume, given a certain cost structure, per unit (per call) cost would decrease as fixed costs were spread over a larger number of runs.

1.2.1 Public Choice Issues in EMS Delivery

1.2.1.1 Access

Public access to the EMS system is a critical component in the delivery of EMS services. Many rural areas lack centralized dispatch and may have antiquated communications equipment in need of replacement.

1.2.1.2 Level of Care

A primary decision is the level of EMS care to be provided at the site of illness or accident. This in turn requires a decision regarding the level of emergency training to be given the individual care providers. Federally, there are two broad distinctions in care, First Responders and Emergency Medical Technicians (EMTs). First Responders are trained to provide initial care for patients suffering injury or sudden illness until trained EMTs arrive. These First Responders assess patients, and provide basic life support that is necessary to prevent medical injury-related problems from becoming a threat to survival (U.S. Congress, 1989). Emergency Medical Technicians provide emergency medical care, and stabilize and transport patients to a hospital. In Michigan there are currently three levels of EMTs -- EMT-Basic, EMT-Specialist, and EMT-Paramedic --corresponding to three levels of regional EMS care: Basic Life Support, Limited-Advanced Life Support, and Advanced Life Support.[3] Each level can provide increasingly sophisticated forms of medical care treatment. As operations move to increasingly more sophisticated levels of care, the medical equipment and training required to support the level of care becomes more complex and costly.

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[3]Legislation is pending in the Michigan legislature which will modify these designations.

1.2.1.3 Response Time

For a person whose heart has stopped pumping, the rule of thumb states that brain cell deterioration begins in about four minutes. Such short time allowances, further reduced by the time lapse between point of identified need and EMS attention, impose heavy requirements on EMS staffing and stationing. For motor vehicle fatalities, the average response time for rural areas is 11 minutes as compared to 6 in urban areas (U.S. Congress, 1989). Some communities have conducted massive, CPR education programs to supplement the EMS system. Others have trained all fire and police personnel at the First Responder level.

1.2.1.4 Transportation

By law, an EMS provider must service an emergency request.[4] However, an EMS provider is not legally required to service nonemergency transfer requests, e.g., a transfer between a nursing home and a hospital. Choices regarding whether or not EMS producers will service nonemergency requests must be made and may have implications for the profitability of EMS producers.

1.2.1.5 Control

Control over the EMS system may rest in federal and state health planning agencies and communications agencies, regional medical control authorities, local governments, local medical personnel, local leaders (particularly those who hold dual roles as EMS volunteers) and citizen/consumers. The power to influence planning, development and operation of EMS rests in both the legal authorities governing EMS as

[4]Jackson Emergency Services estimates that 59 percent of its runs (including urban areas) are emergency calls and 41 percent are non-emergency. The percent of emergency calls in rural areas would most likely be higher.

well as the local values regarding EMS. Lack of clarity of responsibility over EMS may result in poor oversight and difficulty in system planning.

1.2.1.6 Organization

A number of organizational arrangements may be used to administer the provision and production functions of EMS delivery. Provision functions include determining the appropriate volume and quality of service to be produced, and arranging for the method of finance, oversight mechanism, and method of production. Production is the actual operating of an ambulance service. Different organizations and levels of organizations may administer provision and production functions. For example, EMS may be provided at a county-wide, regional, city, or township level. EMS may be produced by the fire department, police department, a private ambulance service, or a combined public safety department at any one of these provision levels. EMS may be provided and produced by the same organization, for example a county or a private ambulance operation.

The variation in the types and organization of EMS are products of a creative decision process in which economic, technological, and political factors predominate. EMS operators must service a large enough area, billed on a fee for service basis, that will generate sufficient revenue to support operations. In areas were it is difficult for ambulance operators to support EMS on a fee for service basis and at a given level of care, local governments may choose to compensate the operator in some way if these governments perceive a need to assure some minimum level of available EMS at all times for their citizens.

1.2.1.7 Finance

EMS may be financed by a number of methods, e.g., donations, service fees, taxes, or some combination of them. Who should pay for ambulance services? Service users, local governments, and/or the general taxpayer? The quantity of revenue derived from fees for service is a function of the number of calls answered and the number of patients transported. Increasingly a large proportion of calls are likely to be covered by third party reimbursement programs (insurance carriers) and the proportion of uncollectible accounts should influence the decision as to whether to charge for a service with a fee or to support the service via taxes. Examination of the transactions cost of collecting fees must be weighed against the revenues from fees received. There may be increased pressure on governments to assist EMS operators if uncollectible rates are high and call volumes are relatively constant, thereby keeping per unit revenues at levels which may not support per unit costs.

1.2.2 Emergency Medical Services in Michigan

Local governments in Michigan are not statutorily responsible for the provision of ambulance services. However, if counties choose to establish an ambulance service, it must be equally available to all residents. Counties are responsible for paying the cost of transporting indigent persons who are injured on state highways (Michigan Counties, 1978; Michigan 1937 P.A. 176, S 2). Local governments do generally serve a vital function in providing public safety services to citizens, e.g., fire protection and police protection, and are implicitly responsible for the health and general welfare of the inhabitants residing within their jurisdictions (Michigan Constitution, Article IV, Section 51). Thus, citizens may identify EMS with the emergency response function of government, perhaps thus addressing government representatives with concerns

regarding EMS even if local government is not involved in EMS provision and production.

1.3 Institutional Characteristics of EMS Provision in Hillsdale County

Hillsdale is primarily a rural community with approximately 46,500 residents (Table 1). Six ambulance operators serve the residents of Hillsdale County. These ambulance operators provide 11 ambulances located throughout the county to serve county residents. The total number of ambulance runs made in Hillsdale County in 1989 totaled 2,482 (Table 2)[5], equivalent to one run every 16.6 residents. The ambulance operators serve a wide variety of hospitals in cities inside and outside the county and state: Hillsdale, Coldwater, Kalamazoo, Morenci, Montpelier, Jackson, Addison, and Adrian.

TABLE 1: POPULATION OF DESIGNATED SERVICE AREA PER AMBULANCE OPERATOR, HILLSDALE, MICHIGAN

Operator	Number of Vehicles	Population	Percent Total Population
Hillsdale County Rescue Squad	1	---	---
Wright/Waldron Fire Department	1	3,519	7.57%
Addison Fire Department	2	4,397	9.46%
George White Funeral Home	2	8,780	18.90%
Reading Emergency Unit	3	9,513	20.47%
Van Horne/Eagle Ambulance Service	2	20,260	43.60%
Total Hillsdale County	11	46,469	100.00%

Source: Survey of Ambulance Operators, Hillsdale, Michigan. Spring 1990.

[5]If the estimated number of runs performed by the Pioneer and Hudson ambulance services in Hillsdale County is included, the total number of runs is 2,532. However, the Reading, White and Wright/Waldron services occasionally serve areas outside of Hillsdale County as well. Each estimate that they complete approximately 15 to 20 calls outside of the county each year.

TABLE 2: TOTAL 1989 RUNS PER AMBULANCE OPERATOR
HILLSDALE COUNTY, MICHIGAN

Operator	Runs	Percent
Hillsdale County Rescue Squad	72	2.90%
Wright/Waldron Fire Department	90	3.63%
Addison Fire Department	116	4.67%
George White Funeral Home	412	16.60%
Reading Emergency Unit	592	23.85%
Van Horne/Eagle Ambulance Service	1,200	48.35%
Total Hillsdale County	2,482	100.00%

Source: Survey of Ambulance Operators, Hillsdale, Michigan. Spring 1990.

All of these operators cooperate to provide EMS to the county by providing mutual aid backup service to each other as needed and by serving their designated service area. All operators provide EMS care at the Basic Life Support level. Three of the four ambulance operations subsidized by the county are members of the Hillsdale County Ambulance Association (Reading, White, and Wright/Waldron). The primary purpose of the association is to receive and allocate a portion of the subsidy to members.

Each ambulance operator serves a mutually agreed upon service area with the exception of the Hillsdale County Rescue Squad. The Rescue Squad provides only backup ambulance service to all other Hillsdale operators as necessary and serves the entire county. Van Horne/Eagle Ambulance Service serves the largest contiguous area of population (20,260) with two ambulances and 9 ambulance staff members. Wright/Waldron serves the smallest number of people (3,519) with one ambulance and 6 staff members.

In 1989, Wright/Waldron made the fewest ambulance runs; Wright/Waldron provides only emergency service. Tables 1 and 2 indicate that total ambulance runs per

service area is consistent with the size of the population within that area. Van Horne/Eagle Ambulance Service made 1,200 ambulance runs within the largest populated area in 1989.

The major ambulance operators subsidized by the county vary considerably in institutional structure. A number of these characteristics are summarized in Table 3. Public and not-for-profit institutions may enjoy lower fixed costs by benefiting from subsidized rental rates and few taxes. Volunteer staffs may allow these same institutions to minimize fixed and variable labor costs. However, experienced volunteers may be difficult to recruit and retain. Private for-profit firms often employ full time medical technicians, increasing fixed costs. Full time salaries and benefits may allow these private firms to effectively recruit and retain highly qualified personnel. Operations that are organized jointly with another service, e.g., fire, may enjoy some donated benefits from that organization or may find that labor and other resources have competing uses between services. Public and private not-for-profit organizations may enjoy strong community support and contribute to the overall sense of community within their service area. Private for-profit organizations may not enjoy the same kind of public support, however if they have a long history of service to the community, they may also realize community support.

1.3.1 Reading Emergency Unit

Reading Emergency Unit is a volunteer not-for-profit ambulance organization located in the City of Reading. The Unit has been in existence since 1970. Thirty three volunteers support the Unit as emergency medical technicians (EMTs) and ambulance attendants. Two dispatchers (one who also provides bookkeeping services) are full time paid employees. The Unit is governed by two boards. The volunteer membership board

president, vice president, and secretary -- provide supervision and management for the volunteer team. The board of directors provides financial management advice to the operation.

1.3.2 George White Funeral Home

White Funeral Home provides a family owned and operated ambulance service located in the city of Litchfield. White is one of the two private for-profit ambulance operators in Hillsdale County. Eight persons staff the ambulance service, three of whom are part of the White family. These three individuals as well as other funeral home employees provide the majority of management, bookkeeping, and dispatching responsibilities. The balance of the staff represent part time EMTs paid on a per call basis.

1.3.3 Van Horne/Eagle Ambulance Service

Van Horne/Eagle Ambulance Service is located in the City of Hillsdale in the Van Horne/Eagle Funeral Home. The private service employs nine ambulance persons, four of whom are full time EMTs and the balance of whom are part time paid EMTs and ambulance attendants. Management is provided by one of the full time technicians and dispatching is shared by scheduled EMTs and other personnel.

TABLE 3. COMPARATIVE STRUCTURAL AND 1989 PERFORMANCE CHARACTERISTICS FOR AMBULANCE OPERATORS, HILLSDALE COUNTY, MICHIGAN

	Ambulance Operators			
	Reading Emergency Unit	George White Funeral Home	Van Horne/Eagle Ambulance Service	Wright/Waldron Fire Department
Institution Type Operation Type Level of Care	Private:non-profit Separate Basic	Private:profit Joint (Funeral Home) Basic	Private:profit Joint (Funeral Home) Basic	Public Joint (Fire) Basic
Number of Vehicles Response Time (based on mileage)	3 8-14 minutes	2 4-15 minutes	2 8-15 minutes	1 3-11 minutes
Staff Size** Average Training Level Personnel Arrangement	33 EMT* Paid Volunteer	8 EMT* Paid Per Call Paid Per Shift	9 EMT* Paid Per Shift	6 EMT* Paid Volunteer
Total 1989 Costs Total 1989 Runs Population	$109,864 592 9,513	$154,598 412 8,780	$203,975 1,200 20,260	$28,097 90 3,519

Source: Survey of Ambulance Operators, Hillsdale, Michigan. Spring 1990.

* Emergency Medical Technician
** Based on information filed with Michigan Department of EMS, 1989.

1.3.4 Wright/Waldron Fire Department

Wright/Waldron Fire Department provides emergency ambulance service only. It is located in the Village of Waldron and is a purely public organization. One ambulance is located in the fire department quarters. The fire chief manages both the fire and ambulance service on a volunteer basis and is reimbursed with a small stipend. Six volunteers who are also fire fighters work for the ambulance service on a paid per call basis.

1.3.5 Branch County, Michigan; Lenawee County, Michigan; and Williams County, Ohio

Emergency medical services in Branch County are centrally managed by the county sheriff and are located in the City of Coldwater. Ambulance service is centrally dispatched through the sheriff's office. Five full time EMTs are employed as well as more than 20 part time EMTs; all deputies are also trained as EMTS. One full time billing clerk is employed. Basic Life Support service is provided. Five ambulances are centrally located in Coldwater and in 1989, the operation made 3,051 runs within Branch County (population 43,377).

Williams County also runs a centrally managed and dispatched ambulance service. Ten ambulances are located in fire departments throughout the county. Ninety four paid volunteers plus one salaried director and administrative assistant work for Pioneer EMS. Pioneer EMS made 1,967 runs in Williams County (population 36,369) in 1989.

Lenawee County has approximately 12 ambulance operators in the county. Most of these operators are public entities operating jointly out of fire departments. For example, the Blissfield Township service made 135 runs in 1989. One ambulance is operated out of the fire department and is staffed with 6 volunteer technicians. Raisin

Township operates a joint fire/ambulance service serving Raisin, Tecumseh, Macon, Ridgeway and Clinton Townships with 3 ambulances. The ambulance operation made 1,164 runs in 1989 and employs 48 paid on call volunteers and one manager.

1.4 Hillsdale County EMS Pricing Structure

The pricing structure used by the individual ambulance operators is summarized in Table 4. In 1989, two operators offered subscriptions or memberships, Reading Emergency Unit and Van Horne/Eagle Ambulance Service. Van Horne/Eagle has since discontinued the program. In 1989, the base rate for an ambulance call ranged between $80 and $125. The two private operators both currently charge $125 per call. All operators charge $2.50 for each loaded mile with the exception of Van Horne/Eagle. Prices are set based on a number of factors including subsidy availability, third party reimbursement potential, quality of service, level of service, and competing suppliers.

TABLE 4: SERVICE FEE STRUCTURE FOR AMBULANCE OPERATORS
HILLSDALE COUNTY, MICHIGAN

	Reading Emergency Unit		George White Funeral Home		Van Horne/Eagle Ambulance Service		Wright/Waldron Fire Department		County Average	
Fee Structure:	1989	1990	1989	1990	1989	1990	1989	1990	1989	1990
Membership Charge	$ 25.00	$ 25.00	---	---	$29.00	---	---	---	---	---
Number of Members	919	---	---	---	N/A	---	---	---	---	---
Member Base Rate	$ 0	$ 0	---	---	$20.00	---	---	---	---	---
Mileage Charge (loaded)	$ .50	$ .50	---	---	---	---	---	---	---	---
(Nonmember) Base Rate	$ 80.00	$100.00	$100.00	$125.00	$100.00	$125.00	$90.00	$90.00	$92.50	$110.00
Mileage Charge (loaded)	2.50	2.50	2.50	2.50	3.00	3.00	2.50	2.50	2.63	2.63
Other Charges (Per Call)										
Oxygen	$ 10.00	$ 12.50	$ 10.00	$ 10.00	$ 17.50	$ 17.50	---	---	---	---
Supplies	10.00	10.00	---	---	---	---	---	---	---	---
Monitoring	25.00	25.00	25.00	25.00	50.00	50.00	---	---	---	---
Defibrillator	100.00	100.00	50.00	50.00	50.00	50.00	---	---	---	---
Thumper	25.00	25.00	---	---	---	---	---	---	---	---
Emergency Call	---	---	10.00	10.00	20.00	20.00	---	---	---	---
Nighttime Call	---	---	10.00	10.00	---	---	---	---	---	---
MASTS	---	---	---	---	25.00	25.00	---	---	---	---

Source: Survey of Ambulance Operators, Hillsdale, Michigan. Spring 1990.

