EMERGING ISSUES IN EMS AND 911

An Analysis of Prehospital Emergency Medical Services as an Essential Service And as a Public Good in Economic Theory

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Table of Contents

EXECUTIVE SUMMARY

Emergency medical services (EMS) systems provide important benefits to the public. Every day, EMS systems provide immediate medical care in response to individual health emergencies, such as motor vehicle crashes. They also play an important role in responding to disasters that threaten the health and safety of the larger public. Yet EMS does not receive the same recognition and support from policymakers as other services such as police and fire departments. The National Emergency Medical Services Advisory Council has argued that the lack of recognition of EMS as an essential service and public good hinders the efficiency, effectiveness, and equity of EMS provision and—by extension—that of the Nation's healthcare and disaster preparedness.

This white paper explores the concept of an essential service as it relates to EMS and considers the pros and cons for States and localities of implementing EMS as an essential service. Also, it examines the characteristics of a public good *in economic theory* as they relate to EMS systems and discusses the general policy guidance economic theory offers regarding their efficient provision. The white paper does not take a position on whether EMS should be designated as an essential service or on any other issues of Federal policy.

The white paper makes the following major observations in its analysis of EMS as an essentials service.

- While there is no authoritative legal or policy definition of an essential service in the United States, the study found that EMS may be considered an essential service based on two different, but complementary, definitions identified.
    - **Ensuring public health and safety**—a service whose interruption would endanger the life, personal safety, or health of the whole or part of the population. Emergency medical services may be understood as an essential service by the first definition in the context of "mass casualty incidents,"[1] or during epidemics of infectious disease.
    - **Ensuring equal access**—a service to which all residents should be guaranteed access. Emergency medical services appear to fit the second definition of an essential service insofaras the public generally has come to expect that emergency medical services will be available every hour of every day to all residents regardless of ability to pay.
- Although the study did not find any localities that have designated EMS as an essential service, it did identify at least four States that have implemented EMS as an essential service in statute (North Carolina, California, Oregon, and Colorado). These

[1] A mass casualty incident refers to an event, which generates more patients at one time than locally available resources can manage using routine procedures. It requires exceptional emergency arrangements and additional or extraordinary assistance. It can also be defined as any event resulting in a number of victims large enough to disrupt the normal course of emergency and health care services.

States take a broadly similar approach that appears to offer three advantages and one disadvantage.

- Advantages: (1) ensures a minimum capability across the State; (2) provides the flexibility to organize and finance EMS systems to reflect local circumstances; and (3) provides resources to support voluntary improvement over time.
- Disadvantage: the financial burden that the statutory mandate to provide Emergency Medical Services imposes on counties.

In considering the white paper's economic analysis of EMS systems, it is important to distinguish between the common-sense understanding of public goods and the concept of public goods in economic theory. A public good is commonly understood simply as a good that offers public benefits that justify government support. However, a public good in economic theory refers to a good with specific characteristics such that markets will fail to provide it efficiently,[2] in which case government action may be justified.

Economic theory recognizes four types of goods: public goods, common goods, common-access goods, and club goods. Each of these types of goods is defined by whether they possess these two characteristics—*non-excludability* (it is difficult or impossible to exclude individuals from the benefit) and *non-rivalry* (use by one individual does not reduce availability to others). This typology of goods offers a useful framework for considering government action on efficiency grounds. Each type of good is subject to different types of market failures. Economic theory offers general policy guidance on how to address these failures and realize the public benefits of these goods.

The white paper makes the following major observations based on its economic analysis of EMS systems.

- EMS systems do not fit the definition of a public good in economic theory (a good such as national defense where it is difficult or impossible to exclude individuals from the benefit and it costs nothing to provide the benefit to additional individuals). EMS systems may be better understood as a type of good called a "common good" (a good where it is difficult or impossible to exclude users from the benefit, but where there is a marginal cost to provide the benefit to additional individuals). [3]

[2]The term is used here in the sense of Pareto efficiency--an allocation of resources such that no change can be made without making someone worse off. It is important to note that market failure does not imply that government action would actually be more efficient. Government action is subject to its own inefficiencies. There is an extensive academic literature concerned with the conditions under which "government failure" may be expected to occur.

[3]Marginal cost refers to the cost of providing service to additional individuals

- As common goods, EMS systems face two challenges: financing and limiting overuse in the form of non-urgent calls. Economic theory suggests the following approach to these challenges:

    - It may be most efficient to fund the costs of maintaining EMS system readiness to respond through taxation and the marginal cost[4] of delivering services through user fees.
    - User fees may also be applied to deter overuse, but their deterrent effect will depend in part on the extent to which user fees are paid directly by individuals receiving the service rather than by insurers.

This report was produced to support the deliberations of the National Emergency Medical Services Advisory Council (NEMSAC) regarding options for funding EMS systems at the State and local levels. The paper will also be useful to State and local government officials who make decisions governing the funding of the EMS systems that they oversee. Providing stable and ongoing funding for EMS systems is an essential prerequisite to ensuring that injured occupants of motor vehicle crashes receive skilled emergency medical care and timely transportation to hospitals and trauma centers. This study was not conducted to develop policy recommendations, but rather to provide insight and general guidance on how to approach the efficient and equitable provision of EMS through discussions of policy implications.

. It is important to distinguish between the marginal cost of responding to a call with available units, which includes gas, "wear and tear" on the vehicle, and medical supplies, and the cost of adding the capacity needed to support readiness to respond to additional calls during periods of peak demand. This includes additional vehicles and personnel available on demand.

[4] Marginal cost here refers to the cost of delivering emergency medical services to an additional individual with available units, which includes gas, "wear and tear" on the vehicle, and medical supplies.

BACKGROUND AND OVERVIEW

Emergency medical services systems respond daily to "routine" emergencies, such as motor vehicle crashes and heart attacks, and provide medical evaluation, immediate medical care, and rapid transport to medical facilities. They also play an important role in disaster response. Yet EMS does not receive the same recognition and support from policymakers as other services such as law enforcement and fire protection. For example, EMS does not have a Federal grant program dedicated to its particular needs and has received a disproportionately small share of disaster preparedness funding.[5] Also, EMS received little attention in the debate over healthcare reform, despite its relevance to healthcare access, medical outcomes, and healthcare costs.[6]

The NEMSAC has argued that the lack of recognition of EMS as an essential service and public good hinders the efficiency, effectiveness, and equity of EMS provision and—by extension—that of the nation's healthcare and disaster preparedness. To help address these issues, the NEMSAC called for a white paper to be commissioned that would examine the concept of public goods in the economic literature as it relates to EMS systems. [7]

Scope and Methodology

This white paper explores the concept of an essential service as it relates to EMS and considers the pros and cons for States and localities of implementing EMS as an essential service. Also, it examines the characteristics of a public good *in economic theory* as they relate to EMS systems and discusses the general policy guidance economic theory offers regarding their efficient provision. The white paper does not take a position on whether EMS should be designated as an essential service or on any other issues of Federal policy.

