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Transporting Lazarus: Physicians, the State, and the Creation of the Modern Paramedic and Ambulance, 1955–73

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Abstract. In 1966, morticians provided 50 percent of ambulance services in the United States; today advanced care by trained medical professionals en route to the hospital is considered a basic standard of care. The creation of emergency medical services (EMS) provides an important case study for how physicians acting as "experts" helped to shape the creation of federal policy in the post-World War II years. This paper challenges a narrative of the development of EMS that has emphasized technology, individual agency, and the role of fortuitous chance as the prime movers of EMS development. Instead it argues that a key factor in EMS development was the National Academy of Science-National Research Council's Committee on Emergency Medical Services. Using the examples of paramedic training and ambulance design, this paper argues that members of the committee utilized complex mix of local experimentation and professional networking to suggest directions for the federal government's efforts to create national standards and guidelines for EMS. The NAS-NRC Committee retained a prominent role in EMS development until the passage of the Emergency Medical Services Systems Act of 1973, when federal interest in EMS largely shifted from prehospital transport to an emphasis on in hospital care and regional trauma systems planning. *Keywords:* emergency medical services, paramedic, ambulance design, National Academy of Sciences, Highway Safety.

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On Friday November 4, 1966, former Pittsburgh mayor and Pennsylvania governor David L. Lawrence suffered a massive heart attack while speaking at a preelection rally. Despite receiving cardiopulmonary resuscitation (CPR) from a nurse in the crowd, Lawrence arrived at nearby Presbyterian University Hospital brain dead and in a coma, likely the result of an ill fitted or malfunctioning respirator on board the police ambulance that picked him up from the rally. After lingering for seventeen days, Lawrence died on November 22, 1966, at seventy-seven years old.[1]

Nine years later, on May 17, 1975, a seventy-two-year-old African American man named James Parker from Pittsburgh's Hill District reported "feeling real hot and sweaty all of a sudden" while sitting at a local cafeteria.[2] Trained paramedics quickly arrived at the scene and took a detailed patient history which revealed that Parker was a heart patient; was on digitalis (although he had not yet taken it that day); had a history of hypertension; and appeared to present no other diseases. Then Parker's pulse and respiration counts were taken, oxygen was administered, and the results of an electrocardiograph were attached to his file.[3] Finally, it appears that Parker was transported to nearby St. Francis Hospital.

Both men's stories highlight one of the important tenets of emergency medical care—survivability rates are inexorably linked with the treatment given to the patient on the way to the hospital. This simple observation predates the era of modern emergency medicine, but has often been an area of contest among physicians, policymakers, and first responders as new techniques and technologies for providing emergency care have been created over the last half-century.

Individual stories about advances in medical research or narratives about technology modification in the field form the backdrop of an origins story for emergency medical services (EMS) in which physicians, volunteer responders, professional firefighters, and police officers built a specialty by applying such improvements to victims of accidents or medical emergencies. This narrative argues that a highly localized

1. Michael P. Weber, *Don't Call Me Boss: David L. Lawrence, Pittsburgh's Renaissance Mayor* (Pittsburgh: University of Pittsburgh Press, 1988), 384–86.

2. Police Forms, Freedom House Case Reports, Freedom House Collection, Safar Center for Resuscitation Research, University of Pittsburgh, Pittsburgh, Pennsylvania. Patient's name has been changed to protect his privacy.

3. Ibid.

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and patchwork approach to life saving, as mediated through individual actors, gradually attracted the interest of the federal government in the standardization and control of training, rescue procedures, and equipment. In order to achieve cross-jurisdictional conformity, a more activist federal government used the power of legislation and Executive Branch regulations to create a national standard of emergency care.

The most common source of historical writing about EMS has been the historical actors themselves. Published in professional medical or EMS journals, this writing has emphasized technology, individual agency, and the role of fortuitous chance. Many of these accounts are brief, often part of attempts by physicians, nurses, and paramedical professionals to capture the rapid growth and maturation of EMS from the 1960s to the present before the field's founders retire or pass away.[4] While all of this work provides important background and offers the historian a rich primary source base, much of this work has downplayed the ways in which individual actors used a variety of professional or quasi-governmental forums to shape policy.[5]

This article suggests that the formation of modern EMS was more complex than simply the aggregate of many local origins stories. Because EMS policymaking involved multiple sets of physician and nonphysician actors, it provides an important window into how experts used quasi-governmental bodies like the National Academy of Sciences-National Research Council (NAS-NRC) as a clearinghouse for multidisciplinary ideas and as an important site where these ideas were sifted, evaluated, and transformed into a uniform set of federal policy recommendations.