The base rates charged by these ambulance operators are commensurate with the base rates that operators charge in Lenawee, Branch and Williams counties.[6] Pioneer EMS charges a base rate of $125 and $2.50 per loaded mile. Branch EMS charges county residents $100 per run and nonresidents $225 per run plus $2.00 per loaded mile. The Lenawee county operators surveyed charge a range of prices: Blissfield Township, $80 base for residents plus $1.00 mile round trip and $120 base for nonresidents plus $1.00 round trip; Raisin Township, base for subscribers $25 per emergency plus $.25 per loaded mile and $100 for nonsubscribers plus $2.00 per loaded mile; Morenci Township, no charge for subscribers and $150 base for nonsubscribers; Palmyra Township, no base for subscribers plus $1.00 per loaded mile, $75 base for nonsubscribers plus $1.00 per loaded mile and $85 base for nonresidents plus $1.00 loaded mile; and Madison Township, no charge for residents and $100 base for nonresidents plus $3.00 per loaded mile. All these ambulance service are subsidized at different levels in some way by their local units of government. All services, at this time, provide Basic Life Support service. Fully private operators may charge $175 for Basic Life Support service to $395 or $500 for Advanced Life Support service as a base rate to cover their full operating costs.

Of all the operators in Hillsdale, Reading Emergency Unit is the only provider practicing some sort of price discrimination. Lenawee County operators, however, discriminate between service area residents, nonresidents, and often subscribers and nonsubscribers.

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[6]There is considerable variation in the other fees charged on a per call basis, e.g., oxygen, across ambulance operators. Some operators do not charge any additional fees, others may charge different amounts for the same service.

1.5 Hillsdale County EMS Finance Method

All of the primary ambulance operators are subsidized by Hillsdale County. The structure of revenues for four of these six operators is shown in Table 5. The subsidy from the County comprises between 21.1% (Reading Emergency Unit) to 74.3% (Wright/Waldron Fire Department) of the 1989 total revenues of the operators. The per capita subsidy allocated to the four ambulance operators ranges from $2.53 to $4.41. Direct costs to taxpayers in the United States ranges between $0 and $25 (Werner 1988, p.8). The total actual subsidy allocated to the four operators in 1989 was $115,672.[7] All four operators use some sort of fee for service system. The two private operators depend on receipts from services to fund a large portion of their operating expenses. Van Horne/Eagle obtains almost 75 percent of its income from billings; it also makes the most runs of all the providers (1,200) or 48 percent of the total for the county. Average receipts per run range between $53 and $124 for the ambulance operators (Table 5). Van Horne/Eagle is the only operator that captures almost all of the base rate charged per run, $124. Reading Emergency Unit has diversified its revenues between billing receipts, the county subsidy, memberships, donations and miscellaneous income (sale of equipment, fees for training classes). However the largest proportion of its revenues is derived from billing receipts. Thus, White, Reading and Van Horne/Eagle heavily depend on receipts from billing for services rendered. Each are therefore critically affected by the level of uncollectible receipts and third party reimbursements.

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[7]This does not include financial support given to the Hillsdale County Rescue Squad or the Addison Fire Department. If this support is added ($4,200 and $3,150 for 1989, respectively), the subsidy totals $123,022. In 1989, Hillsdale County reimbursed the ambulance operators for indigent persons (see section 2.2) for a total of $6,445 (Van Horne/Eagle, $5,086; Reading, $767; and White, $592).

TABLE 5. SOURCES OF 1989 REVENUE FOR AMBULANCE OPERATIONS HILLSDALE COUNTY, MICHIGAN

Revenue Sources	Ambulance Operators							
	Wright/Waldron Fire Department		George White Funeral Home		Reading Emergency Unit		Van Horne/Eagle Ambulance Service	
Receipts from Billing	4,801	23.0%	46,850	66.0%	50,998	44.5%	149,297	73.3%
County Subsidy	15,515	74.3%	24,112	34.0%	24,112	21.1%	51,933	25.5%
Memberships	—	—	—	—	23,930	20.9%	2,562	1.3%
Donations	—	—	—	—	10,321	9.0%	—	—
Township Village Subsidy	564	2.7%	—	—	—	—	—	—
Miscellaneous	—	—	—	—	5,133	4.5%	—	—
Total 1989 Revenue	$20,880	100.0%	$70,962	100.0%	$114,495	100.0%	$203,792	100.0%
Billing Receipts/Run*	53.35		113.71		86.15		124.41	
Per Capita Subsidy**	4.41		2.75		2.53		2.56	

Source: Survey of Ambulance Operators, Hillsdale County, Michigan. Spring 1990.

* Receipt Structure: Run Charge plus extra charges.
** Per Capita estimated by subsidy/population per service area.

From the data available, the percentage of billings uncollectible (including that portion of the bill not paid by insurance), on a cash flow basis for 1989, ranges between 58 percent (Wright/Waldron) to 38 percent (Reading).[8] The rate for White Funeral Home is about 42 percent. Percent uncollectible may be a function of effort exerted by ambulance operators. For example, since Wright/Waldron is a public organization, time devoted to bad debt or insurance collection may be less than the other operators. For operations that are joint with another service -- White, Van Horne/Eagle, and Wright/Waldron -- personnel resources may have competitive uses from the other

[8]For comparison purposes, other ambulance operators were surveyed regarding their collection rates. Pioneer estimates that their uncollectible rate is 28 percent. Jackson Emergency Services estimates their uncollectible rate for areas in Jackson and Lenawee counties with a population of less than 5,000, is 16.1 percent and 22.8 percent respectively.

service, for example, fire fighting or operating a funeral home. This may also influence the level of uncollectible accounts.

One might classify ambulance clients into four categories: Medicare, Medicaid, other insurance carriers, and direct billing with no insurance. Limited data is available on the proportion of clients in each class. The proportions for Reading Emergency Unit are Medicare, 41 percent; Medicaid, 13 percent; and direct or other insurance, 46 percent. The Wright/Waldron proportions are Medicare, 28 percent; Medicaid, 8 percent; and direct or other insurance, 64 percent. The percentage for Reading might be used as a county proxy. Extrapolating this information to the entire county, Medicare payments represent a large guaranteed portion of the receipts for billings. While Medicare pays only an average of the rates charged within a given area, it does represent secure cash flow for operators. However, this cash flow may occur 3 to 4 months after services are rendered. This delay represents a cost to operators. The transactions costs incurred from the billing Medicare may be quite large.

Pioneer is funded through public funds and billing receipts. A millage is levied county wide to support the sheriff department, the ambulance operations, and a public school. The millage support represents approximately 50% of the operating budget for the county. The total subsidy to Pioneer in 1990 is $118,000, equivalent to $3.24 per capita. Branch County subsidizes the ambulance operations with a 3/4 mill, equivalent to a rate of $6.21 per capita or a total subsidy in 1990 of $269,400. Billing receipts account for the balance of revenues, about $314,259, or $104.95 per run. Raisin Township in Lenawee subsidizes their ambulance operation by $1.35 per capita or a total of $28,000. Fairfield Township levies 1 1/2 mill for both fire and ambulance services and Madison Township levies 1 mill to support ambulance operations.

1.6 Hillsdale County EMS Costs

The aggregated total cost for delivering EMS within Hillsdale County is $521,937 (Table 6). The 1989 total cost figure was calculated by estimating the 1989 nominal costs for each ambulance operator subsidized by Hillsdale County, adjusted to reflect true market costs as appropriate (see Appendix I). For example, where building rental costs were subsidized by local government or by joint production systems, a fair rental value for that portion of the building used by ambulance operations was estimated using state equalized property values. The costs for Addison and the Rescue Squad were estimated from records received from the two operators. The cost for Addison represents the portion of its costs allocated to Hillsdale County. The county-wide total cost figure represents an average cost of $210 per run, equivalent to a per capita cost of $11.23 (Table 7). Branch County's service costs approximately $195 per run and Pioneer EMS is estimated to cost $110 per run in 1990. Per capita costs for Branch and Williams Counties are estimated to be $5.97 and $12.38 respectively.

TABLE 6. 1989 ADJUSTED NOMINAL COSTS FOR AMBULANCE OPERATIONS HILLSDALE COUNTY, MICHIGAN

Operators:	Fixed Cost	Variable Cost	Total Cost	Percent Total Cost
Hillsdale County Rescue Squad	N/A	N/A	$ 5,336	1.0%
Addison Fire Department*	N/A	N/A	20,068	3.8%
Wright/Waldron Fire Department	19,220	8,876	28,096	5.4%
Reading Emergency Unit	67,966	41,898	109,864	21.0%
George White Funeral Home**	136,328	18,270	154,598	29.6%
Van Horne/Eagle Ambulance Service	190,466	13,509	203,975	39.1%
Total Hillsdale County	$413,980	$82,553	$521,937	100.0%

Source: Survey of Ambulance Operations, Hillsdale County, Michigan. Spring 1990

* Hillsdale County portion only

** Fixed Costs represent an estimate of overhead costs associated with an operation commensurate with White.

TABLE 7. SUMMARY OF PER CAPITA AND PER RUN COSTS FOR HILLSDALE COUNTY AMBULANCE OPERATORS HILLSDALE COUNTY, MICHIGAN

Operators:	Total Runs 1989	Fixed Cost Per Run	Variable Cost Per Run	Total Cost Per Run	Popula-tion	Per Capita Fixed Cost	Per Capita Variable Cost	Per Capita Total Cost
Hillsdale County Rescue Squad	72	—	—	$ 74.11	—	—	—	—
Wright/Waldron Fire Department	90	$213.56	$98.62	$312.18	3,519	$ 5.46	$2.52	$ 7.98
Addison Fire Department	116	—	—	$173.00	4,397	—	—	$ 4.56
George White Funeral Home*	412	$330.89	$44.34	$375.24	8,780	$15.53	$2.08	$17.61
Reading Emergency Unit	592	$114.81	$70.77	$185.58	9,513	$ 7.14	$4.40	$11.55
Van Horne/Eagle Ambulance Service	1,200	$158.72	$11.26	$169.98	20,260	$ 9.40	$0.67	$10.07
Total Hillsdale County	2,482	$166.79	$33.26	$210.29	46,469	$ 8.91	$1.78	$11.23

Source: Survey of Ambulance Operations, Hillsdale County, Michigan. Spring 1990.

* Actual fixed costs for White are considerable less than estimated due to joint product production. Therefore, fixed cost per run and total cost per run may be overestimated.

Seventy-nine percent of the total costs are fixed, i.e., they do not depend on the number of runs the service completes. A large portion of the 1989 total cost for Reading Emergency Unit, George White Funeral Home, and Van Horne/Eagle Ambulance Service are fixed, primarily due to full time salaries for dispatching and/or EMTs. Seventy two percent of Van Horne/Eagle fixed costs are labor costs; about 50 percent of White fixed costs are labor costs; and 28 percent of Reading fixed costs are labor costs. The private for-profit operators also must incur larger tax burdens than their not-for-profit and public counterparts.

The total cost per run for ambulance operations varies considerably based on the number of runs for each operation, fixed costs, and variable costs. Cost structures, in turn, reflect alternative structural arrangements and thus, implications for public access, response time, level of care and personnel training, and oversight.

It is important to note that the cost figures for White Funeral Home's ambulance service were calculated on a different basis than the balance of the operators. The ambulance service and the funeral home business for White is owned and operated as part of the same business; they are joint products. Fixed costs associated with the ambulance service were therefore very difficult to calculate. Actual salaries and other overhead costs are attributable to both the funeral home and the ambulance service. The fixed costs included for White's ambulance service represent an estimate of the fixed costs associated with an ambulance service commensurate with the White operation. The total costs, therefore, for White, represent an estimate of the total cost of operating an ambulance service similar to White's but not White's actual costs.

1.7 Institutional Alternatives and Recommendations[9]

Hillsdale County is served by 6 ambulance operators providing 11 ambulances and 56 emergency medical technicians and ambulance attendants on a 24 hour on call emergency basis providing basic life support services. Each operator provides a community based service within a designated service area. Minimum response time to an emergency situation ranges among operators between 4 minutes and 15 minutes, assuming good weather.[10] The total number of ambulance runs made in Hillsdale County in 1989 was 2,482 for a total cost of $521,937. The average cost of these runs in 1989 was $210. This level of service was subsidized by Hillsdale County in 1989 at a rate of $2.49 per capita. The per capita subsidy allocated to each operator was not equal; it ranged between $2.53 (Reading Emergency Unit) to $4.41 (Wright/Waldron Fire Department).

1.7.1 Institutional Alternatives

Three institutional alternatives are outlined in the following sections. While other organizational arrangements are possible, the three to be discussed appear to be the most feasible. Each of the options have different implications for the standards associated with EMS delivery, e.g., public access, response time, level of care, staffing, control, oversight, and financing. Each option should be explored with ambulance operators, local units of government, the county, the medical control authority, local

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[9]Special thanks to Dr. Lynn R. Harvey for his comments and suggestions to this section.

[10] Response time was estimated by calculating the mileage between the ambulance operator's base station and the corners of their service area. Response time depends on a number of factors including, but not exclusive to, weather, road conditions, equipment, and dispatching procedures. This estimate is therefore only a crude measure of response time to be used for comparative purposes.

medical personnel, and citizens/consumers with these issues in mind. Since local government is not mandated by statute to provide ambulance service, local units have latitude on how they choose to organize and produce ambulance services. Hillsdale county government is not required to subsidize EMS but may elect to continue the practice within the context of the three suggested organizational options.

Since the provision function of ambulance service (who will provide) may be separated from the production function of ambulance service (who will produce the service), local government units need to assess each of the functions separately, since each of the choices produce different distributional consequences.

1.7.1.1 Ambulance Authority

The provision of EMS could be provided through a statutory county ambulance authority organized under county government. The Emergency Services Authority Act, Public Act 57, 1988 (MCLA 124.601 - 124.614) provides for the creation of an authority for the provision of emergency services (fire, police, EMS, and any other emergency health or safety services designated in the articles of incorporation of the authority). The Ambulance Authority would cover the entire county and the articles of incorporation would contain certain provisions for the creation of an ambulance board to oversee the production and provision of EMS. The Act provides for the levying of millage to finance the service. The authority may levy up to 20 mills for a period not to exceed thirty years and voter approval is required if the authority chooses to finance the service via millage. Financing of ambulance services provided by the authority could be achieved by means other than property taxes. The county, under an ambulance authority, may elect to provide a subsidy to the authority and require contribution from townships and cities as a means of financing the service.

The authority could contract with producers of ambulance services, both public and private, to service designated geographical areas (districts) of the county. Intergovernmental agreements between the authority and individual producers would be necessary in order to establish standards of production and the terms of financing.

The advantage of utilizing an authority to provide ambulance service to county residents would be that the ambulance board would provide oversight to ambulance services, standardize intergovernmental agreements, pricing and if a county wide millage was selected as the preferred means of financing, provide stability in financing of the service and gain economies in training of personnel. Should fees for services be used as an additional revenue source, the authority might oversee a centralized billing operation to gain economies of size for potential improvement in collection rates and minimization of duplication in accounting and billing services.

The disadvantage to the creation of an ambulance authority is the transactions costs involved; county government would be responsible for organizing the authority and providing oversight to the authority's board. Additionally, if the county authority elected to finance ambulance services by the levying of millage, gaining county electorate approval would rest with the county board of commissioners. The ambulance authority would be charged with the responsibility of establishing ambulance service districts, selecting ambulance producers, and negotiating with producers of ambulance services.

The ambulance authority could choose to be both a provider and a producer of ambulance services. This would entail the acquisition of equipment and personnel to operate a county wide ambulance service. The authority could consider purchasing existing equipment from current operators and employing existing personnel. Personnel

would be considered employees of the authority. Emergency vehicles could be located in existing facilities with the authority renting the building from owners or local units.