As agreed at the beginning of the project, this study focuses on *prehospital* EMS systems.[8] The study scope is defined with reference to a consensus definition of EMS provided in the 2007 Institute of Medicine report, *Future of Emergency Care: EMS at the Crossroads*: "prehospital and out of hospital EMS, including 911 and dispatch, emergency medical response, field triage and stabilization, and transport by ambulance or helicopter to a hospital or between facilities."

While this definition generally reflects the current state of EMS, this study recognizes that

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[5] Committee on the Future of Emergency Care in the United States Health System. *Future of Emergency Care: Emergency Medical Services at the Crossroads*. Washington, D.C.: Institute of Medicine; 2007. Available at: http://www.gwumc.edu/hspi//policy/EMSFederalLeadership.pdf. Cilluffo FJ, Kaniewski DJ, Maniscalco PM. *Back to the Future: An Agenda for Federal Leadership in Emergency Medical Services*. Washington, D.C.: The George Washington University Homeland Security Policy Institute; 2005.

[6] Recent evidence of improved medical outcomes and downstream healthcare savings is summarized in NEMSAC, "EMS Makes a Difference," December 2009. www.ems.gov/pdf/nemsac-dec2009.pdf

[7] NEMSAC, "EMS as a Public Good," An update on discussions of the NEMSAC Systems Committee. Presented March 29-30, 2012.

[8] The Institute of Medicine, *op. cit.*, defines EMS systems as, "the organized delivery system for EMS within a specified geographic area – local, regional, state or national – as indicated by the contex."

the boundaries of prehospital EMS are evolving. For instance, pilot programs have shown that EMS units can deliver definitive care on the scene, which eliminates the need for transport to a hospital.[9] Also, the potential of EMS systems to play a more preventive role are being explored as in the case of "community paramedicine" programs. Both developments promise public benefits such as downstream healthcare savings and reduced overcrowding of hospital emergency departments.[10] However, because these practices are still in the exploratory stage and have not been implemented widely, they are not included in the study's analysis of prehospital EMS as a public good.

This should be considered an exploratory study given the absence of academic research on the concept of essential service or public goods theory as they relate to EMS systems. Research on the concept of essential service included systematic web searches for definitions of essential service and related concepts such as "essential employees," as well as examples of States and localities implementing EMS as an essential service. Web research included academic articles, stakeholder reports, city charters, State statutes, and Federal, State, and local policy and planning documents. Major stakeholders and experts were all asked for references to legal and policy definitions of essential service. Research on the pros and cons for States identified as implementing EMS as an essential service included reviews of the relevant State statutes, background discussions with relevant State officials, as well as legislative hearings and media coverage to identify views on both the disadvantages and advantages of the approach taken by these States.[11]

This study applies a standard market failure analysis to EMS systems to provide general insights and guidance on the efficient provision of EMS systems. It does not analyze particular approaches to EMS provision. Individual experts and stakeholders were contacted to validate the interpretation of economic concepts and their application to the practical realities of EMS systems.

Expert and stakeholder outreach for the study also included members of the Academy's Federal System Standing Panel,[12] and individual NEMSAC members. Appendix B provides a list of stakeholder and experts contacted.

The paper is organized into three sections:

1. Section 1 examines the concept of an "essential service," how it applies to EMS, discusses States that have implemented EMS as an essential service, and considers

[9] NEMSAC, "EMS System Performance-based Funding and Reimbursement Model," Finance Committee Draft Advisory, March 29, 2012, p. 1.

[10] A brief overview of these pilot programs is provided in NEMSAC, "EMS System Performance-based Funding and Reimbursement Model." A more detailed discussion of the benefits associated with these alternative approaches can be found in NEMSAC, "EMS Makes a Difference," December 2009. www.ems.gov/pdf/nemsac-dec2009.pdf.

[11] The study also included research on a failed legislative effort in Idaho and an ongoing effort in Illinois to designate EMS as an essential service.

[12] The Academy's Standing Panel on the Federal System includes Fellows with expertise in issues of intergovernmental management and governance.

the pros and cons of the approaches taken by these States.

2. Section 2 discusses public goods and the closely related concept of externalities in economic theory, analyzes EMS systems with respect to these concepts, and discusses insights provided by theory about their efficient provision.
3. Section 3 reviews the observations following from the study's analyses of EMS as an essential service and public good.

AN ASSESSMENT OF EMS AS AN "ESSENTIAL SERVICE"

The study began by trying to identify existing definitions of "essential service." It found no reference to legal or policy definitions of "essential service." Stakeholders contacted were unaware of any official definitions of an essential service. The study's review of city charters, State statutes, and policy and planning documents yielded no definitions.[13] A review of information on EMS-related statutes available on the web site of the National Association of State Emergency Medical Services Officials did identify a number of statutes that make reference to EMS as "essential" or "vital."[14] While the term is not used consistently and is not defined, usage of the term in some statutes is suggestive.

The study's review of academic literature did identify two Supreme Court decisions—*New York v. United States*[15] and *National League of Cities v. Usery*[16]—that addressed the question of what constitutes "essential" government functions. These cases were focused on issues of Federalism and do not bear directly on the subject of this white paper, but the Court's approach to defining "essential" is instructive.

A 1980 Fordham University Urban Law Review Journal article[17] explains the decisions:

> *The Supreme Court in* National League of Cities v. Usery *turned to the general definition of an essential governmental function suggested in* New York v. United States *to determine whether [F]ederal or [S]tate governments ought to regulate local government employees. However, rather than delineating a working definition of an essential governmental function, the National League of Cities Court merely stated several examples of activities considered to be essential.*

While the court offered a variety of examples, including hospital and school workers, it did not provide a clear or consistent definition.