Moreover, because of the National Academies of Sciences' unique relationship with the Executive Branch, this model of policymaking provided physician members with an alternative channel of influence

4. For examples of this trend, see Anthony C. Mustalish, "Emergency Medical Services: Twenty Years of Growth and Development," *N. Y. State J. Med.*, 1986, *86*, 414–20, and James Page, "A Brief History of Emergency Medical Services," *J. Emerg. Med. Serv.*, 1989, *14*, S11.

5. Ryan Corbett Bell, *The Ambulance: A History* (Jefferson, North Carolina: McFarland & Co., 2009). Bell does an excellent job of collecting multiple project histories and putting them into one volume. While the book is an important contribution to the history of EMS, it spends less time examining the role that quasi-governmental bodies and professional networking played in privileging a specific vision for EMS policy from the 1960s to the present. For example, Bell very briefly mentions the NAS-NRC Committee's work for the Department of Transportation (DOT) and the Department of Health, Education, and Welfare (HEW) but does not assign it a central role in the development of modern EMS.

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into the federal bureaucracy, a channel that gave the committee's physician membership an especially powerful platform from which to promote their own personal and professional ideas about how the nascent specialty of emergency medicine should develop and who should ultimately be responsible for determining the contours of federal involvement in providing EMS. As this article will show, even though the NAS-NRC's advice was nonbinding and it was not the only organization involved in trying to improve prehospital care, nevertheless it was quite influential. Overlooking or minimizing the role of the NAS-NRC Committee on Emergency Medical Services has obscured an important way that physician actions were translated into national policies.

This article is not a complete history of the development of modern EMS; rather it examines a specific model of physician-driven policy-making surrounding the creation of paramedic training standards and design standards for the modern ambulance. It begins by providing an overview of the NAS-NRC Committee on Emergency Medical Services and situates the Committee's and its physician members' roles in the rapidly expanding field of emergency medicine. Next it shows how the interest of the Executive Branch in improving prehospital care helped to position the Committee and its membership in an important advisory role. Finally, it concludes by demonstrating how the Committee acted as a space for the translation of heterogeneous local experiments into specific policy recommendations.

THE NAS-NRC COMMITTEE ON EMERGENCY MEDICAL SERVICES

First chartered by Congress during the Lincoln Administration, the National Academy of Sciences was tasked with providing, when asked, nonbinding expert advice to the Executive Branch. The National Research Council (NRC), designed to support the work of the National Academies of Sciences, was established under the Wilson Administration in 1916.[6] Despite its Congressional charter, both the National Academy of Sciences and the NRC have retained a nongovernmental status. The NAS-NRC operates through a series of ad hoc committees organized by subject.

6. http://www.nationalacademies.org/about/history.html (accessed November 2010).

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The Committee on Emergency Medical Services, the primary NAS-NRC committee concerned with the creation of EMS standards, was chartered in January 1967. Testifying at the first meeting of the Committee on March 16 of that same year, Dr. Keith Cannon, the chairman of the NAS's Division of Medical Sciences, explained the relationship between the NAS-NRC and the state:

> The National Research Council does not conduct its own research programs, nor does it conduct field operations in health programs. As advisors, on the other hand, we do not simply passively wait till someone comes and asks us for advice like a lawyer. We volunteer advice when we think it is in the interest of the social welfare. To put it another way, we are not a lobbying institution but we are an institution that tries to help decision making by cooperation and the power of reason.[7]

Thus the committee acted as an institutional bridge connecting professional medical organizations with the Executive Branch.

Staffed by a Professional Associate, retired U.S. Army Brigadier General and surgeon Sam F. Seeley, the committee's membership was selected from leaders in the areas of shock, trauma, and emergency response. Members provided unpaid service and did their committee work in conjunction with their full-time jobs. This created a dynamic environment that provided a space for members to bring their academic interests, and practical local experiments, to bear on the process of creating paramedic training and ambulance design standards. Most importantly, the Committee provided an alternative route for physicians to influence federal policy that was outside of the traditional model of legislative advocacy by professional organizations.[8]

7. Keith Cannon, Testimony from First Meeting of the Committee on Emergency Medical Services, Division of Medical Sciences, Committee on Emergency Medical Services, MED: Com on Emergency Medical Services, Meetings First, National Academy of Sciences Archive, Washington, DC (hereafter NAS-NRC).