The ambulance authority option would require consensus among the townships, cities, and current operators since the new structure is a substantial change from the current organization of ambulance service in the county.

1.7.1.2 Series of Supplier Agreements

The county could elect to maintain the current system of ambulance provision but establish individual agreements between Hillsdale County and ambulance operators. The county board of commissioners could appoint an Emergency Services Board to provide oversight to ambulance provision and production. Public Act 7, 1967 (Extra Session) - MCLA 41.801 - 41.810, the Urban Cooperation Act, could be used a the legal authority to establish an emergency services board and create a series of intergovernmental agreements between the county and the suppliers of ambulance services.

Each supplier contract would stipulate the service area, performance standards (response times, equipment standards, training requirements, evaluation of performance) consistent with the EMS standards set by the community at large, length of agreement, and financial terms.

The county could continue to provide a subsidy for the production of ambulance service, levy millage, charge service fees, or some combination. If the county selects to provide a subsidy, the allocation of the subsidy should be provided based on a mutually agreed upon criteria such as on a per capita or percent of county population within each service area.

The advantage to option two, the use of supplier agreements, is that the organizational structure represents only a slight modification of current structure. It

does require the establishment of new intergovernmental agreements, the designation of service areas, and increased responsibility of an ambulance or emergency services board.

The disadvantage lies with the county assuming a more proactive role in ambulance provision that may be resisted by both suppliers and other local units of government with the county, therefor the political and transactions costs may be higher. The designation of service area and selecting suppliers to service each of the districts may pose a difficult task for the emergency services board. Additionally, some local units may choose not to participate in a county wide system of ambulance service. The county, however, does maintain leverage through the control of the subsidy. The county could decide that in order for a local unit or operator to receive a subsidy, the provider must be a part of the county ambulance system.

1.7.1.3 Local Government Unit Provision

The third alternative is to establish an entirely new structure of EMS delivery in Hillsdale County. Under this scenario, each township, village, and city would contract with the ambulance operator of their choice for a given price, coverage area, and performance level. Each local governmental unit would have to decide how to finance ambulance services in their own jurisdiction. The Hillsdale County board of commissioners would have to decide whether to continue the ambulance subsidy. If it elects to continue the subsidy, it is suggested that the subsidy by provided on a per capita basis. Thus, each township and city would receive a subsidy based on their jurisdiction's population.

Cities and townships would be free to negotiate their own agreements with ambulance operators or elect to both produce and provide ambulance services as a public service.

The advantage of option three is that is maximizes individual local government choice as to service operator and level of service. The disadvantage of option three is that some townships may not be able to contract with a supplier or to be financially able to produce and provide the service to their residents. While this option may encourage competition between suppliers, economies of size may not be realized and total costs of ambulance operation within the county may increase. The option also shifts transactions costs surrounding the organization of ambulance services from the county to the local units.

1.8 Recommendations

The three alternative structures outlined above have the potential to address the Hillsdale Ambulance situation, but each option carries with it a set of benefits and costs that need to be examined by all parties concerned. Regardless of the option selected, if the Hillsdale County board of commissioners chooses to continue the ambulance subsidy, the method of distribution of the subsidy needs to be modified from the current structure. Since county general fund revenues are used in the subsidy and currently some residents of the county do not benefit from the subsidy in equal amounts, a question of equity in the distribution of the subsidy is raised that needs to be addressed. The payment of subsidy directly to local governmental units on a per capita basis would represent a more equitable method of distributing the funds assuming each unit is left to contract with the supplier.

If no change is made in the structure of provision of ambulance service within the county and the county elects to subsidize individual suppliers of ambulance services, contracts with suppliers should be required. Such contracts should contain performance

clauses, service area designation, and reporting requirements. Additionally, new arrangements need to be worked out with local units of government who purchase ambulance service from source outside the county as to the level and form of subsidy for their residents.

CHAPTER TWO

PUBLIC POLICY ISSUES IN EMS DELIVERY

2.1 A Public Policy Problem in Hillsdale County, Michigan

For the past 18 years, six individual ambulance operators have served the primarily rural[11] community of Hillsdale County, Michigan. Two of these operators are public organizations; two are private for-profit organizations; and two are private not-for-profit organizations. Over the past few years four of these six ambulance operators have indicated to the ambulance committee of the Hillsdale County board of commissioners that their costs have exceeded their revenues; these operators claim they can no longer support the existing level of ambulance operations with their current method of financing. The operators indicate that rising operating expenses, including insurance premiums and gasoline prices, coupled with increasing uncollectible accounts, including decreased insurance reimbursements and increased bad debts, are the primary cause of their financial situation. Lack of capital to finance purchases of new equipment, e.g., ambulance vehicles and communications equipment, is a primary concern for the operators. Each of these operators has been financially subsidized by Hillsdale County for 18 years via a lump sum general fund tax allocation. The subsidized operators have

[11]Rural is defined as any county or group of contiguous counties with at least one city of 50,000 inhabitants or twin cities with at least a combined population of at least 50,000.

requested a substantial increase in their current level of subsidy. Without increases in the subsidy, the two private, for-profit, operators have suggested that they may close down their ambulance operations. The county, however, has indicated that no additional funds to support ambulance operations are available.

On what basis may community and governmental leaders address the policy situation in ambulance operations in Hillsdale County? What are the public policy issues associated with the delivery of emergency medical services in rural areas? What role does local government[12] play in the delivery of EMS? Do different organizational structures imply different sets of policy issues and thus different performance consequences? In order to investigate the answers to these questions and provide guidance to the local leaders in Hillsdale County, the local political-economic system associated with EMS delivery in rural Hillsdale County and the performance of that system may be explored to suggest alternative institutional arrangements for improved EMS performance. Chapter two provides a background for the development of an analytical framework to study the political economy of rural EMS delivery by exploring the public policy issues in rural EMS. Chapter three defines the analytical framework as well as outlines the theoretical foundations of the framework.

2.2 Rural Health Care and the Renewed Interest in Rural EMS

Almost 25 percent of rural residents live in areas that are federally designated as health manpower shortage areas (one or fewer physicians per 3,000 or 3,500 in population) (U.S. Congress, 1989). The 1980s has witnessed a trend in rural hospital

[12]Local government, in Michigan, is defined as any township, village, city, county, or special district level government.

closures; almost 190 rural hospitals have closed since 1981 (U.S. Congress, 1989). As these community hospitals close and the availability of health care decreases in rural areas, EMS operators may play an increasingly important role in delivering pre-hospital health care, e.g., nonemergency transport or urgent primary care services. EMS operators may also be required to transport and medically stabilize patients over longer distances, perhaps requiring increased technical expertise. A changing rural health care environment may critically affect the nature and quantity of rural EMS demand, shifting demand from purchasing services from local physicians and hospitals toward purchasing substitutable EMS services and medical service from non-local sources. This shift might require EMS producers to deliver increasingly sophisticated emergency medical care, implying additional training and equipment, and increasing costs.

If past federal and state involvement in regulating the quality of EMS supply is an indicator of future involvement,[13] the EMS industry can anticipate future regulatory changes which may also require EMS producers to increase their technical sophistication.

Renewed federal interest may indicate recognition of the changing environment for rural emergency medical care. In 1973, the federal government passed the EMS Systems Act; its goal being to blanket the country with high-quality EMS programs. It provided substantial amounts of technical assistance and capital, about $30,000,000 per year, to EMS producers, much of it targeted for rural areas (U.S. Congress, 1989). In

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[13]For example, federal regulations include, but are not limited to, the Highway Safety Act of 1966 (Public Law 89-564) and the Emergency Services Systems Act of 1973 (Public Law 93-154). During the 101st Congress a number of bills were introduced which relate to rural EMS systems and funding (U.S. Congress, 1989). In Michigan, Act 368 of the Public Acts of 1978, Act 79 of the Public Acts of 1981, and Act 122 of the Public Acts of 1985 all govern the delivery of EMS.

1981, EMS funding was folded into the federal block grant programs and EMS spending declined dramatically; in 1989, $13,000,000 was spent on EMS through the block grant programs (U.S. Congress, 1989). A recent report by the Office of Technical Assessment (1989) summarizing a Rural EMS Workshop cosponsored by the federal Department of Transportation and the Office of Technology Assessment, illustrates a renewed interest and concern regarding the delivery of rural EMS and cites "new evidence that EMS systems are fragmented and lacking resources" (p. 2). Furthermore, "state-to-state variability in EMS systems is marked, and within States, **rural areas are more likely to lack resources and comprehensive systems than urban areas**[14]" (p. 60). Increasingly, the states and local governments rather than the federal government are viewed by the federal government as responsible for EMS funding, regulation, and direction setting.

The Division of Emergency Medical Services of the State of Michigan has recently rewritten the regulations governing EMS operations in Michigan. As of May of 1990, the proposed legislation had passed the state House of Representatives but had yet to be passed by the state Senate. The new bill modifies the current regulatory structure defining and licensing EMS producers and personnel. Additionally the bill provides for "an in-depth assessment of the **unique needs of rural communities** ... concerning the provision of emergency medical services. At a minimum, the assessment shall include an analysis of training programs, medical procedures, recruitment and utilization of volunteers, vehicle and equipment needs, and systems coordination" (Reprint Substitute for House Bill No. 4952, Sec 20910 (1) N))[15].

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[14]Emphasis added by the author.

[15]Emphasis added by the author.

In summary, the changing environment in rural health care may fundamentally impact rural EMS delivery by influencing both the nature and quantity of rural EMS demand and the regulatory system governing the supply of rural EMS. Recognition by both the federal government and the State of Michigan of these potential impacts exists. The State of Michigan has recognized the need for an investigation of EMS personnel issues, medical protocols, and system coordination. Investigation and assessment of system coordination would require analysis of the technological and medical coordination of EMS systems at state and local levels as well as analysis of the political and economic system within which EMS delivery operates, particularly with respect to funding EMS services. The case of the Hillsdale County EMS system would provide such an opportunity to investigate the political economy of one such EMS system and the implications for system performance, perhaps thereby illuminating areas for further study on a state-wide level.

2.3 Purpose of Research

The research would attempt to address the issues and concerns as identified by the local governmental leaders and ambulance operators in the delivery of EMS in Hillsdale County. As well, in order to bring a broad policy perspective to the public policy situation in Hillsdale County, the public choice issues associated with rural EMS delivery would be explored. And finally, the performance implications of alternative institutional arrangements for Hillsdale County EMS would be investigated with respect to the identified needs of Hillsdale County policy makers.

Hence at a broader policy analysis level, the research would function as a case study into the local political economy for EMS delivery in rural Michigan by (1) outlining

the public choice issues associated with rural EMS care; (2) empirically investigating the structure and performance of rural EMS delivery to identify the constraining and facilitating factors within the EMS delivery system; (3) exploring and identifying the patterns of institutional rules and performance consequences among varied organizational arrangements in EMS delivery (public, private for-profit, private not-for-profit); and (4) investigating alternative institutional rules for improved performance in rural EMS delivery.

In addition to providing guidance to the Hillsdale County leaders, it is hoped that the proposed research might provide baseline information for further broad-based research in rural EMS care, comparative information for other communities facing similar policy situations, and a set of empirical techniques for communities to use to investigate rural EMS delivery.

The primary audience for the proposed research is the relevant set or sets of policy makers involved in the delivery of EMS on a local level. Thus, the research would be oriented toward research for action and would focus, as feasible, on factors influencing EMS delivery which might be made operational by local leaders. The proposed research is pragmatic; it proposes to address key problems as identified by community leaders as well as policy issues which would become apparent as the analysis proceeded. For example, a set of performance indicators which may be useful for local level policy makers in evaluating EMS delivery would be identified. As well, the substantive consequences of those key structural rules which seem to be most important to local leaders would be hypothesized, i.e., alternative financing institutions and alternative pricing rules. The proposed research is oriented toward local governmental officials' involvement in EMS as well as EMS operators. As appropriate, implications

for other policy makers would be examined and explored, for example, State EMS regulators.

Policy research requires a rounded picture of all relevant influences on the policy situation. It is particularly important to determine what, if any, are the potential impacts upon the composition and quality of medical care delivered by EMS operators. Researchers must, therefore, consult and coordinate research regarding EMS system changes with local medical authorities. The proposed research focuses primarily on the political economy of EMS; medical, sociological and even cultural factors would not be included due to time constraints and the researcher's lack of specialized knowledge in these areas.

Chapter two outlines the issues and concerns of the Hillsdale County board of commissioners and the ambulance operators serving Hillsdale County as identified via a rapid appraisal. The chapter then describes the results of a literature review conducted to investigate the public policy issues in rural EMS delivery as well as to illuminate what conditions in the rural EMS industry may have contributed to cause the situation in Hillsdale County. Finally, the proposed research objectives are outlined.

2.4 Pragmatic Concerns of Hillsdale County Local Officials and Ambulance Operators

Based on a rapid appraisal of the organization of the EMS delivery in Hillsdale County, the following areas of concern were voiced by the Hillsdale County board of commissioners and the EMS operators serving Hillsdale County.

2.4.1 Cost of Ambulance Production

What is the total cost and marginal cost of producing ambulance services in Hillsdale County? How does this compare to EMS systems in other similar counties?

What is the cost structure for ambulance service production, per operator and in the aggregate?

2.4.2 Revenues from Ambulance Production

What is the structure of revenue sources for individual ambulance operations and in the aggregate for the county? How does this compare to EMS systems in other counties of a similar nature? What are the consequences of the apportionment of the subsidy among ambulance operators? Are there alternative financing methods for ambulance services? What are the performance implications of these methods?

2.4.3 Profit/Loss Position

What is the profit/loss position for the ambulance operators serving Hillsdale County? Are the private for-profit operators enjoying monopoly-like profits?

2.4.4 Capacity of EMS System

What is the current capacity of the EMS system serving Hillsdale County? How does this compare to any standards available for EMS operations? What is the current service area definition for ambulance operations in Hillsdale County?

2.5 Emergency Medical Services

An EMS system is "the resources used to deliver medical care to those with an unpredicted, immediate need outside a hospital or other emergency care facility" (Werner and Smith, 1988, p. 1). For the purposes of the proposed study, EMS consists of the ambulance operations (including personnel, equipment, etc.) used to deliver emergency and nonemergency pre-hospital medical care.

2.5.1 The Demand and Supply of Rural EMS

Table 8 summarizes the demand and supply conditions in EMS delivery. The following section further describes these conditions and summarizes some available empirical evidence regarding demand and supply.

2.5.1.1 Demand for EMS

The demand for rural EMS is a function of the severity of accidents or illnesses in conjunction with demographic and temporal factors, the presence or absence of substitutes, the tastes and preferences of users, and legislatively mandated minimum acceptable levels of care (Navin and Stevens, 1979). As well, EMS demand is influenced by the income of citizen/consumers and the price of EMS.

Aging populations may influence both the demand for emergency calls as well as the demand for non-emergency transport calls. Friday evenings and summer months tend to be peak demand periods for EMS. Public education efforts in Cardio Pulminary Resuscitation (CPR) may also influence EMS demand.

The hypothesized effects of price and income on EMS demand are more clearly understood if EMS demand is decomposed into the demand for emergency services and the demand for nonemergency services, e.g., transport between nursing homes and hospitals for medical examinations. It is assumed that changes in the price of emergency services do not greatly effect the quantity of emergency EMS purchased. Similarly, changes in the income level of citizens/consumers do not greatly effect the quantity of emergency EMS purchased. Consequently, it is assumed that the price and income elasticities of demand are inelastic; emergency EMS service is considered to be some form of "necessity" item.