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[13] In addition to broad-gauged Web research, the study specifically searched city charters of the country's 25 most populous cities.

[14] www.nasemso.org/legislation/search/Default.aspx

[15] *New York v. United States*, 326 US 572 (1946). http://bit.ly/18ndxp0

[16] *National League of Cities v. Usery,* 426 U.S. 833 (1976). http://bit.ly/12PdKvA

[17] Souther SA. The Essential Governmental Function after National League of Cities v. Usery: Impact of an Essentiality Test on Commuter Rail Transportation. *Fordham University Urban Law Journal* 1980; 9(1) Article 4. http://bit.ly/15M2umx

It is a common government practice to identify certain types of employees that must report to work under adverse conditions. The study identified State- and local-level definitions and designations of a "essential employees," which are sampled below:

- Pennsylvania: "Employees who are designated as required to work when an office closing is authorized, usually in operations that must provide services around the clock. The designation of essential can depend upon the employees' duties, as well as the circumstances for the closing."[18]
- Colorado: "Essential employees are those employees who perform law enforcement, highway maintenance, and support services directly responsible for the health, safety, and welfare of patients, residents, students, and inmates (24-50-104.5, C.R.S.). Department heads are responsible for designating whether or not an employee is essential."[19]
- Minnesota: "Essential employee" means firefighters, peace officers subject to licensure under sections 626.84 to 626.863, 911 system and police and fire department public safety dispatchers, guards at correctional facilities, confidential employees, supervisory employees, assistant county attorneys, assistant city attorneys, principals, and assistant principals. However, for [S]tate employees, "essential employee" means all employees in law enforcement, health care professionals, correctional guards, professional engineering, and supervisory collective bargaining units, irrespective of severance, and no other employees. For University of Minnesota employees, "essential employee" means all employees in law enforcement, nursing professional and supervisory units, irrespective of severance, and no other employees. "Firefighters" means salaried employees of a fire department whose duties include, directly or indirectly, controlling, extinguishing, preventing, detecting, or investigating fires. Employees for whom the [S]tate court administrator is the negotiating employer are not essential employees. For Hennepin Healthcare System, Inc. employees, "essential employees" means all employees.[20]

These examples indicate a variety of interpretations of an "essential employee." Generally, these listings included job categories responsible for public safety and health. However, it is difficult to derive a definition from such listings without additional context.

In sum, the study found no authoritative legal or policy definition of an "essential service." What constitutes an essential service is more a matter of local practice than official definition.

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[18] State of Pennsylvania, *Guidance for Designating Essential Employees Management Directive, 530.17 Amended*. www.portal.state.pa.us/.../guidance_defining_essential_employees_pdf

[19] State of Colorado statute C.R.S. 24-50-104.5(1), *Colorado Personnel Rules and Administrative Procedures under rule 3-37*. http://hr.colorado.edu/es/Classified/Documents/EssentialServiceFAQ.pdf

[20] State of Minnesota, *Legislative History of PERLA Essential Employees Definition*, 2009. http://mn.gov/bms/documents/Essential.pdf

WORKING DEFINITIONS OF AN ESSENTIAL SERVICE

The study did identify two different, but complementary, working definitions of essential service. These definitions are discussed and their applicability to emergency medical systems considered.

Definition #1

The first concept of essential service is defined by the International Labour Organization's (ILO) Freedom of Association Committee, a specialized agency within the United Nations.[21] The ILO has written about essential services in the context of a workers' right to strike:

> *The principle regarding the prohibition of strikes in essential services might lose its meaning if a strike were declared illegal in one or more undertakings which were not performing an "essential service" in the strict sense of the term, i.e.[,] services whose interruption would endanger the life, personal safety, or health of the whole or part of the population.*

This definition provides a criterion by which to assess whether a service should be considered essential. The ILO identifies police and fire in its own listing of essential services. While the ILO does not discuss the inclusion of specific services on its list, it is intuitive that the disruption of police and/or fire services would pose a significant risk to public health and safety. Effective police forces help deter crime and maintain public order. Fire prevention services guard public safety by containing and extinguishing fires before they spread.

In the case of "routine" emergencies, the threat posed by the disruption of emergency medical services is less clear. For instance, although an individual may die for lack of emergency medical treatment, the broader public is not threatened in the same way that it would be by a fire left unchecked. This routine scenario suggests agreement with the ILO, which identifies emergency medical services among a group of services that do not meet its definition of essential service.[22]

However, a different assessment is suggested in the context of a mass casualty incident, which the World Health Organization defines as:

> . . . an event which generates more patients at one time than locally available resources can manage using routine procedures. It requires exceptional emergency arrangements and additional or extraordinary assistance. It can also be defined as

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[21] International Labour Organization. *Freedom of Association: Digest of decisions and principles of the Freedom of Association Committee of the Governing Body of the ILO.* Fifth (revised) edition, 2006. Geneva: International Labour Organization; 2006. www.ilo.org/wcmsp5/groups/public/---ed_norm/---normes/documents/publication/wcms_090632.pdf

[22] Ibid. The document provides no explanation for the inclusion of Emergency Medical Services on this list.

any event resulting in a number of victims large enough to disrupt the normal course of emergency and health care services.[23]

Mass casualty incidents, which may vary greatly in scale, are defined relative to local resources or normal response capacity, including both emergency and healthcare services. They may include such things as a multiple-vehicle collision, a building collapse, a mass transit accident, a HAZMAT incident, or a case of multiple shootings.[24]

In the context of mass casualty incidents, the interruption of emergency medical services may be understood to threaten the health and safety of the broader public. This logic is implied in the emergency response plans of several States, including Florida and Illinois, which identify a key role for EMS in disaster response.[25] In a similar vein, the National Association of Emergency Medical Technicians asserts that emergency medical services are a "critical element of our [N]ation's disaster and mass casualty response infrastructure" and "fulfill [an] essential public function to the best of their ability for all patients in need within their limited resources."[26]

Definition #2

Based on research, the study derived a second definition of an essential service: a service to which every citizen should be guaranteed access. This definition follows from an equity-based justification for government provision.

This underlying equity-based justification is implicit in the North Carolina, California, and Colorado State statutes that mandate counties to provide a minimum level of EMS service. North Carolina's statute, for example, says that "county governments shall establish EMS systems," that an EMS system must have a defined geographic area of at least one county (but may extend into others), and that care must be offered to residents 24 hours per day.[27] This language is a clear indication that the government of North Carolina implicitly believes that all residents must enjoy equal access to care.