8. The battles to defeat universal health insurance throughout the twentieth century provide one of the clearest examples of the ways that organized medicine and its allies used the legislative process to shape public policy. For specifics on each of these battles, see Ronald L. Numbers, *Almost Persuaded: American Physicians and Compulsory Health Insurance, 1912–1920* (Baltimore: Johns Hopkins University Press, 1978); Paul Starr, *The Social Transformation of American Medicine: The Rise of a Sovereign Profession and the Making of a Vast Industry* (New York: Basic Books, 1982), 281–89; Colin Gordon, *Dead on Arrival: The Politics of Health Care in Twentieth-Century America* (Princeton: Princeton University Press, 2003).

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EMS BEFORE THE HIGHWAY SAFETY ACT: 1955–66

The NAS-NRC Committee on Emergency Medical Services was created in response to a perceived crisis in medicine—the lack of appropriate prehospital care. By the middle of the 1960s, changes in scientific medicine growing out of the experience of war, escalating concern with chronic disease, and a federal state increasingly willing to become involved in protecting the health of individual citizens created a receptive atmosphere for a body of medical experts to propose public policy changes.

Before the passage of the 1966 Highway Safety Act, ambulance service in America was disorganized and privately run; it varied widely in the quality of care provided en route to the hospital.[9] According to the National Academy of Science's landmark report "Accidental Death and Disability: The Neglected Disease of Modern Society," during the late 1950s and early 1960s "approximately 50% of the country's ambulance services [were] provided by 12,000 morticians, mainly because their vehicles [could] accommodate transportation on litters."[10] Furthermore, the majority of mortician- and volunteer-run ambulance services in the United States had no uniform training standards for drivers or attendants and since many ambulance services were run either as sidelines or as a community service, there was little incentive for providers to expend time, money, and effort to stay abreast of changes in the trauma care field.[11]

9. Several sources cite the passage of this act as the legislative catalyst for federal involvement in the development of EMS. See David Boyd, "The Conceptual Development of EMS Systems in the United States, Part I," *Emerg. Med. Serv.*, 1982, *11*, 19–23; Geoffrey Gibson, "Emergency Medical Services," *Proc. Acad. Pol. Sci.*, 1977, *32*, 121–35; Carl J. Post, *Omaha Orange: A Popular History of EMS in America*, 2nd ed. (Boston: Jones and Bartlett Publishers, 2002); Charles A. Rockwood Jr., Collen M. Mann, J. D Farrington, Oscar Hampton Jr., and Robert E. Motley, "History of Emergency Medical Services in the United States," *J. Trauma*, 1976, *16*, 299–308.

10. National Academies of Sciences–National Research Council Committee on Trauma and Committee on Shock, "Accidental Death and Disability: The Neglected Disease of Modern Society" (Washington, DC, 1966), 13–14.

11. Joe Dolphin, "Private Ambulance," *Emerg. Med. Serv.*, 1977, *6*, 155–56, 155. Roswell K. Brown, Report of the Task Force on Ambulance Services, Division of Medical Sciences, National Research Council. Appended to Minutes of the Second Meeting of the Committee on Emergency Medical Services, April 6–8, 1967, Medical Sciences Committee on Emergency Med Services General, 1967, Appendix, 3, NAS-NRC.

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A PARALLEL CREATION: EMS AND EMERGENCY MEDICINE

Trauma care inside of the hospital might also be described as chaotic. A mix of generalist personnel staffed most emergency rooms, including medical students and residents, foreign-trained physicians, and doctors at the margins of their careers due to advanced age, substance abuse problems, or other professionally disqualifying factors.[12] Some hospitals even did away with regular physician staffing, choosing instead to rely on a triage nurse who would phone particular physicians depending on the patient's diagnosis.[13]

For much of the early twentieth century, the American College of Surgeons (ACS) had taken a leadership role in promoting better emergency care inside and outside of the hospital. As early as 1922, the ACS formed a Committee on Fractures. In 1939, this committee was combined with the Committee on Industrial Medicine and Traumatic Surgery to create a new committee with a field of interest that was "widened to cover all forms of trauma."[14] Under the leadership of Dr. Robert H. Kennedy, the ACS's Committee on Trauma was an early leader in trying to set standards for emergency room organization and practice—first by conducting a series of surveys of hospital emergency departments across the country to highlight perceived deficiencies and later through the publication of a brochure titled "A Guide to the Organization and Management of Hospital Emergency Departments" which was "sent to all approved hospitals in the United States."[15] However, neither Kennedy nor the membership of the ACS was content to simply focus on improving just the emergency room.

Since the late 1930s, Kennedy had personally been calling for a closer relationship between medical education and first responders, arguing that "the average medical student receiving his degree knows less about it [first aid] than a first-class Boy Scout." Kennedy claimed

12. Brian J. Zink, *Anyone, Anything, Anytime: A History of Emergency Medicine* (Philadelphia: Mosby/Elsevier, 2006), 14–15.