TABLE 8: DEMAND AND SUPPLY OF EMS

Demand Factors	Supply Factors
Severity of Accident/Illness	Technology: Dispatching Equipment Medical Equipment Vehicles
Population Size, Age	Community Resources: Labor: Training Availability Financial Capital
Peak Use Periods	Economies of Size
Substitute Availability: CPR	Competing or Complementary Input Uses
Tastes and Preferences: Non-emergency Transport	Weather
Legislated Minimum Level of Care	Population Dispersion
Income	Quality of Roads
Price	

Source: Based, in part, on Navin and Stevens, 1979, p. 7.

For nonemergency services, however, one would expect that increases in the price of nonemergency EMS would have a negative effect on the demand for nonemergency EMS as citizen/consumers substitute to another form of medical care, e.g., home treatment, transport by neighbors. An analogous argument may be made for the effect of income increases on the quantity of nonemergency EMS demanded; increases in citizen/consumer incomes, over time, would bring about increases in the quantity of nonemergency EMS demanded. Hence, the price and income elasticities of nonemergency demand are assumed to be somewhat elastic.

An additional influence on the quantity of EMS demanded is the presence of insurance coverage for citizen/consumers. Possession of health insurance reduces out-of-pocket expenses, increasing the level of real income for citizen/consumers. Consistent with the hypothesis that the income elasticity of demand is elastic for nonemergency EMS, the presence of insurance coverage would cause an increase in the quantity of nonemergency EMS demanded. Verification of these hypotheses requires empirical determination of the price and income elasticities of demand for EMS services.

Empirical information regarding demand for rural EMS is scarce and generally limited to data regarding call volumes and to information regarding illness and accident related injury. However, a cross sectional study on the composition of the demand for EMS was recently completed in Massachusetts (Cadigan and Bugari, 1989). Population size was found to be positively correlated to the quantity of emergency responses and transports. Other variables which were found to be statistically significant were, median income (-), the percent of population living below the poverty level (+), and the percent of population greater than 65 years of age (+).

An individual will need EMS for emergency purpose at least twice in his or her lifetime. A population of 10,000 residents generates one true emergency call per day (U.S. Congress, 1989). Low call volumes to a dispersed population are generally quite prevalent in the rural United States; small rural communities may receive less than one emergency call per day, making it difficult for rural ambulance services to support themselves financially on a fee for service basis and to maintain professional skill levels.

In rural Texas 54 percent of ambulance-transported individuals were age 65 or older and in rural New York, 54 percent transported were age 60 or older (U.S. Congress, 1989). This is consistent with findings in rural Texas that ambulance transported patients are more likely to be suffering from a heart condition or stroke than in urban areas (U.S. Congress, 1989). Injuries occur as or less frequently in rural areas than in urban areas. When injuries do occur, they tend to be more serious in rural areas (U.S. Congress, 1989). Although accidents seem to occur less often in rural areas than urban ones, persons involved in rural accidents are three times more likely to sustain serious or untreatable injuries than those in urban areas (U.S. Congress, 1989).

2.5.1.2 Supply of EMS

The supply of rural EMS is a function of technology, community resources, economies of size, complementary and competing uses of community resources, weather conditions, population dispersion, and road quality. Technological factors include how to detect, report, and respond to medical emergencies in remote areas, how to gain access to the victim, and how to treat and expeditiously transport the patient to an appropriate medical care facility.

Trained labor is a key community resource input to the supply of EMS; there may be shortages of trained personnel for dispatching, administration, and medical

technicians in rural areas. Skill level in rural areas may deteriorate because of low utilization of EMS resources (Poley, 1980). To help defray the cost of EMS, many rural communities use volunteer EMS personnel or assign EMS responsibilities to full time personnel who have other compatible responsibilities, e.g., police dispatchers, fire fighters or police officers. However, these responsibilities may also be competitive, e.g., fire fighting. Hence, economies or diseconomies may occur from joint production of one or more good or service. Availability of capital for replacement of capital equipment is often cited as a financial problem for EMS operators (Myers, 1990; Foulk and Ryan, 1989).

The major factors influencing operating costs, or variable costs, are system size, level of care, and personnel and staffing policies: part-time vs. full time, paid vs. volunteer, length of duty shift, and shift rotation systems. Inclement weather, roads and highways, and widely dispersed populations may cause EMS transport to be quite difficult, thus also effecting the cost of EMS production.

The production of EMS is subject to economies of size. Theoretically, economies of size arise "due to a fact of certain indivisibilities where a certain physical asset must be present if one is to produce at all" (Schmid, 1987, p. 62). Economies of size may be analyzed from a short run perspective and from a long run perspective. In the short run, economies of size may exist due to a large fixed investment, representing a certain production capacity or scale, which is present whether production is zero or greater than zero. As production increases given this fixed capacity, the unit cost of production decreases as fixed costs are spread over a larger quantity of production. Economies of size may also exist in the long run, whereby the scale of the production process is increased by investing in additional fixed inputs to increase production capacity with

some commensurate increase in the variable inputs to the production process. Economies of size are realized in the long run if the production process at the increased scale of production is more efficient (greater output quantity given input quantities) due to a change in the technological relationship of production.

For example, EMS requires high initial capital costs for ambulances, specialized medical equipment, and communications equipment. In the short run, the capacity of EMS operators is fixed given a certain level of fixed inputs: the number of ambulances, specialized medical equipment, and communications equipment. Given this capacity, the average cost per run for an ambulance service may be calculated by dividing the total costs of the operation by the total number of runs for any given year.[16] The higher the costs and/or the lower the number of runs, the higher the unit cost. Rural areas may realize high unit costs due to low call volumes and high operating expenses. By expanding service area to increase call volume, given a certain cost structure, per unit (per call) cost would decrease as fixed costs were spread over a larger number of runs, thereby realizing economies of size in the short run. The marginal cost of production, or the cost of producing one additional unit of output, is less than the average cost of production up to capacity. At some point, however, marginal cost may increase more rapidly than average cost, indicating some level of congestion occurring in the delivery of the service. At capacity, marginal cost is quite large, representing the additional resources necessary to increase the scale of production, e.g., purchasing an additional ambulance.

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[16]In order to discuss the implications of economies of size on EMS production costs, the unit of output for EMS is assumed in chapter one to be call volume, i.e., the number of ambulance runs. Further discussion regarding the implications of utilizing alternative units of output is discussed in chapter three.

In the long run, the capacity of EMS to respond to increases in demand is discontinuous. For example, a small community with a two-ambulance system, operating at or near capacity, cannot meet a 20 percent increase in demand with a 20 percent increase in capacity. Purchasing a new ambulance and adequately staffing that ambulance requires a 50 percent increase in capacity (U.S. Congress, 1989). A new ambulance may cost between $30,000 and $50,000 depending on the model and type.[17] By increasing the scale of production, economies of size may occur due to the larger scale of operation. For example, billing processes may be more efficiently produced for a larger scale and quantity of production.

Empirical studies regarding the supply of ambulance operations generally focus on the composition of the cost structure of EMS, however; few of these studies are current.[18] Cost studies which explore the current structure of costs for EMS delivery, given extensive industry changes, are relatively few. The most major piece of work completed with respect to the delivery of rural EMS (U.S. Congress, 1989) has little information with respect to the cost of EMS operations. The American Ambulance Association recently completed a national survey of ambulance operators to determine the historical cost structure for ambulance service provision (Myers, 1990). Initial results show that wages account for 50 to 60 percent of the total budget for ambulance

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[17]In 1990, a type II ambulance cost $30,000 to $35,000 to replace. A type III ambulance cost $50,000 to $60,000 to replace. A type II ambulance has a van chassis. When replacement is necessary, the entire vehicle must be purchased. A type III has a modular box chassis. When replacement is necessary, the "box", containing all the medical equipment may be removed from the automobile chassis allowing replacement of only the chassis.

[18]See, for example, Navin and Stevens, 1979, "Estimating the Cost of Small Scale Ambulance Operations," Michigan State University Department of Agricultural Economics Staff Report 354, for a survey of a number of these studies.

operations and that EMS wages have risen an average of 37.7 percent between 1983 and 1989.

2.5.2 Public Choice Issues in Rural EMS Delivery

The delivery of EMS involves public choice regarding key components of the EMS system. Public choice is driven by political and economic factors within EMS and institutions and individuals involved in the EMS system, including state regulatory institutions, medical personnel, local government officials, EMS producers, and/or citizen/consumers. The interactions of these individual and group decisions determine the EMS system structure and the performance of that system. There are no generally accepted standards for the components of an EMS system and variability characterizes EMS systems within and between states (Werner and Smith, 1988). For example, per capita expenditures for EMS ranges from a low of $.02 in Ohio to a high of $14.00 in Hawaii (U.S. Congress, 1989). Important public choice issues in EMS delivery include: access, level of care, response time, transportation, control level and responsibilities, organizational arrangement, and finance and are summarized in Table 9.

2.5.2.1 Access

Public access to the EMS system is a critical component in the delivery of EMS services. In order for EMS to be delivered, an adequate and effective communications system must be in place to request and dispatch EMS personnel. This system may be a centralized 911 emergency communications network or a simple phone exchange. Many rural areas lack centralized dispatch and may have antiquated communications equipment in need of replacement. Some communities have multiple EMS phone numbers and confusion over what number to call may cause response delays. Dispatchers, from either 911 systems or decentralized systems, must be trained in

TABLE 9: PUBLIC CHOICE ISSUES IN EMS DELIVERY

Issues	Decision Components
Public Access	Dispatching Organization and Protocol Dispatching Equipment
Level of Care	Level of Training for Personnel State Licensure Ambulance and Medical Equipment
Response Time	Minimum Acceptable Level Emergency Non-emergency
Transportation	Non-emergency Transport
Control	Oversight Responsibilities for System Participants
Organization	Provision and Production Level: County, Regional, City, Township, Other Type: Public, Private Joint For-Profit Not-for-Profit
Finance	Distributional Consequences of Funding Structure Type: Service Fees General Fund Expenditure Special Milage Donations Etc.

emergency care and dispatching protocols in order to effectively identify emergency situations, advise callers, as well as dispatch the appropriate emergency response.

2.5.2.2 Level of Care

A primary decision is the level of EMS care to be provided at the site of illness or accident. This in turn requires a decision regarding the level of emergency medical training to be given the individual care providers. Federally, there are two broad distinctions in care, First Responders and Emergency Medical Technicians (EMTs). First Responders are trained to provide initial care for patients suffering injury or sudden illness until trained EMTs arrive. These First Responders assess patients and provide basic life support that is necessary to prevent medical and injury-related problems from becoming a threat to survival (U.S. Congress, 1989). Emergency Medical Technicians provide emergency medical care, and stabilize and transport patients to a hospital. In Michigan there are currently three levels of EMTs -- EMT-Basic, EMT-Specialist, and EMT-Paramedic -- corresponding to three levels of regional EMS care: Basic Life Support, Limited Advanced Life Support, and Advanced Life Support. Each level can provide increasingly sophisticated forms of medical care treatment. As operations move to increasingly more sophisticated levels of care, the medical equipment and training required to support the level of care becomes more complex and costly.

2.5.2.3 Response time

For a person whose heart has stopped pumping, the rule of thumb states that brain cell deterioration begins in about four minutes. Such short time allowances, further reduced by the time lapse between point of identified need and EMS attention, impose heavy requirements on EMS staffing and stationing. In effect, persons situated more than a certain number of miles away from ambulance stations are subject to the

unavoidable risk that response times would be insufficient should certain types of emergencies occur. Some EMS systems have attempted to minimize this risk by mapping the peak geographic areas and time periods for EMS demand and rotating ambulance positions based on this information. Use of data of this sort requires maintaining an accurate and relatively sophisticated record keeping system.

For motor vehicle fatalities, the average response time for rural areas is 11 minutes as compared to 6 in urban areas (U.S. Congress, 1989). Some communities have conducted massive, CPR education programs to supplement the EMS system. Others have trained all fire and police personnel at the First Responder level.

2.5.2.4 Transportation

By law, an EMS operator must service an emergency request. However, an EMS operator is not legally required to service nonemergency transfer requests, e.g., a transfer between a nursing home and a hospital. Choices regarding whether or not EMS operators will service nonemergency requests must be made and may have implications for the profitability of an EMS operator.

2.5.2.5 Control Level and Responsibilities

Control over the EMS system may rest in federal and state health planning agencies and communications agencies, regional medical control authorities, local governments, local medical personnel, local leaders (particularly those who hold dual roles as EMS volunteers) and citizen/consumers. The power to influence planning, development, and operation of EMS rests in both the legal authorities governing EMS as well as the local values regarding EMS. Lack of clarity of responsibility over EMS may result in poor oversight and difficulty in system planning and performance.

2.5.2.6 Organizational Arrangement

A number of organizational arrangements may be used to administer the provision and production functions of EMS. For example, EMS may be provided by firms/organizations whose boundary (service area) is county-, regional-, city-, or township-wide, within a competitive or monopolistic market structure. EMS may be produced by a fire department, a police department, a private ambulance service, or a combined public safety department at any one of these provision levels. The variation in the types and organizations of EMS are products of public choice -- a creative decision-making process through time in which economic, technological, and political factors interact.

EMS provision functions include determining the appropriate volume and quality of service to be produced, and arranging for the method of finance, oversight mechanism, and method of production. Production is the actual operating of an ambulance service. The provision/production distinction derives from the work on public economies of Bish (1971); Ostrom, Bish, and Ostrom (1988); and Oakerson (1987). These scholars examine local service delivery -- e.g., fire protection, waste disposal, education -- from a public choice perspective. Public choice analysts posit that examination of the interaction of the institutional rules which comprise organizational arrangements, the nature of the service produced, and the nature of community actors explain the performance consequences of a political economic system.

EMS production and provision activities are performed by a variety of community actors. These activities must be coordinated in order to deliver the service to the citizen/consumer. Decomposition of these activities illuminates and isolates for empirical analysis, the functional relationships among EMS system participants. The

theoretical distinction between provision and production activities allows decomposition of the complexities inherent within the EMS system. As well, it provides an analytical perspective from which performance tradeoffs may be understood.

Theoretically, multiple local governments, existing within a given geographic region, may be viewed as a local public economy, organized on a provision/production level and on a governance level. First, organizational units within a local public economy provide and produce goods and services for citizen/consumers participating in the economy; second, the provision and production activities occurring within the local public economy are politically governed by rules and regulations. Provision activities are collective choices that determine what goods and services to provide; what private activities to regulate and how to regulate them; how much revenue to raise and the mechanisms to raise it, the quantity and quality standards of goods and services to be provided; and how to arrange for the production of those goods and services (Oakerson, 1987). In contrast, production activities transform inputs into outputs; they are represented by the physical production function and may be, but are not necessarily, organizationally separated from provision activities. Different organizations and levels of organizations may administer provision and production functions.

An example may help to explain the different functions of provision and production organizational arrangements. The organizations which administer provisional activities are reviewed first. Pioneer EMS is a public EMS organization serving Williams County, Ohio. Provisional activities occur on a countywide basis within two organizations, the Williams County board of commissioners and Pioneer EMS, an administrative department within the administrative branch of Williams County government. The boundaries of the organization are coterminous with the political

boundaries of Williams County. Revenue for the EMS service is raised via millage and fees for service. Definition of the quantity of EMS service to produce is delegated from the county to the director of Pioneer EMS. Quality standards are defined by the state of Ohio.

Production decisions are made by the director of Pioneer EMS and the employees of Pioneer EMS. Dispatching originates from the central dispatch of the Williams County Sheriff Department. Ambulances and personnel are located and shared with fire departments situated in certain areas in Williams County, thus, actual production transformation activities occur via joint fire/ambulance organizations.

The decomposition illuminates the linkages where EMS activities must be coordinated, e.g., among Williams County commissioners, between commissioners and Pioneer EMS, between Pioneer EMS and Williams County Sheriff Department. The analyst may choose, for example, to examine these linkages and their effect on system performance or to examine the institutional rules which comprise these organizations and functional activities and the rules' effect on system performance.