Equity has been a major consideration in descriptions and justifications of EMS by advocates. Most notably, *EMS Agenda for the Future*[28] refers to EMS as the public's "emergency medical safety net," three years before the first State mandate was enacted by

[23] World Health Organization, Mass Casualty Management Systems, 2007, p.9. www.who.int/hac/techguidance/tools/mcm_guidelines_en.pdf

[24] These examples are drawn from a more extensive list provided in an EMS online publication: Mass Casualty Incident: An Overview www.emsconedonline.com/pdfs/EMT-Mass%20Casualty%20Incident-an%20overview-Trauma.pdf

[25] Interview with Jill Morganthaler, former head of the Illinois Department of Homeland Security

[26] National Association of Emergency Medical Technicians, *Recognition of EMS as an Essential Public Function,* 2013. http://bit.ly/15PBt3K

[27] North Carolina statute 10A NCAC 13P .0201 *EMS SYSTEM REQUIREMENTS*. www.ncdhhs.gov/dhsr/rules/ems/011409/13P_0201.pdf

[28] National Highway Traffic Safety Administration. *EMS Agenda for the Future*. (Report No. DOT HS 808 441). Washington, D.C.: National Highway Traffic Safety Administration; 1996. www.ems.gov/pdf/2010/EMSAgendaWeb_7-06-10.pdf

North Carolina in 1999. Similar language is used in a draft policy statement being considered by the National League of Cities this year recognizing EMS as an essential service.

> *[L]ike police and fire protection, EMS is an essential public safety service and maintaining a state of readiness for emergency response, regardless of the delivery model, is in the public interest. EMS is and must remain the community's safety net to ensure timely access to emergency medical care.*[29]

Equity-based justifications are closely related to public expectations of service. For instance, the American Ambulance Association argues that the public's expectation has evolved so far that the act of dialing 9-1-1 and expecting an ambulance to arrive is an "essential health benefit" that requires reimbursement at the Federal level.[30]

It is important to understand the equity-based justification of EMS provision by government in the context of evolving public expectations in the modern era. Social scientists, beginning with Max Weber, have observed a general social tendency: as affluence increases and new technologies and services become available and more widespread over time, the public comes to see access to certain technologies and services as "indispensable" to enjoying the same opportunities and quality of life.[31] The public comes to expect that these technologies and services should be available to everyone. It is a commonly expressed belief that, in an affluent society, no citizen should be denied equal access to the benefits of modernity.

Electricity and telephone service offer notable examples of this tendency. Both have been provided as public utilities to ensure access to remote and sparsely populated areas where market provision would not be profitable. High-speed Internet service offers a more recent example of a technology that has come to be seen as indispensable and has become the subject of debates about government action to ensure equal access. This is reflected in arguments about "bridging the digital divide" over the last decade. Most recently, the Obama administration has advocated action to ensure equal access.[32]

EMS follows this general trajectory. In 1965, the President's Committee on Traffic Safety published *Health, Medical Care and Transportation of the Injured* bringing national attention to highway injury care. The next year, the National Research Council released its landmark report, *Accidental Death and Disability: The Neglected Disease of Modern Society*, which highlighted the inadequate capabilities of and unequal access to ambulance services. Army surgeons with experience in trauma care in World War II and Korea played an

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[29] Draft provided by Dr. Scott Somers, vice chair, Public Safety & Crime Prevention Committee, July 2013.

[30] Ambulance service is included in a list of essential health benefits covered by subsidized insurance plans under the Affordable Care Act.

[31] Gerth HH, Mills CW, eds. *From Max Weber.* New York: Oxford University Press; 1958.For a recent treatment of the concept see Lewis E. *American Politics in Bureaucratic Age.* Cambridge, MA: Winthrop Publishers, Inc., 1977).

[32] *National Journal*, The Promise Audit blog, http://promises.nationaljournal.com/science-technology/expand-high-speed-internet-access-in-rural-areas/

important role advocating for improving capabilities in the United States. In the 1960s, the efficacy of CPR was demonstrated and advanced cardiac life support technologies became available. In 1966 Congress passed the Highway Safety Act, which provided impetus to support improved EMS capabilities across the Nation.[33]

The public has come to expect the availability of EMS service over time. The public's expectations about access to EMS are addressed indirectly in a couple of polls.[34] Also, these expectations may be inferred from the public outcry that results from the occasional cases of EMS failure to respond and the fact that most hospitals and hospital-based ambulances are required by Federal law to provide stabilizing emergency care regardless of ability to pay.[35]

While one can argue whether particular technologies and services are truly indispensable in an objective sense, the demands on government services are real and create a challenge for the provision of emergency medical services as noted in the discussion of EMS systems as common goods in Section 3.

THE PROS AND CONS FOR STATES AND LOCALITIES OF IMPLEMENTING EMS AS AN ESSENTIAL SERVICE

If EMS is an essential service – a service that the government must provide to ensure access for the public, the question is how best to do it. As noted in the beginning of this section, a number of State statutes refer to EMS as essential, but not all have acted to ensure access to the service. This study identified at least four States—North Carolina, California, Oregon, and Colorado--that have done so. The pros and cons of the approach taken by these States are discussed below.

Each statute differs in detail, but the approach is broadly similar in three respects. First, each statute mandates that counties ensure the availability of a basic level of emergency medical services (*i.e.,* minimum standards for EMS personnel). Second, the counties are

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[33] This history is recounted in *Emergency Medical Services at the Crossroads*, Chapter 2.

[34] A Harris poll conducted for the Coalition for American Trauma Care in 2005 found that 9 in 10 Americans indicated that it is extremely or very important for their States to have trauma systems, after hearing a definition of trauma systems that included ambulances. Poll results reported in congressional briefing by HarrisInteractive, "The American Public's Views of and Support for Trauma Systems," March 2, 2005. The 2007 Motor Vehicle Occupant Safety Survey found that 94 percent of respondents believe EMS is equally important or more important than police services and fire services. Also, 58 percent of respondents were willing to pay more for 9-1-1 call services and 63 percent were willing to pay more for EMS. Results of this survey are reported in Block AW. 2007 Motor Vehicle Occupant Safety Survey: Use of and Support for Emergency Medical Services Systems. (Traffic Safety Facts Research Note. Report No. DOT HS 811 178). Washington, DC: National Highway Traffic Safety Administration; Sepbember 2009..