2.5.2.7 Finance

EMS may be financed by a number of methods, e.g., donations, service fees, taxes, or some combination of them. Who should pay for ambulance services: service users, local governments, and/or the general taxpayer? The quantity of revenue derived from fees for service is a function of the number of calls answered and the number of patients transported. Increasingly a large proportion of calls are likely to be covered by third party reimbursement programs (insurance carriers) and the proportion of uncollectibles should influence the decision as to whether to charge for a service with a fee or to support the service via taxes or some combination of the two. Examination of

the transactions costs of collecting fees must be weighed against the revenues from fees received. There may be increased pressure on governments to assist EMS operators if uncollectible rates are high and call volumes are relatively constant, thereby keeping per unit revenues at levels which may not support per unit costs. Prior to any action by local governments, the reasons why uncollectible rates are high must be understood: poverty conditions, poor collection procedures, and/or citizen/consumer attitudes.

EMS operators must service a large enough area of population, billed on a fee for service basis, to generate sufficient revenue to support operations. In areas were it is difficult for ambulance operators to support EMS on a fee for service basis and at the given level of care desired, local governments may choose to compensate the operator in some way if these governments perceive a need to assure some level of available EMS for their citizens. Thus EMS is not strictly a "private" or "public" service, rather it might be viewed as a community service sometimes financially subsidized with government funds and subsidized in-kind through community volunteer labor.

2.6 Summary

Determining the nature of community pre-hospital EMS is a task far more complex than responding call-by-call when help is critically needed, particularly in rural areas. Community and governmental leaders are faced with policy decisions regarding how to allocate scarce resources to the provision and production of EMS within a complex, interdependent, and often uncertain environment. Decisions with respect to the degree and nature of public access to EMS, the level of medical care provided by EMS operators, response time requirements, transportation policies, levels of control for EMS, organizational arrangements for provision and production of EMS, and financing

methods by a variety of EMS system actors collectively form the structure, conduct, and performance of the EMS delivery system. These actors face numerous constraints in the delivery of EMS to persons in sparsely populated areas, e.g., antiquated communications equipment, low demand for EMS relative to a given fixed capacity, or the desire for local autonomy in EMS delivery. The inherent characteristics of the demand and supply of EMS delivery combined with rapidly increasing health care costs and tightening fiscal conditions for local governments have made these constraints more acute in recent years.

We now have an understanding of the nature of the supply and demand of rural EMS, the resulting public policy considerations in EMS delivery, and the concerns of local governmental actors and ambulance producers associated with one rural EMS system in Michigan. The proposed research would provide an opportunity to explore the interactions of these economic and political forces.

The proposed research is guided by the expressed concerns and needs of Hillsdale County local governmental leaders and EMS operators. It would thus primarily focus on cost issues in EMS delivery, the financial viability of alternative organizational arrangements for EMS delivery, and alternative financing methods for EMS arrangements. However, EMS system actors must understand a broad set of performance tradeoffs in order to make informed decisions with respect to EMS delivery. Consequently, the research would examine the distributional consequences, as well as other complementary performance effects, of the current EMS delivery system as well as for alternative institutional rules to be proposed for improved performance.

2.6.1 Objectives

The objectives of the research would be as follows:

1. To develop a theoretical framework to analyze the political economy of rural EMS delivery.

2. To investigate what role, if any, local government has in the system of EMS delivery.

3. To analyze the structure, conduct, and performance of rural EMS delivery in Hillsdale County to determine the facilitating and constraining factors influencing the performance of the EMS system, in light of the inherent characteristics of the supply and demand of EMS and the public choice issues arising from the interaction of supply and demand;

> 3a. to investigate the nature of the market for EMS delivery in Hillsdale County by exploring the revenue and cost patterns, the financing methods, the implications of economies of size in EMS delivery, and the institutional characteristics of the ambulance operators serving Hillsdale County; and
>
> 3b. to identify a set of economic and institutional indicators to assess the performance of EMS delivery in Hillsdale County, thus potentially increasing the level of information available to policy makers.

4. To investigate alternative institutional arrangements for the delivery of ambulance services which may influence performance for a given public cost;

> 4a. to explore and appraise alternative provision and production organizational arrangements and their performance, e.g., public, private for-profit, private not-for-profit production;
>
> 4b. to explore and appraise alternative pricing structures and their potential performance, e.g., pricing standardization based on geographic area; and
>
> 4c. to explore and appraise alternative financing structures and their performance, e.g., service fees, specialized taxing, general fund expenditure, private donations.

CHAPTER THREE

AN ANALYTICAL FRAMEWORK FOR RESEARCH

3.1 Introduction to the Analytical Framework

To inform policy makers of the consequences of EMS institutional arrangements, the distribution of property rights among Hillsdale county EMS actors must be illuminated. An analytical framework to achieve this task is developed in this chapter. A political economy perspective which utilizes situation, structure, conduct, and performance variables forms the foundation of this analytical framework.

3.1.1 Political Economy, Scarcity, and Interdependence

What is the political economy of a system? Schmid and Shaffer (1972, p. 6) describe the political economy of a community as

> STRUCTURE ... all of the predetermined characteristics of the [system] ... which constrain the [actors'] choices.
>
> CONDUCT ... all of the choices, decisions, or strategies that the [actors] adopt within the opportunity set established by the structure.
>
> PERFORMANCE ... all of the consequences of the [actors'] choices which are the payoffs to the [actors in the system]. Performance is the matrix of benefits and costs resulting from the [system].

These three categories, along with the additional category, situation, serve to decompose and order the interdependencies and complexities of the political economy of EMS delivery in Hillsdale County.

Application of this model of institutional analysis to the system of EMS delivery in Hillsdale County functions as an impact analysis of alternative institutional arrangements in EMS delivery. Impact analysis assumes the nature of the good or service under study, i.e., situation, is constant within the research study period. The characteristics of goods, and the attributes of the community of interest and individual comprise the situational features of the system under study. These characteristics and attributes are observed to be inherent to the good in question and given within the time under study. Situational features summarize the nature of the interdependencies among the system actors. The analyst examines the given system structure (institutional arrangements) which shapes actor incentives and the perceived consequences of actor decisions. Conduct examines how the actors respond behaviorally to the given or changed incentive structure. The researcher then hypothesizes and empirically observes the collective consequences of actor conduct on the benefits and costs (performance) to the system under study. Performance may imply a change in the structure and situation of a system in the long run.

Scarcity begets interdependence. Within a community, when interests conflict over the allocation of scarce resources, the interdependence among community actors becomes apparent. One aspect of the policy situation in Hillsdale County appears to be a conflict over who should bear the cost of EMS production within the county and how those costs should be apportioned. Underlying this conflict is a scarcity of financial capital, and perhaps a scarcity of EMS management expertise on a county and/or operational level. Property rights, or institutions, are how society orders these interdependencies and resulting potential conflicts, and resolves distributional questions. The existing institutional rules regarding the apportionment of the cost of EMS

production include the contract stipulations between Hillsdale County and the EMS operators, insurance reimbursement arrangements, EMS operator pricing arrangements, EMS operator funding arrangements, and service area boundary definitions. These institutional arrangements shape Hillsdale County EMS actors' exposure to the conflicting interests of others.

In ordering relationships, institutions govern access to and use of power, i.e., the ability of an individual actor or group of actors to participate in decisions and implement one's own interests when they conflict with those of others. When this occurs, costs are created for others. These costs may be foregone opportunities, pecuniary costs, or unmet preferences in performance goals. Collective decisions regarding the performance of one public choice component of EMS -- for example, the degree of, technological components of, and organizational arrangement for public access -- may imply performance tradeoffs with respect to other public choice components -- for example, response time. When interests do conflict, and interests go unmet, externalities are created. Externalities may be shifted between actors within a community by changes in the existing set of property rights, but never eliminated. Property rights determine whose preferences count in determining performance outcomes. No institution is optimal for performing economic activities for everyone. Rather, alternative institutions govern resource control and thus the distribution of resources among actors (Schmid, 1987). These themes of interdependence, institutions, and "external" costs form the foundations of the Situation-Structure-Conduct-Performance framework used in this research.

3.1.2 Transactions as the Unit of Analysis

The unit of analysis is the transaction between or among actors in the delivery of EMS in Hillsdale County. For example, the exchange relationship between Hillsdale County government and EMS producers, the exchange relationship between EMS producers and citizen/consumers, and the series of transactions linking EMS provision and production functions are examined to understand the performance of the EMS market. The interdependencies between the service component examined, the structural rules governing transactional relationships, and thus actor incentives and conduct, shape the final market performance consequences. The researcher traces both the reasons why the system works as it does, i.e., performance, and, examines alternative institutional arrangements and their effect on the performance of the EMS system. These institutional arrangements may be internal or external to the production units themselves or they may be between provision and production units.

In chapter two, the demand for EMS was discussed from the perspective of the demand for EMS by citizen/consumers. By opening the analysis up to a political-economic perspective and examining transactional relationships, another demand relationship emerges: the demand for EMS by Hillsdale County local officials. It is this demand and supply relationship which drove the initiation of the research. County government asked for the answers to the following basic questions: "How 'much' EMS are we getting for our money? Is the EMS system serving Hillsdale County organized to minimize costs to us given the implications for response time requirements, quality of care, and other performance objectives? What are those other performance objectives?"

In examining the answers to these questions, the researcher must identify a set of economic and institutional performance criteria to assess the performance of the EMS

system. This information provides baseline data to Hillsdale County to assess the current price of EMS to Hillsdale County and its relation to the quantity of EMS provided by EMS producers. This type of research could provide baseline information regarding existing production cost structures as well as hypothesizes least-cost combinations of inputs per given capacity for EMS organizational forms. Examining the individual cost structures of varied organizational arrangements might provide a summary of the tradeoffs in input combination choices that the individual firms have made. The research could thus examine, in part, the implications for gaining economies of size in EMS production. Neo-classical cost definitions and theoretical cost relationships could be applied to the EMS market in Hillsdale County to study this component of the analysis. This cost analysis would then set the stage for a closer examination of the institutional (transactional) relationship between Hillsdale County government and EMS producers from a broader political-economic perspective.[19]

The balance of chapter three is devoted to further development and specification of the political economic analytical framework. Prior to describing the framework, however, some of the empirical work studying alternative arrangements for local service provision and production are surveyed in order to cull those techniques and findings relevant to studying alternative institutional arrangements for rural EMS delivery.

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[19]For discussion of the complementarily between production cost analyses and institutional analyses in understanding the performance implications of alternative modes of organization, see, for example, Williamson (1985).

3.2 Empirical Studies: The Provision and Production of Local Goods and Services

The review of empirical studies of the provision and production of local goods and services focuses on two study areas: one, the frequency of alternative provision/production arrangements and two, the structure, conduct, and performance of alternative provision/production arrangements. Much of the research reviewed arises out of two related debates in the academic literature: privatization of public services[20] and the efficiency of "consolidated" versus "fragmented" forms of government[21]. These arguments are not directly addressed in this research. While the proposed research does not examine whether private or public is better, some of the implications of these two alternative organizational forms may be useful to the development of the framework.

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[20]Much of the support for privatization is based on the premise that many services provided and produced by government are subject to economies of size (see, for example, Fox, 1980). The optimal scale (maximum per unit cost savings) of the service may be equal to the size of the market, in effect, creating a monopoly situation. Niskanen suggests that "government organizations operating under monopoly conditions have little incentive to innovate or reduce costs" (1975, p. 620). Proponents of privatization emphasize that the private sector is inherently more efficient than the public sector because it allows increased competition and reduces governmental bureaucracy and red tape (Morgan and England, 1988) which assumes there are no bureaucratic activities within private firms.

[21] There appear to be two schools of thought regarding the optimum size of government. Reformists suggest that multiple governments lead to confusion in responsibility for services, reduced political accountability, duplication of effort, inefficiency in production and higher expenditures (Chicione and Walzer, 1985). Advocates of this view promote consolidation activities or metropolitan forms of government as a means to overcome these problems. What is sometimes called the public choice perspective argues with the reformists that multiple, often overlapping units of government best serve citizen preferences by providing "more opportunity for residents to select a desired combination of services at the tax price they are willing to pay" (Chicione and Walzer, 1985, p. 25). Competition among governments encourages efficiency and responsiveness to citizen demands.

It is suggested that private supply will lead to lower government costs because of competition for government contracts, a substitution of the profit maximization motive for the budget maximization motive, realization of economies of size, reduced personnel costs and increased flexibility in the use of personnel and equipment. Proponents of this view encourage "contracting out," i.e., purchasing goods and services from either private organizations or other governmental units; load shedding, i.e., decreasing the demand for services; or increased use of vouchers (Valente and Manchester, 1984).

Critics of the privatization perspective point out some weaknesses in the privatization arguments. Privatization, particularly contracting out, may be a source of corruption or graft in government. Local officials may find it difficult to hold private suppliers accountable for performance, the political and legal responsibilities of government might be difficult to enforce, the overlapping of responsibilities and the coordination of activities by government may cause duplication and confusion for citizens evaluating the performance of such services, and contracting and vouchers may help to limit governmental personnel expansion but taxes may still increase through subsidization of private suppliers (Morgan and England, 1988). The distributional consequences of certain privatization initiatives are also questioned. For example, user fees may adversely effect the poor while benefitting the more wealthy. The reliance on competition in contracting relationships is extremely important to obtain the advantages of "contracting out," whether it is competition in the public or private economy.[22]

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[22]Williamson (1985, p. 61) points out that competition for contracts at the initial bidding stage does not necessarily imply competition when contracts are re-bid. He posits that ex post competitive contract bidding will be difficult to achieve if there are investments in durable specific assets for the production of the good or service under contract, even if a condition of a large number of bidders existed at the original bidding stage. He states (p. 61) "once substantial investments in transaction-specific assets are put in place [,] winners ... enjoy advantages over nonwinners" whereby significant losses in economic value would be

3.2.1 The Frequency of Alternative Provision and Production Arrangements

In 1982, the International City Management Association surveyed 4,700 local governments regarding what services they provide and how they are provided. Fifty six percent of those responding that they provided some form of EMS indicated that EMS was provided and produced through solely public means; 18 percent used public employees and contracted out facilities; and 26 percent were contracted out to other providers and producers. Of those who fully contracted out, 45 percent contracted with another government, 37 percent with a for-profit organization, and 28 percent contracted with a not-for-profit organization (Ferris and Grady, 1986).

Ferris and Grady (1986) modeled the decision to contract out by local governments by defining a two-stage decision model: stage one, defined as the "yes-no" decision to contract out and stage two, defined as the decision regarding with whom to contact out. For EMS and ambulance services, they suggest that the decision to contract out is based on considerations regarding utilization of capacity (unutilized capacity may exist due to capacities developed to serve peak-demand periods), the ease in defining the output from the service, and the availability of alternative suppliers. They predict that EMS and ambulance services provided by local governments will be contracted out to a larger degree than, for example, fire and police protection services. Their results indicate that contracting occurs more frequently for these services than for police and fire protection. However, Ferris and Grady did not empirically investigate the posited reasons why this pattern occurred.

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incurred by changing suppliers at the re-bidding stage. A "fundamental transformation" occurs altering the original multilateral contracting relationship into a relationship of bilateral supply after the initial contract is awarded.

The ACIR (1985) surveyed over 4,000 cities and counties to determine the prevalence of contracting with the private sector and other governmental organizations. Of the 2,089 who responded to the survey, 52 percent indicated that they had some form of intergovernmental service contract of which 26 percent were entered into to address citizen health and welfare concerns. From the data available, not all local governments perceive that the provision of EMS services is within their domain. Additionally, no one organizational form of delivery of EMS is prevalent; purely public, joint public-private ventures, and contracting out with both public and private suppliers exist.