[35]The Emergency Medical Treatment and Active Labor Act (EMTALA), passed in 1986, requires that patients presenting urgent conditions be given a standard evaluation, "stabilizing" medical care, and be transferred to the most appropriate facility, regardless of ability to pay. This requirement was expanded to include hospital-owned ambulance transports. EMTALA applies to all Medicare-contracted hospitals with emergency departments.

given discretion on how to meet these basic requirements. Third, they dedicate funding to support county efforts to meet requirements.

Each State varies in the basic level of EMS service it requires. In North Carolina, counties are required to offer service to all residents, and EMTs are required to meet a minimum certification level. In Colorado, the State has established minimum standards that counties must meet, and the State licenses EMS services. In California and Oregon, counties are only required to ensure the provision of ambulance service.

The approach taken by these four States offers three advantages. First, it ensures a minimum capability across the State. North Carolina is a notable case as legislation enacted in 1999 has extended EMS coverage to 93 percent of the geographic area of the State and 99 percent of its population.

Second, it provides the flexibility to tailor EMS provision to local circumstances. Flexibility in staffing is especially important for rural counties, because smaller tax bases and higher costs (due to limited economies of scale and higher travel expenses) force them to rely on volunteers to staff EMS units. Raising training requirements too quickly might threaten those communities' ability to provide basic service because volunteers may decide that the demands of continued service are too great.

Third, this approach provides resources to support system improvement over time. For example, Colorado has instituted a vehicle tax that provides a distinct funding stream for the State-level EMS agency to ensure that counties continue to meet minimum standards in ambulance service. The EMS agency also uses a portion of this funding to encourage local providers to upgrade equipment and reimburse personnel who wish to improve their certifications.

An obvious disadvantage of any policy action is government financial liability. The approach to promoting EMS in these four States is largely an unfunded mandate that appears to present minimal financial risk for the States themselves. However, dedicating funding streams to the support of county EMS systems does involve new or increased taxes at these levels. Cost is the most common objection to State mandates.

This approach means that the financial burden falls primarily on the counties that are mandated to ensure the availability of service. The extent of the burden will depend on the particular requirements, the funding dedicated by the State, and how counties choose to organize the provision of EMS.

A PUBLIC GOODS ANALYSIS OF EMS SYSTEMS

In considering an economic analysis of EMS systems, it is important to distinguish between the common-sense understanding of public goods and the concept of public goods in economic theory. A public good is commonly understood simply as a good, such as education or fire protection, that offers public benefits, which justify government support.

Economic theory is not concerned with providing any particular good, but with the conditions under which government action might be efficient. Public goods in economic theory refer to a specific condition under which government action *may* be justified by market failure—when markets do not achieve Pareto efficiency.[36]

Externalities, the costs or benefits which result from an activity or transaction and which affect an otherwise uninvolved party who did not choose to incur those costs or benefits, are another condition under which market failure may be expected to occur. The following sections will discuss public goods and the closely related concept of externalities, as well as the general policy prescriptions offered by economic theory to address market failures.

PUBLIC GOODS

Public goods are defined by two characteristics:

- *Non-excludability*—it is either not possible or not feasible to exclude individuals from enjoying the good (that is, the costs of exclusion would exceed the benefits).
- *Non-rivalry*—it does not cost anything for an additional individual to enjoy the good (that is, zero marginal cost), so one person's consumption of the good does not reduce its enjoyment by another.

National defense illustrates a pure case of a public good and the logic of market failure. Everyone benefits when national defense deters an attack on the United States, and there is no marginal cost to provide national defense to additional citizens born in the United States. Assuming that everyone values national defense, but the government does not provide it, would it be provided through the market? Since no one can be excluded from the benefits of national defense, no one has the incentive to pay for the service voluntarily, which prevents market provision. This incentive problem—known as the *free rider problem*—is the justification for taxation to support the provision of public goods.

Public goods may be understood in contrast to private goods, such as food and clothing, which are both excludable and rival. Their consumption or use by one person precludes their consumption or use by others. For example, once an apple is eaten it cannot be eaten by someone else.

A TYPOLOGY OF GOODS

Public and private goods may be understood within a broader typology of goods classified with respect to their *dominant* characteristics. This typology is presented in Table 1 below.

[36] Pareto efficiency refers to an allocation of resources such that no change can be made without making someone worse off. It is important to note that market failure does not imply that government action would actually be more efficient. Government action is subject to its own inefficiencies. There is an extensive academic literature concerned with the conditions under which "government failure" may be expected to occur.

Table 1: Typology of Goods

	Excludable	Non-excludable
Rival	**Private Goods** • Food • Clothing	**Common Goods** • Scarce natural resources, such as water, fish stocks • Publicly provided private goods, such as college education
Non-rival	**Club Goods** • Community pools • Un-crowded toll roads	**Public Goods** • National defense

Three of these types—public goods, club goods, and common goods—may offer the potential for public benefits that may not be realized due to market failure. *Pure public goods* are non-excludable and non-rival as already discussed in the case of national defense.

Goods that are excludable, but non-rival, are often referred to as *club goods*. As the name implies, club goods would include amenities such as swimming pools and golf courses offered through private clubs accessible only to dues-paying members. They also include toll roads. Cost-effective exclusion mechanisms enable the private provision of club goods to be financially viable, but may prevent the full public benefits from being realized by unduly limiting consumption. For example, while it may be feasible to charge for the use of an un-crowded road, it may not be Pareto efficient because it leads individuals not to use the road even though additional use entails little or no cost.

Common goods are non-excludable, but rival. This category includes: (1) scarce natural resources, such as water and fish stocks subject to overuse and degradation for lack of effective exclusion mechanisms; (2) goods such as highways subject to congestion because exclusion is not feasible; and (3) publicly provided private goods such as college education that are difficult to exclude because the public expects access to goods supported by tax payer dollars. The difficulty of exclusion in the case of publicly provided private goods creates the potential for overuse. Because marginal costs are high and public resources are scarce, overuse may lead to degradation of the good over time due to underinvestment in capacity.

As Table 2 illustrates below, each of these three types of goods—public goods, club goods, and common goods—is subject to different types of market failures. The market failure in the case of public goods is because of the free-rider problem. In the case of club goods, the market failure is under-consumption. In the case of common goods, the characteristics of non-excludability and rivalry combine to create two problems: under-provision and overuse.