3.2.2 Structure, Conduct, and Performance of Alternative Provision and Production Arrangements

Modified structure, conduct, performance studies include analyses of the performance of alternative provision and production structures. The most common performance criteria used is the relative efficiency of alternative delivery mechanisms as measured by a per capita costs indicator. Limited evidence shows that delivery via a contracting arrangement with the private sector or with other governmental units is at least as less costly than in-house delivery of services for fire protection (Ahlbrandt 1973, Harvey, 1978); airlines (Davis, 1971); and refuse collection (Savas, 1976).

The public versus private distinction as alternative organizational arrangements does not fully illuminate the true nature of the institutional arrangements which comprise these organizations. Organizations are composed of alternative institutional rules. One must determine which rules within these organizations are significant for performance and whether these rules vary across organizational type to determine if there is a difference in the performance of the organizations. Without understanding which institutional rules are being examined or compared, only limited conclusions and comparative implications may be drawn from the empirical work cited.

Ostrom, Bish, and Ostrom (1987) report findings of "industry" analyses of fire protection, police protection, refuse collection, and education in an effort to illustrate the efficiency of fragmented and overlapping forms of government. They found that there was no duplication of effort in direct police services in over 50 percent of the areas studied. For police protection, they concluded that higher multiplicity of governments and autonomy in service delivery achieved higher technical efficiency than consolidated forms of government.

Perhaps most relevant is the approach which Ostrom, Bish, and Ostrom (1988. pp. 128-134) used to analyze the systems of public sector service provision. They define a number of structural variables to describe public economies: fragmentation, multiplicity, independence, dominance, alternation, coordination, and duplication. All the terms are defined for a given geographic area or market. Fragmentation is defined as the number of local governmental units acting as providers of a specific good or service. "Multiplicity is defined as the number of producers of a particular service in [a given area]" (Ostrom, Bish, and Ostrom, 1988, p. 129). Independence within a given geographic area is the fraction of local governmental units receiving the good or service from their own producer. Dominance is the proportion of the geographic area by population receiving service from the dominant producer of the good or service. The dominant producer is defined as the producer serving the largest population on a regular basis. "Alternation occurs when two or more [local governmental units] are served by more than one producer, but the multiple producers distinctly divide responsibilities using spatial or temporal criteria. Coordination of service [or good] delivery is a type of relationship in which two or more producers plan and execute service [or good production] activities together for a single [local unit of government] (op cit, p. 132)."

Duplication is the fraction of governmental units within the given geographic area which are served by multiple producers that do not alternate or coordinate in the production of the good or service. These structural variables aid in (1) decomposing the complexity of organizational forms producing a good or service within a geographic area, (2) defining an indicator (dominance) of relative market power and perhaps, relative power in decision making, and (3) identification of variations in structural characteristics with which a comparative empirical analysis may be made with respect to identified performance criteria.

3.2.3 Summary

In sum, it appears that no one form of organizational arrangements predominates in the delivery of EMS. Empirical analysis of the performance of alternative organizational arrangements for local service delivery seem to be compared across organizations which are composed of a number of structural institutions. Which of these structural rules then influenced the performance observed by the researchers? The researcher must carefully uncover and define these alternative structural rules within, and across, organizations to investigate the implications of alternative rules on performance.

3.3 Analytical Framework

3.3.1 Model Conditions

Prior to describing the components of the analytical framework, a number of assumptions regarding the boundaries of the model and the system under analysis must be outlined. EMS delivery would be explored on a local level only. Local is defined for

this analysis as activities occurring within the political jurisdictions of a county, city, village, or township. State and federal institutional arrangements would not be assessed.

The technology of EMS supply is assumed to be given, i.e., the technology influencing the technical communications and medical equipment is constant. Weather, quality of roads, and the level of community resources committed to EMS production are assumed to be constant The level of care, as defined through the laws of the State of Michigan, is assumed to remain constant throughout the analysis. As well, the federal and state laws governing the supply of EMS are assumed to be given.

Demand is assumed to be price inelastic in the short run. Other factors influencing the demand for EMS as discussed in chapter two, e.g., demographic composition of population, the severity of illnesses/accidents, population age, peak use patterns, substitute availability, tastes and preferences by citizen/consumers, and legislated minimum levels of care are assumed to be exogenous to the model.

As stated earlier, the research would attempt to inform policy making in EMS delivery and in part, would focus on policy making by local governmental officials. Within a single unit of government, local officials act as agents of citizens and thus as a collective voice articulating constituency demands in arranging institutions to meet citizen demands. The factors which influence the negotiation of choices within local governments would not be the primary focus of the research and are assumed to be given. Local officials also make collective choices between alternative constituency demands and alternative institutions to accommodate those demands. The aggregated consequences of local officials' decisions as members of the local public economy produce a collective choice about a plan for future action. The proposed research assumes that constituency demand is given; and the composition of constituency

demands being met by local government action is given. Thus, the focus is on alternative institutions to meet a given public demand for EMS, rather than alternative consumer/citizen demands.

3.3.2 Situational Features

Situational features summarize the classes of interdependencies among actors within a community of interest. They include (1) the characteristics of goods, (2) the attributes of communities, and (3) the attributes of individuals. The following section outlines these situational categories, describing those subcategories within each category which are relevant.

3.3.2.1 Goods

Goods are products, which may or may not be physically tangible, which have economic utility for individuals. For example, the delivery of EMS is a good, as is energy conservation or a baseball field. Most goods are multidimensional in nature. It is these dimensions which give rise to interdependencies. Different dimensions, or characteristics, may be more or less relevant to different performance consequences given certain structural arrangements. These goods dimensions are assumed to be given. The following characteristics would be examined to determine their relevancy to the delivery of EMS:

1. A good which is **incompatible** is one where use by one actor, during a given time period, precludes use by another. For example, most emergency medical equipment can only serve one patient during each given moment. A victim of a car accident has a right to the medical services until transport to a hospital is complete. Should another accident occur and no other ambulance is available, interests among consumers of EMS

conflict and institutional rules define who "owns" the right to the service during which interval.

2. **Uncertainty** associated with the demand for a good will effect the decision of a firm or organization to produce the good. Demand for emergency EMS is unpredictable. EMS producers must carefully evaluate the decision to produce in an uncertain climate.

3. **Economies of size** are realized as average cost decreases when more units of the good are produced. Often it is realized by spreading the fixed costs of an operation over more consumers or users of a good. A large proportion of the costs of production of EMS, given a certain capacity, are fixed, e.g., salaried labor, capital equipment costs. In order to reduce average costs, it is in the interest of producers to expand production (or service area) in order to realize economies of size.

A change in production capacity in the long run, i.e., the addition of an ambulance, may also bring about realization of economies of size due to a larger scale of production. For example, purchasing larger quantities of supplies may allow for bulk discounts. As well, the unit cost of vehicle maintenance may also be cheaper as more ambulances are serviced. The unit cost of certain inputs to the production process may be cheaper due to increased production capacity due to an increase in the scale of production. Here, size economies may also be realized due to decreases in per unit costs. However, there may be tradeoffs to increased capacity. For example, EMS management may serve a larger production capacity less efficiently than a smaller capacity.

4. **Transactions costs** are those costs incurred by reaching agreement with another actor (contractual), by obtaining information concerning price and quality

(information), and by detecting users of a good (policing) (Schmid, 1987). The relative magnitude of these costs and the distribution of transactions costs influences the distribution of costs and benefits among participants in a community of interest.

3.3.2.2 Community

The community of interest (Oakerson, 1987, Shaffer and Schmid, 1972) include all economically relevant actors who are directly or indirectly affected by the delivery of EMS in Hillsdale County on a local level. Key in analyzing the attributes of the community which are relevant to the analysis is identifying those groups of individuals affected by the policy situation and the relative size and power of the groups. The groups of interest to the analysis are Hillsdale County commissioners, EMS producers serving Hillsdale County, other local governments within the County, the local medical control authority, and citizens/consumers. As appropriate, the involvement of state and federal regulatory agencies -- for instance, Medicare or the Michigan Department of Emergency Medical Services -- would be brought into the analysis.

The level of common understanding among groups in a system and the homogeneity of preferences are additional key attributes of community. It is assumed that consumer/citizens residing in smaller units of geographical area have more homogeneous preferences than those residing in larger areas, e.g., townships versus counties. The level of common understanding influences the strategies undertaken by the participants and thus the conduct occurring with a system of EMS delivery. The frequency of transactions among participants and thus, the opportunities for communication among actors influences the level of common understanding.

3.3.2.3 Individuals

The capabilities and motives of the individual participants involved in the system of EMS delivery are assumed as given in this analytical framework. Individuals are assumed to possess incomplete information regarding the delivery of EMS in Hillsdale County. These limits on information combined with limitation on time and the individual processing capabilities cause individuals to act in a satisficing manner, perhaps employing incremental changes and/or standard operating procedures to reduce uncertainty and risk (Simon).

Individuals may possess multiple, and perhaps, conflicting goals regarding a system. For example, EMS producers may seek to minimize costs as well as maximize their budget for county subsidies. Local officials, acting as elected officials and bureaucrats, may seek to maximize votes and budgets (Bartlett, 1973).

3.3.3 Structural Rules

Structural rules are property rights alternatives, or institutions, which determine whose interests count in the control of resources. They may be formal or informal. The given set of structural rules impacting a system determines who has the opportunity to participate in a decision situation. Personal and collective choice determines any given set of structural rules. Different structural rules may be more or less relevant to the performance consequences of a system given the characteristics of the good, and the attributes of the individuals in the community of interest and of the community itself. Thus, besides those structural institutions which were defined to be given for the entire analysis, certain other institutions become given when analyzing alternative rules for influencing performance. Public choice issues of particular importance to community leaders in Hillsdale County are the financing of EMS, organizational arrangements for

EMS, clarifying levels of control and responsibilities for oversight, and the costs of EMS production. Alternative institutional arrangements for financing, pricing, organization, and control imply tradeoffs in the allocation of scarce resources in the community, e.g., labor and capital, and thus tradeoffs in performance consequences, including production costs. The following structural rules for EMS delivery would be examined for their implications in influencing the performance.

1. The mechanisms used to finance EMS influence how the costs of production are born by various participants in the EMS community. County subsidies, fees for services, membership programs all have different implications for the distribution of costs among citizen/consumers and other participants.

2. Under conditions of economies of size, pricing rules also affect how the costs of production are distributed among users and the relative magnitude of that proportion. Thus, the existence and mechanisms of price differentiation activities by EMS producers is explored.

3. The rules which define the boundaries of the service areas for the EMS producers, the jurisdictional boundaries of governmental units supporting EMS, and the interaction between the two, affect the distribution of benefits and costs within the EMS system. Boundary rules also have implications for the structure of the EMS market. For instance, overlapping service areas may imply a competitive market structure whereas mutually exclusive ones may imply an oligopolistic market. As well, the size of the service area, or market for consumption, may critically affect the financial sustainability of an EMS producer if supported on a fee for service basis.

4. The structure of the market for EMS may influence the degree of power in decision making within the system. In markets where there are few producers, strategic

bargaining and/or cooperative behavior influence the final performance consequences of the system. Ostrom, Bish, and Ostrom (1987) use a dominance indicator to describe the market power for local service delivery.

5. The organization of production and the organization of provision have potential implications regarding the distribution of system costs and benefits. Within any given production arrangement, e.g., a private firm producing joint products of funeral home services and EMS, there are a number of institutional rules which order the production of these services. These rules may or may not vary across production and provision organizations.

As stated earlier, using composite organizational types for comparison purposes is less precise than decomposing these organizations into sets of institutional rules. However, in addressing possible changes in organizational structures for EMS delivery, local community and governmental leaders may find it more useful to use these organizational types rather than specific institutional rules. When comparing across organizational types, particular attention must be paid to determining which rules are significant in influencing performance, particularly in terms of the variation between transaction types -- bargained, administrative, or status-grant.

A bargained exchange is a transfer of rights between actors generally described in terms of price. Mutual coercion occurs. An administrative transaction is a transfer of rights from a superior to an inferior. No exchange occurs but one-way coercion does. Status and grant transactions are defined by social rules or by custom. No exchange or overt coercion occurs (Schmid, 1987).

Another example of variation in organization is whether the production of EMS is arranged jointly with another good. Joint production arrangements may allow for

realization of economies or diseconomies of scope, thereby influencing production costs and the distribution of costs among system participants.

3.3.4 Conduct

Conduct links structure and performance. It summarizes the actual behavior of the actors within the community of interest. The perceived distribution of costs and benefits contain the incentives for behavior. The array of choices available is influenced by the complexity of the system, the repetitiveness of transactions, the degree of certainty within the system, and how participants value the outcomes of their actions. The aggregated set of choices and actions by system decision makers is the conduct of the system.

3.3.5 Performance

The performance of a political economic system is "the flow of consequences from a particular structure, given the conduct of participants in a system" (Shaffer and Schmid, 1972, p. 19). There may be a multitude of consequences of any given system. The performance of a system is measured by a set of indicators. These indicators attempt to measure how well the system meets the goals as identified by EMS decision makers. The performance measures were chosen based on two criteria. First, measures were chosen based on what was identified as important by local EMS decision makers, local officials and EMS producers. Second, those measures which illuminate the tradeoffs associated with some of the public choice issues as identified in chapter two

were also chosen. The categories of performance[23] are outlined in the following section.

1. Production costs. The cost structure serves as an indicator of the distribution of financial costs and benefits among participants in the EMS system. It does not serve as an indicator of the relative efficiency of alternative organizational arrangements. Efficiency relates to the cost per unit of output of the service produced. Measurement of service levels is difficult in EMS delivery. The number of runs of an ambulance operation during a given time period does not illuminate the quality of the care being provided or the relative difficulty of tasks performed in the production of the service.

2. Substantive performance. What is the distribution of provision and production costs among the actors in the EMS system? What is the relative magnitude of these costs? What are the externalities associated with EMS and who bears these external costs?

3. Control levels and responsibilities. How are the levels of control for EMS defined? What are the responsibilities for each level of control? What mechanisms exist for enforcement? How are decision makers as well as producers held accountable for their actions?

4. Fiscal equivalency. What is the match between jurisdictional boundaries and service area definitions? Olson describes the concept of fiscal equivalency as,

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[23] The quality of the medical care delivery by EMS producers is not addressed in this research. While critical to providing a composite picture of the performance of the EMS system, the quality of the EMS care is very difficult to investigate. Quality of care might be measured by reviewing patient records, interviewing emergency room medical staff, or reviewing state EMS licensing records. Confidentiality of medical records and reticence on the part of medical professionals to discuss EMS performance precluded exploration of this performance component. All EMS producers did, however, regularly pass the state licensure inspection. This may indicate that all EMS producers delivered some minimum quality of EMS care.

"individuals and groups get what they pay for and pay for what they get" (ACIR, 1987, p. 8). The greater the disparity between jurisdictional boundaries and the community of interest, the more problematic fiscal equivalency becomes.

5. Response time. What is the response time of the various EMS producers. Response time may be considered an indicator of the technical coordination of the EMS system. Technical coordination may be defined as reaching the victim within a reasonable amount of time given the severity of the situation to administer the appropriate health care services.

6. Community and citizenship. How does the organizational arrangement influence the opportunity for community involvement? Morgan and England (1988) discuss a performance goal for local service delivery as the opportunity for community and citizenship, defined as the degree of coproduction in service production and the degree of community participation in service provision.

3.4 The Role of Hypotheses

The application of the analytical framework proposed in this paper would be an exercise in applied policy analysis; the research questions which it would address are, therefore, initially derived from the identified needs of system actors and policy makers. As stated in chapter two, the proposed research would focus on factors which may be made operational by those involved in the system of EMS delivery in Hillsdale County. Hakim (1987, p. 4) states these variables are "often defined ... from the ground up rather than down from theory" in order to be sensitive to policy makers' needs. A role of hypotheses, within this context, can be to broadly guide the research, providing an overall theme from which the research could evolve. For example, a hypothesis of this nature

regarding EMS might be, "EMS organizational forms of a private nature are more efficient than those organizational forms of a public nature due to increased flexibility in combining inputs and a substitution of the profit maximization motive for the budget maximization motive." In order to test this hypothesis, the research would define and measure the relative efficiency of alternative forms of organization and determine the factors influencing efficiency within these organizational forms to test for causal relationships and plausible rival hypotheses. Implicitly stated by this sort of broad organizing hypothesis is a supposition regarding how delivery systems "ought" to be organized based on efficiency criteria. There is however, an alternative role for hypotheses in policy research which does not prescribe policy solutions based on pre-defined performance criteria. When the purpose of the research addresses a multitude of performance tradeoffs of various policy alternatives, a series of hypotheses drawn from theoretical constructs can provide a road map for the analysis of the impact of alternative institutional forms. Formulating hypotheses in this manner allows for the "analytical generalization" that Yin (1989, pp. 44-45) describes in his text on case study research. "In analytic generalization, the researcher is striving to generalize a particular set of results to some broader theory." The variation in institutional rules in Hillsdale County EMS production provides an opportunity to test a set of theoretical concepts applied to the EMS delivery system by formulating hypotheses and observing performance. Hypotheses might be employed in an additional manner as well; the performance consequences of changes in the existing set of institutional rules governing critical functions of EMS delivery may be hypothesized to illuminate the tradeoffs for institutional change. The research would not utilize hypotheses to direct the cost

analysis component of the research. Rather, as stated earlier, this proposed research component would be driven by EMS policy decision maker needs.

APPENDIX I

Worksheets for Total Costs Per Ambulance Operator

Hillsdale County, Michigan

The annual expenses in the following worksheets are separated into two categories -- fixed and variable costs. Fixed costs are those incurred whether or not the ambulances are sent out on calls. Variable costs are not incurred if the ambulances are not sent out on calls. Distinguishing between the two types of costs highlights the effect of the number of runs per year on the cost of ambulance operations (Navin and Stevens, 1979).

TABLE I-A. ANNUAL COSTS FOR EMERGENCY MEDICAL SERVICES OPERATION
HILLSDALE COUNTY, MICHIGAN

NAME OF OPERATION: Reading Emergency Unit
YEAR: 1989
DATE PREPARED: 5/10/90

I. FIXED COSTS (OVERHEAD)(1)	ACTUAL(a)	ADJUSTED(b)
A. Annual Depreciation of Owned Capital Equipment		
1. Annual Vehicle Cost(2)	---	15,274
2. Annual Communications Equipment Cost(3)	---	2,166
3. Annual Cost of other Vehicular Equipment Not Included in Purchase Price of Vehicles, e.g., difibrilator(4).	---	3,200
B. Annual Overhead on Office and Garage Space		
1. Rent or Depreciation on Building(5)	1	2,600
2. Utilities including Telephone	4,944	4,944
C. Annual Insurance Costs (Total)	11,585	11,585
1. Vehicles		
2. Liability		
3. Workman's Compensation		
4. Building and Equipment		
D. Annual Cost of Personnel Paid Salary or Hourly Wage (dispatching and clerical staff, no benefits included; does not include costs of personnel paid on a per run basis).	25,683	25,683
E. Annual Training Costs(5)	1,650	1,650
F. Annual Licenses and Fees (Department of Emergency Medical Services Licensure Fees).	50	50
G. Annual Professional Fees (e.g., lawyer, collection agency)	---	---
H. Public Relations	816	816
I. Equipment Purchased	42,925	---
TOTAL FIXED COSTS	$87,653	$67,966
II. VARIABLE COSTS (OPERATING EXPENSES)		
A. Annual Vehicle Costs		
1. Gasoline	3,932	3,932
2. Annual Maintenance and Repair Costs	7,761	7,761
B. Annual Supply and Equipment Costs (Total)	20,557	20,557
1. Laundry	---	---
2. Medical Supplies	---	---
3. Office Supplies	---	---
C. Annual Non-Salaried Personnel Costs	9,648	9,648
TOTAL VARIABLE COSTS	$41,898	$41,898
III. TOTAL COSTS 1989	$129,551	$109,864
IV. TOTAL ESTIMATED REVENUE 1989	$114,495	$114,495
V. OVER (SHORT)	($15,056)	$4,631

SOURCE: Survey of Ambulance Operations: Hillsdale County, Michigan. Spring 1990.

TABLE I-A (Continued).
DEFINITIONS:
(a) actual per records of ambulance operation.
(b) adjusted to reflect full cost at current nominal market values.

NOTES:
(1) Fixed Costs not reflected include time donated by Ambulance Board for financial management purposes.

(2) Determination of Annual Vehicle Depreciation Cost.

Vehicles:	#51	#52	#53	Total
Total Mileage:	50,687	55,654	87,909	
Mileage in 1989:	10,626	13,442	5,421	
Year Purchased:	1981	1986	1986	
Purchase Price:	45,000	45,000	35,000	
Vehicle Type:	I	I	III	
Salvage Value:	4,500	4,500	3,500	
Depreciation:	5,738	7,259	2,277	15,274

If annual mileage for vehicles is available, use formula (i), otherwise use formula (ii).
(i) Annual Depreciation = ((Purchase Price - Salvage Value)/75,000)*(Annual Mileage for Vehicle)
(ii) Annual Depreciation = (Purchase Price - Salvage Value)/5 years

Salvage Value = .10*Purchase Price

(3) Determination of Annual Communications Cost

Major Equipment Owned:	20 Pagers	3 Portable Radios	Base & Amb Radios	Total
Year Purchased:	N/A	1987	N/A	
Purchase Price:	350	330	10,000	
Depreciation:	1,400	99	667	2,166

Annual Depreciation = (Total Cost of Pagers)/5 years
Annual Depreciation = (Cost of Other Communications Equipment including garage and vehicle radios, Portables)/15 years

(4) Determination of Annual Equipment Cost.

Major Equipment Owned:	2 Difibrilators	1 Thumper
Year Purchased:	1989	1986
Purchase Price:	5,500	5,000
Depreciation:	2,200	1,000

Annual Depreciation = (Purchase Price)/5 years

TABLE I-A (Continued).

(5) Determination of Rent or Depreciation on Building.

	Owned/ Rented	Shared	Square Footage	Actual Rental	Replacement Cost	Fair Mkt Value	Year Built	Original Cost	Depreciation
Garage and Office	Owned	No	2,322	$1	$28/sq ft	$2,600	1972	N/A	---

Fair Market Value = (Total Square Footage*Replacement Cost)/25 years

(6) Determination of Annual Training Cost.
Reading Emergency Unit provides $50 per employee for training.

TABLE I-B. ANNUAL COSTS FOR EMERGENCY MEDICAL SERVICES OPERATION
HILLSDALE COUNTY, MICHIGAN

NAME OF OPERATION: George White Funeral Home
YEAR: 1989
DATE PREPARED: 5/10/90

I. FIXED COSTS (OVERHEAD)(1)	Estimated(a)
A. Annual Depreciation of Owned Capital Equipment	
1. Annual Vehicle Cost(1)	12,110
2. Annual Communications Equipment Cost(2)	600
3. Annual Cost of other Vehicular Equipment Not Included in Purchase Price of Vehicles, e.g., difibrilator(3).	1,100
B. Annual Overhead on Office and Garage Space	
1. Rent or Depreciation on Building(4)	27,018
2. Utilities and Telephone(5)	4,944
C. Annual Insurance Costs (Total)	
1. Vehicles and Liability	7,000
3. Workman's Compensation	3,798
4. Building and Equipment	600
D. Annual Cost of Personnel Paid Salary or Hourly Wage (estimated to include three full time EMTs plus 15% benefits, part time clerical staff, and overnight dispatching; does not include wages earned on a per run basis).	68,690
E. Annual Training Costs	1,350
F. Annual Taxes, Licenses and Fees (Department of Emergency Medical Services Licensure Fees).	7,869
G. Annual Professional Fees (e.g., lawyer, collection agency)	1,250
TOTAL FIXED COSTS	$136,328
II. VARIABLE COSTS (OPERATING EXPENSES)	
A. Annual Vehicle Costs	
1. Gasoline	3,270
2. Annual Maintenance and Repair Costs	300
B. Annual Supply and Equipment Costs	
1. Laundry	400
2. Medical Supplies	3,500
3. Office Supplies	100
4. Maintenance and repairs of communications equipment	700
C. Annual Non-Salaried Personnel Costs	10,000
TOTAL VARIABLE COSTS	$18,270
III. TOTAL COSTS 1989	$154,598
IV. TOTAL ESTIMATED 1989 REVENUES	$70,962

SOURCE: Survey of Ambulance Operations: Hillsdale County, Michigan. Spring 1990.

TABLE I-8 (Continued).
DEFINITIONS:

(a) estimated current nominal market value per information provided by ambulance provider.

NOTES:

(1) Fixed costs not reflected include annual computer cost, backup dispatching during the day, and some senior management personnel.

(1) Determination of Annual Vehicle Depreciation Cost.

Vehicles:	#1	#2	Total
Total Mileage:	110,000	50,000	
Mileage in 1989:	15,000	15,000	
Year Purchased:	1982	1986	
Purchase Price:	42,000	24,500	
Vehicle Type:	III	II	
Salvage Value:*	3,500	2,450	
Depreciation	7,700	4,410	12,110

If annual mileage for vehicles is available, use formula (i), otherwise use formula (ii).

(i) Annual Depreciation = ((Purchase Price - Salvage Value)/75,000)*(Annual Vehicle Mileage)
(ii) Annual Depreciation = (Purchase Price - Salvage Value)/5 years

Salvage Value = .10*Purchase Price
* Salvage Value for 1982 Vehicle obtained from White Funeral Home.

(2) Determination of Annual Communications Cost

Major Equipment Owned:	4 Pagers	Base & Amb Radios	Total
Year Purchased:	1978/1988	1972	
Purchase Price:	150/350	6,000	
Depreciation:	200	400	600

Annual Depreciation = (Total Cost of Pagers)/5 years
Annual Depreciation = (Cost of Other Communications Equipment including garage and vehicle radios, Portables)/15 years

(3) Determination of Annual Equipment Cost.

Major Equipment Owned:	1 Difibrilator
Year Purchased:	1989
Purchase Price:	5,500
Depreciation:	1,100

Annual Depreciation = (Purchase Price)/5 years

TABLE I-B (Continued).

(4) Determination of Rent or Depreciation on Building.

	Owned/ Rented	Shared	Square Footage	Actual Rental	Total SEV	Estimated Rental	Fair Mkt Value
Garage:	Owned	No	1,008	---	---	---	$19,908
Office Space:	Owned	Yes	360	---	---	---	$7,110
Structure:	Owned	Yes	5,438	---	$107,400	$19.75	---

Fair Market Value = (Estimated Rental Cost)*(square footage)

(5) Utilities and Telephone expense is estimated.

TABLE I-C. ANNUAL COSTS FOR EMERGENCY MEDICAL SERVICES OPERATION
HILLSDALE COUNTY, MICHIGAN

NAME OF OPERATION: Van Horne/Eagle Ambulance Service
YEAR: 1989
DATE PREPARED: 5/10/90

I. FIXED COSTS (OVERHEAD)(1)	ACTUAL(a)	ADJUSTED(b)
A. Annual Depreciation of Owned Capital Equipment (Total)	13,185	---
1. Annual Vehicle Cost(2)	---	12,600
2. Annual Communications Equipment Cost(3)	---	793
3. Annual Cost of other Vehicular Equipment Not Included in Purchase Price of Vehicles, e.g., difibrilator(4).	---	1,100
B. Annual Overhead on Office and Garage Space		
1. Rent or Depreciation on Building(5)	---	6,600
2. Telephone and Utilities(6)	881	1,754
C. Annual Insurance Costs (Total)	8,619	8,619
1. Vehicles	---	---
2. Liability	---	---
3. Workman's Compensation	---	---
4. Building and Equipment	---	---
D. Annual Cost of Personnel Paid Salary or Hourly Wage (adjusted includes clerical staff and benefits; does not include costs of personnel paid on a per run basis).	133,871	139,184
E. Annual Training Costs	35	35
F. Annual Licenses, Taxes, and Fees (Department of Emergency Medical Services Licensure fees, taxes).	12,822	12,822
G. Annual Professional Fees (e.g., lawyer, collection agency)	5,039	5,039
H. Public Relations	517	517
I. Travel and Entertainment	1,403	1,403
J. Bad Debt Expense	11,189	---
TOTAL FIXED COSTS	$187,560	$190,466
II. VARIABLE COSTS (OPERATING EXPENSES)		
A. Annual Vehicle Costs		
1. Gasoline and Tires	5,972	5,972
2. Annual Maintenance and Repair Costs	1,634	1,634
B. Annual Supply and Equipment Costs		
1. Laundry	166	166
2. Medical Supplies	4,153	4,153
3. Office Supplies	1,585	1,585
C. Annual Non-Salaried Personnel Costs	0	0
TOTAL VARIABLE COSTS	$13,509	$13,509
III. TOTAL COSTS 1989	$201,069	$203,975
IV. TOTAL ESTIMATED 1989 REVENUES	$203,792	$203,792
V. OVER (SHORT)	$2,723	($183)

SOURCE: Survey of Ambulance Operators: Hillsdale County, Michigan. Spring 1990.

TABLE I-C (Continued).
DEFINITIONS:

(a) actual per records of ambulance operation.
(b) adjusted to reflect full cost at current nominal market values.

NOTES:

(1) Fixed Costs not reflected include annual computer cost, backup daytime dispatching, and senior management salary.

(2) Determination of Annual Vehicle Depreciation Cost.

Vehicles:	#1	#2	Total
Total Mileage:	85,000	45,000	
Mileage in 1989:	N/A	N/A	
Year Purchased:	1985	1988	
Purchase Price:	35,000	35,000	
Vehicle Type:	I	I	
Salvage Value:	3,500	3,500	
Depreciation:	6,300	6,300	12,600

If annual mileage for vehicles is available, use formula (i), otherwise use formula (ii).
(i) Annual Depreciation = ((Purchase Price - Salvage Value)/75,000)*(Annual Mileage for Vehicle)
(ii) Annual Depreciation = (Purchase Price - Salvage Value)/5 years

Salvage Value = .10*Purchase Price

(3) Determination of Annual Communications Cost

Major Equipment Owned:	4 Pagers	6 Portable Radios	Base & Amb Radios	Total
Year Purchased:	1979	1983	1984	
Purchase Price:	350	450	5,000	
Depreciation:	280	180	333	793

Annual Depreciation = (Total Cost of Pagers)/5 years
Annual Depreciation = (Cost of Other Communications Equipment including garage and vehicle radios, Portables)/15 years

(4) Determination of Annual Equipment Cost.

Major Equipment Owned:	1 Difibrilator
Year Purchased:	1989
Purchase Price:	5,500
Depreciation:	1,100

Annual Depreciation = (Purchase Price)/5 years

TABLE I-C (Continued).

(5) Determination of Rent or Depreciation on Building.

Monthly Rental for Apartment (to account for pm dispatch):	400
Estimated Monthly Rental for Garage and Office:	150
Total:	$550
Annual Estimated Rental at Fair Market Value:	$6,600

(6) The adjusted Telephone and Utilities figure includes an estimate for utilities.