Table 2: Market Failures by Type of Good

	Excludable	Non-excludable
Rival	**Private Goods** Efficient provision/No market failure	**Common Goods** Under-provision AND Overuse
Non-rival	**Club Goods** Under-consumption	**Public Goods** Under-provision/Free riders

Policy Prescriptions for Market Failures Associated With Different Types of Goods

Economic theory offers general policy prescriptions for market failures associated with each type of good, except private goods, in which case it is presumed that market provision is efficient. The study has already noted that the standard remedy for the free rider problem of public goods is financing through taxation. In the case of club goods, the inherent inefficiency of exclusion in the context of non-rival benefits suggests that government financing through taxation may be efficient depending on the degree of non-rivalry. The case of common goods is more complicated, given the diversity within this category. However, the standard policy prescription for publicly provided private goods is a mix of financing through taxation and user fees and the application of user fees to discourage overuse.

Economic theory prescribes that where a service is excludable (*i.e.,* a fee can be charged) and the benefits of a service accrue primarily to the user (rival), it is most efficient to charge the user only for marginal cost, defined as the long-run cost of providing the benefit to an additional user. Pricing the service above marginal cost will lead to under-consumption and pricing the service below marginal cost will lead to over-consumption. Marginal-cost pricing then also serves to discourage overuse. The fixed costs associated with providing the service are most efficiently financed through taxation so as not to distort individual consumption decisions.

EXTERNALITIES

Externalities may be negative or positive. A negative externality occurs when the actions of an individual or firm impose an uncompensated cost on others. A positive externality occurs when the actions of an individual or firm create a benefit for others that they do not pay for.

Industrial pollution is an example of a negative externality. Because a firm does not bear the (external) cost of its actions, it has no incentive to reduce the negative effect of pollution and will, therefore, "overproduce" it. This incentive problem mirrors the free rider problem that results in the underproduction of public goods. Indeed, negative externalities are often referred to as "public bads."

Industrial research is a good example of a private activity with positive externalities. Private firms' investments have strong positive effects on other firms and the public because they enable innovation. However, even though research benefits the firms investing in it, they tend to underinvest because they cannot capture all of the benefit. Other firms and consumers may be seen as free riders on this benefit.

The conventional policy prescription to address the free rider problem behind this underinvestment is to provide a tax subsidy to firms for performing research. This reduces the cost of performing the research thereby compensating in part for the (external) benefit of the activity.

Externalities and public goods are closely related and sometimes difficult to distinguish. Like public goods, the benefits and costs associated with externalities are non-excludable and non-rival. Positive externalities are commonly distinguished from public goods in so far as they are unintended.

While the concept of externalities was developed to apply to the actions of private actors in the context of market failure theory, the same basic incentive problems apply to public actors, such as government agencies. For example, a local government agency responsible for disaster preparedness whose activities benefit multiple jurisdictions will tend to underinvest in this activity, given its local mandate and limited resources.

ANALYSIS

This study analyzes EMS systems with respect to the characteristics of non-excludability and non-rivalry and assesses how EMS systems fit within the typology of goods discussed above. The purpose of this analysis is to provide insight into the basic problems faced by EMS systems from a market failure perspective. This study then discusses the general policy prescriptions offered by economic theory to address these problems.

Non-excludability

Pre-hospital emergency medical services are effectively non-excludable.

While technically possible, it is difficult to exclude all non-payers due to the uncertain and exigent circumstances under which emergency medical services are provided. The decision to respond must be based on limited information obtained over the phone and radio, often indirectly, from private individuals and first responders on the scene in highly stressful and emotional situations. More importantly, where a health emergency is in play, it does not

make sense for a dispatcher or an EMS unit on the scene to spend time attempting to discern whether a patient is able to pay. Uncertainty also limits the ability of EMS providers to screen calls for urgency of need and exclude non-urgent calls.

Leaving aside the challenges posed by an uncertain and exigent operating environment, public sentiment would likely not accept denial of emergency care based on ability to pay and adds political risk to any attempt to deny service for non-urgent calls. Together these factors make emergency medical services effectively non-excludable.

The free rider problem

The mix of funding for EMS systems varies across the country. State and local taxes generally fund some part of EMS systems, including ambulance services in some cases. However, funding for ambulance services, in general, depends primarily on reimbursement by public and private insurers. Medicare, Medicaid, and most private insurers reimburse ambulance providers for medical transportation to the hospital.

An analysis of the free rider problem and the resulting financial challenges facing EMS systems should consider both the cost of delivering emergency medical services to individuals and the cost of maintaining system readiness to respond to calls on demand. The marginal cost of delivering EMS to an individual using existing response units includes gas, "wear and tear" on the vehicle, and medical supplies used in the care of the individual patient. Medicare, Medicaid and private insurance reimbursements for medical transport generally cover these costs. The extent of the free rider problem varies across jurisdictions, depending in large part on the insurance coverage of the population served. In relatively affluent jurisdictions where insurance coverage is high, the free rider problem may have a more limited impact on the financial viability of EMS. This free rider problem may be expected to decrease significantly with the implementation of the Affordable Care Act, which is intended to extend private medical insurance and Medicaid coverage to a larger proportion of the population.

This leaves the challenge of funding the costs of EMS system readiness, such as staffing, training, equipment and supplies, and administration. Currently, Medicare, Medicaid, and most private insurance reimbursements, as a matter of policy, do not cover readiness costs.[37]

Medicare and Medicaid may be understood as partial free riders on EMS systems. As government health insurance programs, Medicare and Medicaid, guarantee the elderly and the poor access to healthcare. This guarantee depends on the capacity of local EMS systems to respond on demand. Yet, Medicare and Medicaid reimbursements, as a matter of policy, do no cover the costs of system readiness. The financial impact of this free rider problem may be expected to increase as the baby boomer generation ages, requiring local EMS systems to invest in additional capacity to respond on demand.

[37] In practice, total reimbursements may exceed the sum of marginal costs, thereby leaving some cash available to offset the costs of maintaining system readiness.

Non-rivalry

Emergency medical services are rival.