TABLE I-D. ANNUAL COSTS FOR EMERGENCY MEDICAL SERVICES OPERATION
HILLSDALE COUNTY, MICHIGAN

NAME OF OPERATION: Wright-Waldron Fire Department
YEAR: 1989
DATE PREPARED: 5/10/90

I. FIXED COSTS (OVERHEAD)(1)	ACTUAL(a)	ADJUSTED(b)
A. Annual Depreciation of Owned Capital Equipment		
1. Annual Vehicle Cost(2)	---	2,883
2. Annual Communications Equipment Cost(3)	---	1,733
3. Annual Cost of other Vehicular Equipment Not Included in Purchase Price of Vehicles, e.g., difibrilator.	---	---
B. Annual Overhead on Office and Garage Space		
1. Rent or Depreciation on Building(4)	---	2,600
2. Utilities including Telephone	1,620	1,620
C. Annual Insurance Costs (Total)	6,274	6,274
1. Vehicles	---	---
2. Liability	---	---
3. Workman's Compensation	---	---
4. Building and Equipment	---	---
D. Annual Cost of Personnel Paid Salary or Hourly Wage (dispatching and clerical staff, no benefits included; does not include costs of personnel paid on a per run basis).	600	600
E. Annual Training Costs	3,500	3,500
F. Annual Licenses and Fees (Department of Emergency Medical Services Licensure Fees).	10	10
G. Annual Professional Fees (e.g., lawyer, collection agency)	---	---
H. Public Relations	---	---
TOTAL FIXED COSTS	$12,004	$19,220
II. VARIABLE COSTS (OPERATING EXPENSES)(5)		
A. Annual Vehicle Costs		
1. Gasoline	1,824	1,824
2. Annual Maintenance and Repair Costs	1,101	1,101
B. Annual Supply and Equipment Costs (Total)	932	932
1. Laundry	---	---
2. Medical Supplies	---	---
3. Office Supplies	---	---
C. Annual Non-Salaried Personnel Costs	5,019	5,019
TOTAL VARIABLE COSTS	$8,876	$8,876
III. TOTAL COSTS 1989	$20,880	$28,097
IV. TOTAL ESTIMATED 1989 REVENUE	$20,880	$28,097
V. OVER (SHORT)	$0	$0

SOURCE: Survey of Ambulance Operations: Hillsdale County, Michigan. Spring 1990.

TABLE I-O (Continued).
DEFINITIONS:
(a) actual per records of ambulance operation.
(b) adjusted to reflect full cost at current nominal market values.

NOTES:
(1) Fixed Costs not reflected include time donated by Fire/Ambulance Board for financial management purposes.

(2) Determination of Annual Vehicle Depreciation Cost.

Vehicles:	#1
Total Mileage:	25,000
Mileage in 1989:	4,533
Year Purchased:	1986
Purchase Price:	53,000
Vehicle Type:	III
Salvage Value:	5,300
Depreciation:	2,883

If annual mileage for vehicles is available, use formula (i), otherwise use formula (ii).
(i) Annual Depreciation = ((Purchase Price - Salvage Value)/75,000)*(Annual Mileage for Vehicle)
(ii) Annual Depreciation = (Purchase Price - Salvage Value)/5 years

Salvage Value = .10*Purchase Price

(3) Determination of Annual Communications Cost

Major Equipment Owned:	20 Pagers	1 2-way Radio	Base Radio	Total
Year Purchased:	N/A	1980	1980	
Purchase Price:	350	3,000	2,000	
Depreciation:	1,400	200	133	1,733

Annual Depreciation = (Total Cost of Pagers)/5 years
Annual Depreciation = (Cost of Other Communications Equipment including garage and vehicle radios, Portables)/15 years

(4) Determination of Rent or Depreciation on Building.

	Owned/ Rented	Shared	Square Footage	Actual Rental	Replace-ment Cost	Fair Mkt Value
Garage:	Rented	No	520	$0	$40	832
Office Space:	Rented	Yes	300	$0	$40	240

Fair Market Value = (Total Square Footage*Replacement Cost)/25 years
Note: One half of office space square footage aloted to ambulance operations

(5) Variable costs not reflected include 10-20 hours donated maintenance work and medical supplies donated by Morenci Hospital.

BIBLIOGRAPHY

"Accidental Death and Disability: The Neglected Disease of Modern Society." 1966. Division of Medical Sciences, National Academy of Sciences -- National Research Council. Washington D.C.

Advisory Commission on Intergovernmental Relations. 1987. The Organization of Local Public Economies. Washington, DC: ACIR. Report No. A-109.

Advisory Commission on Intergovernmental Relations. 1985. Intergovernmental Service Arrangements For Delivering Local Public Services: Update 1983. Washington, DC: ACIR. Report No. A-103.

Ahlbrandt, Roger S. Jr. 1973. "Efficiency in the Provision of Fire Services." Public Choice 18:1-15.

Bartlett, Randall. 1973. Economic Foundations of Political Power. New York: The Free Press.

Bish, R.L. 1971. The Public Economy of Metropolitan Areas. Chicago: Markham Publishing Company.

Boyd, David R., Richard F. Edlich, and Sylvia H. Micik. 1983. Systems Approach to Emergency Care. Norwalk, Connecticut: Appleton-Century-Crofts.

Cadigan, R.T. and C.E. Burgarin. 1989. "Predicting Demand for Emergency Ambulance Service." Annals of Emergency Medicine 18(6):618-621.

Caves, Richard. 1982. American Industry: Structure, Conduct, Performance, 5th edition. Englewood Cliffs, NJ: Prentice Hall.

Chambers, Howard L. 1988. "Case Studies in Intergovernmental Cooperation: Lakewood, California." Public Management July:8-9.

Chicione, David L. and Norman Walzer. 1985. Government Structure and Local Public Finance. Boston, MA: Oelgeschlager, Gunn, and Hain, Pulbishers, Inc.

Davis, David G. 1971. "Efficiency in the Provision of Public vs. Private Firms: The Case of Australia's 2 Airlines." Journal of Law and Economics 14:149-165.

Deacon, Robert T. 1979. "The Expenditure Effects of Alternative Public Supply Institutions." Public Choice 34:381-397.

Department of Emergency Medical Services, State of Michigan. Report Substitute for House Bill No. 4952. Mimeo.

DeHoog, Ruth Hoogland. 1984. Contracting Out for Human Services. Albany, NY: State University of New York Press.

Dexter, Lewis Anthony. 1970. Elite and Specialized Interviewing. Evanston, IL: Northwestern University Press.

Dodge, William R. 1989. "The Emergence of Intercommunity Partnerships in the 1980s." Public Management July:4-8.

Doeksen, Gerald A., Jack Frye, and Bernal Green. 1975. "Economics of Rural Ambulance Service in the Great Plains." Economic Development Division, Economic Research Service, U.S. Department of Agriculture, AER No. 308.

Epstien, Paul D. 1988. Using Performance Measurement in Local Governance. New York: National Civic League Press.

Ferris, James M. and Elizabeth Grady. 1986. "Contracting Out: For What? With Whom?" Public Administration Review July/August:332-344.

Florestano, Patricia and Stephan Gordon. 1980. "Public vs. Private: Small Government Contracting with the Private Sector." Public Administration Review January/February:29-34.

Fox, William. 1980. "Size Economies in Local Government Services: A Review." Economic Development Division; Economics, Statistics, and Cooperatives Service; U.S. Department of Agriculture. Rural Development Research Report No. 22.

Foulk, David and Rebecca Ryan. 1989. "Getting to the Heart of Rural EMS." Journal of Emergency Medical Services 14(6):54-5 and 57-9.

Gittinger, J. Price. 1982. Economic Analysis of Agricultural Projects. Washington, D.C.: The World Bank.

Gordon, Raymond L. 1975. Interviewing: Strategies, Techniques, and Tactics. Homewood, Illinois: The Dorsey Press.

Gray, Barbara. 1985. "Conditions Facilitating Interorganizational Collaboration." Human Relations 38:911-936.

Hakim, Catherine. 1987. Research Design: Strategies and Choices in the Design of Social Research. Winchester, MA: Allen and Urwin Publishers.

Halpert, Burton P. 1982. "Antecedents." In Interorganizational Coordination, eds., David L. Rogers and David A. Whetten, pp. 54-72. Ames, IA: Iowa State University Press.

Harvey, Lynn R. 1989. "Economic, Social, and Political Issues of Intergovernmental Contracting." Michigan State University Department of Agricultural Economics Staff Paper 89-37.

Harvey, Lynn R. 1984. "Structure and Finance of Michigan Local Government." Michigan State University Department of Agricultural Economics. Mimeo.

Harvey, Lynn R. 1978. "The Organization and Provision of Fire Protection Services by Municipal Governments in Hillsdale, Jackson, and Lenawee Counties -- Michigan." Unpublished Plan B Paper, Michigan State University Department of Agricultural Economics.

Hatry, Harry, Sumner N. Clarren, Therese van Houten, Jane P. Woodward, and Pasqual A. DonVito. 1979. Efficiency Measurement For Local Government Services. Washington, DC: The Urban Institute.

Hoff, Gerald J. Jr. 1988. "Montgomery County, Pennsylvania." Public Management July:14-15.

Honadle, Beth Walter. 1982. "Interlocal Cooperation." National Civic Review July-August:362-374.

Honadle, Beth Walter. 1981. "Voluntary Interlocal Governmental Cooperation: A Big Idea for Small Towns." Municipal Management 3(1980-1981): 152-155.

Hirschman, Albert O. 1970. Exit, Voice, and Loyalty. Cambridge, MA: Harvard University Press.

International City Management Association (ICMA). 1984. Small Cities and Counties, ed., James M. Banovetz. Washington, DC: ICMA.

Johnson, Glenn L. 1986. Research Methodology for Economists. New York: MacMillon Publishing.

Kahneman, Daniel, Jack L. Knetsch and Richard Thaler. 1986. "Fairness as a Constraint on Profit Seeking: Entitlements in the Market." The American Economic Review 76(4):728-741.

Kuennen, Daniel S. 1989. "The Emergency Medical System." Rural Development Resources. 18(2):1-5.

Kiser, Larry L. and Elinor Ostrom. 1982. "The Three Worlds of Action: A Meta-theoretical Synthesis of Institutional Approaches." In Strategies of Political Inquiry, ed., Elinor Ostrom, pp. 179-222. Beverly Hills, CA: Sage Publishing.

Kolderie, Ted. 1986. "The Two Different Concepts of Privatization." Public Administration Review July/August:285-291.

Lowry, David. 1982. "The Political Incentives of Government Contracting." Social Science Quarterly 63:517-529.

Mansfield, Edwin. 1979. Microeconomics: Theory and Applications. New York: W.W. Norton and Company.

Matlock, Linda McGregor and Linda R. Woodhouse with Douglass Peterson. 1987. The State of the Small City: A Survey of the Nation's Cities and Towns under 50,000. Washington, DC: National League of Cities.

McGowan, Robert P. and John M. Stevens. 1983. "Local Government Initiatives in a Climate of Uncertainty." Public Administration Review March/April:1227-136.

Michigan Statistical Abstract 1986-87, 20th Edition. Ed., David I. Verway. Detroit, MI: Bureau of Business Research, School of Business Administration, Wayne State University. 1987.

Morgan, David R. and Robert E. England. 1988. "The Two Faces of Privatization." Public Administration Review Nov/Dec:979-987.

Murphy, J. T. 1980. Getting the Facts: A Fieldwork Guide for Evaluators and Policy Analysts. Santa Monica, CA: Goodyear Publishing.

Myers, Carole. 1990. "Ambulance Service -- At a Crossroads in History." Ambulance Industry Journal May/June:5-7.

National Association of Counties Research Foundation. 1977. Interlocal Service Delivery: A Practical Guide to Intergovernmental Agreements/Contracting for Local Officials. Washington, DC: National Association of Counties Research Foundation.

Niskanen, William, A. 1975. "Bureaucrats and Politicians." Journal of Law and Economics. XVIII(3):617-643.

Oakerson, Ronald J. 1987. "Local Public Economies: Provision, Production, and Governance." Intergovernmental Perspectives 13:20-25.

Olson, Mancur. 1965. The Logic of Collective Action. Cambridge, MA: Harvard University Press.

Ostrom, Elinor. 1974. "Issues in Improving the Performance of Local Government from the Citizens Point of View." Paper Presented at the 1974 National Public Policy Education Conference, September 13, 1974, Osage Beach, Missouri.

Ostrom, Vincent, Robert Bish, and Elinor Ostrom. 1988. Local Government in the United States. San Francisco, CA: Institute for Contemporary Studies Press.

Ostrom, Vincent and Elinor Ostrom. 1977. "Public Goods and Public Choices." In Alternatives for Delivering Public Services: Toward Improved Performance, ed., E.S. Savas, pp. 7-50. Boulder, CO: Westview Press.

Pepler, Richard D. 1980. "Political and Economic Considerations of EMS as Related to Community Size." In Emergency Medical Services: Measures to Improve Care, eds., John Z. Bowers and Elizabeth F. Purcell, pp. 102-114. New York: Josiah Macy Jr. Foundation.

Rosenblatt, Roger and Ira S. Moscovice. 1982. Rural Health Care. New York: John Wiley & Sons.

Savas, E.S. 1976. "Solid Waste Collection in Metropolitan Areas." In The Delivery of Urban Services, edited by Elinor Ostrom, pp. 210-229. Beverly Hills: Sage.

Scherer, F.M. 1980. Industrial Market, Structure, and Economic Performance, 2nd edition. New York: Houghton Mifflin Company.

Schmid, A. Allan. 1987. Property, Power, and Public Choice, 2nd Edition. New York: Praeger.

Schmid, A. Allan and Ronald C. Faas. 1982. "A Research Approach to Institutional Alternatives in the Administration of Agrarian Development Programs." In Law and Economics: An Institutional Perspective, eds., Warren J. Samuels and A. Allan Schmid, pp. 145-165. Boston, MA: Martinus Nijhoff Publishers.

Shaffer, James D. and A. Allan Schmid. 1972. "Community Economics: A Framework for Analysis of Community Economic Problems." Michigan State University Department of Agricultural Economics. Mimeo.

Southeast Michigan Council of Governments. 1982. "Intergovernmental Cooperative Arrangements: Exploring Opportunities." Metropolitan Affairs Corporation. Mimeo.

Stinson, Thomas F. 1985. "Contracting for Government Services -- How Much to Pay" How Much to Charge?." Rural Development Perspectives. Washington, DC: United States Department of Agriculture, Economic Research Service 1(3):17-19.

Stout, Jack L. 1988. "The Emergency Subsidy/Price Tradeoff." Journal of Emergency Medical Services 13(8):74-76.

U.S. Congress, Office of Technology Assessment. 1989. Rural Emergency Services -- Special Report. Washington, DC: U.S. Government Printing Office OTA-H-445.

Valente, Carl F. and Lydia Manchester. 1984. Rethinking Local Services: Examining Alternative Delivery Approaches. Management Information Services Special Report, No. 12.

Varian, Hal R. 1987. Intermediate Microeconomics. New York: W.W. Norton.

Wagner, Richard E. and Warren E. Weber. 1975. "Competition, Monopoly, and the Organization of Government in Metropolitan Areas." Journal of Law and Economics 18:661-684.

Walker, Robert. 1985. "An Introduction to Applied Qualitative Research." In Applied Qualitative Research, ed., Robert Walker, pp. 3-26. Vermont: Aldershot, Hants, and Gower Publishing.

Weiss, Janet A. 1987. "Pathways to Cooperation among Public Agencies." Journal of Policy Analysis and Management 7(1):94-117.

Werner, Carol S. and Bruce A. Smith. 1988. "Emergency Medical Services Systems." Management Information Service Report. Nov:1-16.

Williamson, Oliver E. 1985. The Economic Institutions of Capitalism. New York: The Free Press.

Winter, Alison D. 1988. "Montgomery County Consortium of Communities, Pennsylvania." Public Management July:10-12.

Wrightson, Margaret. 1986. "Interlocal Cooperation and Urban Problems: Lessons for the New Federalism." Urban Affairs Quarterly 22(2):261-275.

Yin, Robert. 1984. Case Study Research: Design and Methods. Beverly Hills, CA: Sage Publications.