Emergency medical services are rival at the point of congestion during periods of peak demand. That is, when all EMS units are busy they cannot respond (or respond in a timely way) to additional calls. The degree to which EMS services are congested is an empirical question and will vary across jurisdictions depending on the balance of capacity and demand. In the absence of current, systematic data on congestion, the relative rivalry of EMS may be indicated by comparison with fire services. Fire protection services are considered non-rival because they are rarely called upon to respond to multiple fires at once and therefore generally have capacity available to respond to calls on demand. By contrast, multiple calls for EMS are common during periods of peak demand or during long transports from rural communities to distant tertiary care centers.

The marginal cost of adding the capacity needed to ensure that EMS can be delivered to an increased number of individuals during periods of peak demand is high. It includes additional vehicles and personnel available on demand. (Compare with the relatively small marginal cost of responding to individual calls with available units, which includes only gas, "wear and tear" on the vehicle, and medical supplies.)

Some elements of EMS systems are non-rival.

Not all elements supporting EMS system readiness to respond are rival. At least two elements commonly identified in definitions of EMS systems--quality improvement activities and offline medical direction--are non-rival. For instance, serving another individual requires another EMS unit, but not additional expenditures on dispatch/communications infrastructure.

The guaranteed *availability* of EMS system capacity to respond on demand is non-rival

While emergency medical services are rival, the guaranteed *availability* of EMS systems to respond to calls on demand is non-rival. In other words, having the system in place potentially benefits everyone, who may or may not need to call for EMS.

Non-rival benefits of EMS systems are greater in the context of mass casualty incidents.

Mass casualty incidents[38] magnify the non-rival benefits of an EMS system, assuming the system has the capacity to respond effectively. Effective EMS systems can mitigate the consequences of disasters and speeding recovery.

[38] The World Health Organization defines a mass casualty incident as: ". . . an event which generates more patients at one time than locally available resources can manage using routine procedures. It requires exceptional emergency arrangements and additional or extraordinary assistance. It can also be defined as any event resulting in a number of victims large enough to disrupt the normal course of emergency and health care services." Mass Casualty Management Systems, 2007, p. 9.

- A robust EMS system can significantly extend the capacity of hospital emergency departments in two ways: (1) triaging/treating people on the scene who might otherwise go to hospitals and (2) efficiently distributing patients to area hospitals with the capacity to treat them.
- In so doing, the EMS system can not only increase the number of people who receive treatment, but also increase treatment quality through efficient alignment of medical needs and capacity, thus improving outcomes.
- Better medical outcomes in the context of mass casualties translates into less disruption of business and government services if more people can resume their work and recovery can proceed more quickly.

Effective EMS systems perform these basic functions—e.g., triaging/treating, efficient distribution of patients--under normal conditions as well, but they perform them on a larger scale in the case of mass casualty incidents.

Preparation for effective EMS response and medical transportation in the case of mass casualty incidents requires extraordinary investments in logistics, training, communications capabilities, as well as the coordination among multiple jurisdictions.[39] Private providers may be expected to under invest in such preparation in so far as they would not be able to reap sufficient returns.

The potential benefits of EMS capacity to respond to mass casualty events span jurisdictions by definition. As already noted, the capacity itself requires investment in coordination across jurisdictions.

Effective EMS systems generate significant positive externalities.

Some evidence indicates that timely, high-quality pre-hospital EMS services significantly improves medical outcomes of hospital-based emergency medical care and reduces downstream healthcare costs.[40] Downstream cost savings arise from the decreased need for intensive emergency care and for post-emergency care as a result of better initial medical management and outcomes. These benefits may accrue to the broader public in the form of lower insurance rates and taxes.

In that these benefits to the broader public are not intentional and smaller overall than the private benefits conferred on individuals receiving EMS, they are treated here as externalities. To the extent that healthcare providers and the broader public do not pay for

[39] See
Sternberg E, Lee G. New York City's healthcare transportation during a disaster: a preparedness framework for a wicked problem. *Prehosp Disaster Med* 2009; 24:95-107.

[40] Recent evidence of improved medical outcomes and downstream healthcare savings is summarized in National EMS Advisory Council. EMS Makes a Difference: Improved clinical outcomes and downstream healthcare savings. A position statement of the National EMS Advisory Council. Published December 2009. www.ems.gov/pdf/nemsac-dec2009.pdf.

these benefits, they may be seen as free riders.

Emergency department overcrowding generates a negative externality for EMS systems.

It is important to note that the performance of prehospital EMS systems is affected by the larger healthcare systems in which they operate. Chronic crowding of hospital emergency departments impairs the performance of EMS systems by delaying treatment, with EMS units being diverted to more distant hospitals and emergency departments unable to admit patients upon arrival.[41]

POLICY IMPLICATIONS OF EMS SYSTEMS AS COMMON GOODS

Based on this analysis, EMS systems may best be understood as a common good. As a common good, EMS systems confront two main challenges: financing and limiting overuse.

Given that the guaranteed *availability* of EMS system capacity to respond on demand is non-rival, economic theory suggests that it would be most efficient to fund the cost of EMS system "readiness" through taxation. EMS system capacity to respond to mass casualty incidents and the positive externalities generated by EMS systems in the context of routine emergencies also raise the question of which level of government should pay. For instance, investments in disaster preparedness may benefit multiple local jurisdictions and downstream healthcare savings may be expected to reduce claims on Medicare and Medicaid, which would benefit Federal and State taxpayers.

By contrast, the benefits of ambulance transports that result from routine medical emergencies accrue primarily to individuals. Therefore, economic theory suggests that that the marginal cost of service delivery may be financed most efficiently through user fees. However, the optimal balance of funding between taxes and user fees depends on a number of considerations, including the extent of the free rider problem, which depends in part on the implementation of the Affordable Care Act.

User fees also may be applied to deter overuse—non-urgent calls—thereby freeing up EMS units to respond to more urgent health emergencies. However, the incentive effect of a user fee is limited as it is paid mostly, if not entirely, by insurance providers rather than the individual. Insurance co-pay requirements may enable some incentive effect, but the impact of such requirements on overuse will depend on the extent to which the population using Emergency Medical Services for non-urgent care is insured.

CONCLUSION

The study found that no authoritative legal or policy definitions of essential service in the United States, but did identify the bases for different yet complimentary definitions. The first relates to ensuring public health and safety—a service whose interruption would

[41] *EMS at the Crossroads*, Chapter 2.

endanger the life, personal safety, or health of the whole or part of the population. Emergency Medical Services may be understood as an essential service by this definition in the context of "mass casualty incidents." The second definition relates to ensuring equal access—a service to which all citizens should be guaranteed access. Emergency medical services appear to fit the second definition of an essential service in so far as the public generally has come to expect that emergency medical services will be available 24/7 to all citizens regardless of ability to pay.

State statutes implementing EMS as an essential service offer the advantages of ensuring a minimum capability across a State, providing the flexibility to tailor the provision of EMS systems to local circumstances, and supporting voluntary improvement over time. These advantages must be weighed against the financial burden imposed on counties.

After examining the concepts of public goods and essential services, this study concluded that EMS is best understood as a common good that faces the challenges of financing and limiting overuse in the form of non-urgent calls. Given that the guaranteed *availability* of EMS system capacity to respond on demand is non-rival, economic theory suggests that it would be most efficient to fund the cost of EMS system "readiness" through taxation. EMS system capacity to respond to mass casualty incidents and the healthcare savings generated in in the context of routine emergencies also raise the question of which level of government should pay. For instance, investments in disaster preparedness may benefit multiple local jurisdictions and downstream healthcare savings may be expected to reduce claims on Medicare and Medicaid, which would benefit Federal and State taxpayers.

By contrast, the benefits of EMS responses to routine emergencies accrue primarily to individuals. Therefore, economic theory suggests that that marginal cost of service delivery may be financed most efficiently through user fees. However, the optimal balance of funding between taxes and user fees depends on a number of considerations, including the extent of the free rider problem, which depends in part on the implementation of the Affordable Care Act.

User fees also may be applied to deter overuse—non-urgent calls—thereby freeing up EMS units to respond to health emergencies. However, the incentive effect of a user fee is limited as it is paid mostly, if not entirely, by insurance providers rather than the individual. Insurance co-pay requirements may enable some incentive effect, but the impact of such requirements on overuse will depend on the extent to which the population using Emergency Medical Services for non-urgent care is insured.

The intent of this study was not to develop policy recommendations, but to provide insight and general guidance on how to approach the efficient and equitable provision of EMS.

This report was produced to support the deliberations of the NEMSAC regarding options for funding EMS systems at the State and local levels. The paper will also be useful to State and local government officials who make decisions governing the funding of the EMS systems that they oversee. Providing stable and ongoing funding for EMS systems is an essential

prerequisite to ensuring that injured occupants of motor vehicle crashes receive skilled emergency medical care and timely transportation to hospitals and trauma centers. This study was not conducted to develop policy recommendations, but rather to provide insight and general guidance on how to approach the efficient and equitable provision of EMS through discussions of policy implications.

APPENDIX A: LEAD AUTHOR AND STUDY TEAM BIOGRAPHIES

Mike Van Milligen—*Lead Author*—Van Milligen is the city manager of Dubuque, Iowa, and an Academy fellow. His prior positions include assistant village manager of Skokie, Illinois; public information officer of Skokie, Illinois; administrative assistant to the sheriff in Jackson County, Illinois, and police officer/traffic accident investigator in Carbondale, Illinois. He has completed the Harvard University's John F. Kennedy School of Government Program for Senior Executives in State and Local Government and the Kellogg Management Institute at Northwestern University. In 2003, he was named the Outstanding Manager of the Year by ICMA. Other achievements Van Milligen has been awarded are the 2007 Iowa City/County Management Association's Manager of the Year, and the 2009 Novogradac Community Development Foundation's Public Executive of the Year. He holds a master of public affairs and bachelor of ccience degrees in fire science management and administration of justice from Southern Illinois University.

Joseph Mitchell, Ph.D.—*Director of Project Development*—Mitchell manages the National Academy for Public Adminiustration's studies program and previously served as project pirector for past academy studies for the Government Printing Office, the U.S. Senate Sergeant at Arms, USAID/Management Systems International, the National Park Service's Natural Resource Stewardship and Science Directorate, and the USDA Natural Resources Conservation Service. He holds a Ph.D. from the Virginia Polytechnic Institute and State University, a master of public administration from the University of North Carolina at Charlotte, and a BA in history from the University of North Carolina at Wilmington. He is currently pursuing a master of international public policy with a concentration in American foreign policy from the Johns Hopkins University School of Advanced International Studies.

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APPENDIX C: GLOSSARY OF TERMS

Club goods—goods that are excludable, but non-rival.

Common goods—goods that are non-excludable, but rival.

Emergency medical services—prehospital and out of hospital EMS, including 911 and dispatch, emergency medical response, field triage and stabilization, and transport by ambulance or helicopter to a hospital or between facilities

EMS system readiness—refers the system capacity required to respond on demand to calls for Emergency Medical Services

Excludable—it is technically possible and feasible to exclude individuals from enjoying the good.

Externality—a cost or benefit which results from an activity or transaction and which affects an otherwise uninvolved party who did not choose to incur that cost or benefit.

Free rider problem—refers to someone who benefits from resources, goods, or services without paying for the cost of the benefit. It can be considered a problem when it leads to under-provision of good or services.

Marginal Cost— Marginal cost refers to the cost of providing service to additional individuals. It is important to distinguish between the marginal cost of responding to a call with available units, which includes gas, "wear and tear" on the vehicle, and medical supplies, and the cost of the added capacity needed to support readiness to respond to additional calls during periods of peak demand. This includes additional vehicles and personnel available on demand.

Market failure—an allocation of resources by the market that is not Pareto efficient.

Mass casualty incident—an event which generates more patients at one time than locally available resources can manage using routine procedures. It requires exceptional emergency arrangements and additional or extraordinary assistance. It can also be defined as any event resulting in a number of victims large enough to disrupt the normal course of emergency and health care services.

Negative externality—occurs when the actions of an individual or firm impose an uncompensated cost on others.

Non-excludability—it is either impossible or not feasible to exclude individuals from enjoying the good.

Non-rivalry—it does not cost anything for an additional individual to enjoy the good (that

is, zero marginal cost); one person's consumption of the good does not reduce its enjoyment by another.

Pareto efficiency— refers to an allocation of resources such that no change can be made without making someone worse off.

Positive externality—occurs when the actions of an individual or firm create a benefit for others that they do not pay for.

Public goods—goods that are non-excludable and non-rival.

Private goods—goods that excludable and rival.

Rival—it costs something for an additional individual to enjoy the good. One person's consumption of the good reduces its enjoyment by another.

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