13. Ibid., 13.

14. Robert H. Kennedy, "Our Fashionable Killer: The Oration on Trauma," *Bull. Am. Coll. Surg.*, 1955, *40*, 73–82, 73.

15. For information on the relationship between medical schools and first responders, see ibid., 75. For information about the ACS's survey program and the creation of "A Guide to the Organization and Management of Hospital Emergency Departments," see Robert H. Kennedy, "Raising Standards of Care in the Emergency Department," *Hospitals*, 1962, *36*, 74–85, 76.

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that this situation was due not only to disinclination by physicians to think about prehospital care but also a serious communication gap between the medical profession and the lay public. "Improved forms of treatment," Kennedy argued "are adopted by the medical profession, but may not be incorporated in first-aid books for years, because the profession did not know how to place them before a layman practically." Yet he also pointed out that the information gap was not solely the fault of physicians, claiming "in other instances first-aid workers have devised improved methods which have not been adopted generally by the medical profession, because of lack of close contact with the work." He concluded by arguing that "much is to be gained in the care of the injured by closer co-operation between these two groups to their mutual advantage."[16]

Despite Kennedy's repeated calls to improve prehospital care, the ACS did not publish any guidelines for first responders until 1966. With the support of the American Red Cross, the ACS published *Emergency Care of the Sick and Injured: A Manual for Law-Enforcement Officers, Fire-Fighters, Ambulance Personnel, Rescue Squads and Nurses*. This book was largely a how-to manual written and was designed for working professionals to carry with them to the scene of an emergency for quick reference.[17]

Change came from two directions—a group composed primarily of general practice physicians who were looking for new challenges outside of a private practice environment and changing economic realities and patient expectations that made ER practice profitable for physicians and hospitals. Inside of the hospital, a younger generation of general practice physicians was starting to become more active in arguing for the creation of emergency medicine as a specialty by the middle of the 1960s. This was partially in response to the declining prestige of general practice medicine and partially due to the exceptional nature of a cohort that included a wide range of broadly trained physicians like John Wiegenstein, R. R. Hannas, William Haeck, and surgeons like George Podgorny, Robert Krome, and Peter Rosen. Yet declining prestige and exceptional leadership is

16. Kennedy, "Our Fashionable Killer: The Oration on Trauma," 75.

17. American College of Surgeons Committee on Trauma and Robert H. Kennedy, *Emergency Care of the Sick and Injured: A Manual for Law-Enforcement Officers, Fire-Fighters, Ambulance Personnel, Rescue Squads and Nurses* (Philadelphia: Saunders, 1966), vi.

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only part of the reason why emergency medicine emerged as an attractive specialty. Community expectations about appropriate levels and spaces for care as well as changing financial incentives also helped to create a market for emergency medicine.

As scholars such as Rosemary Stevens and Kenneth Ludmerer have demonstrated, the Hill–Burton Act helped to create an expectation that the hospital was the appropriate site for acute care largely due to creation of defined emergency care spaces and construction of the new entrances required to meet emergency vehicles paid for, in part, by these funds.[18] For many patients and hospitals, the presence of an emergency room was an indicator of modernity, which provided an important competitive advantage for suburban community hospitals as they competed for patients with rapidly expanding urban academic medical centers.[19]

As more patients flocked to hospital emergency rooms, enterprising physicians realized that emergency care could be a profit center. In 1961, James Mills Jr. and several partners developed an innovative group model of staffing at Alexandria Hospital in Alexandria, Virginia. Under this plan, Mills and his group practiced full time in the ER and then used the hospital's billing department to collect a $5 fee from each patient above the charges billed by the hospital. Soon the men realized a slightly higher income and shorter workweek then they had experienced in private practice.[20] Another model used a third-party billing company and paid an hourly rate, rather than a per-patient fee.[21]

The spread of private health insurance and the passage of Medicare also created financial incentives for patients to seek treatment in a hospital's emergency room.

While Medicare did not initially pay for ambulance service, visits to the emergency room were covered.[22] With both Medicare and

18. Rosemary Stevens, *In Sickness and in Wealth: American Hospitals in the Twentieth Century* (New York: Basic Books, 1989), 220–28; Kenneth M. Ludmerer, *Time to Heal: American Medical Education from the Turn of the Century to the Era of Managed Care* (New York: Oxford University Press, 1999), 163–64.

19. Beatrix Hoffman, "Emergency Rooms: The Reluctant Safety Net," in *History and Health Policy in the United States: Putting the Past Back in, Critical Issues in Health and Medicine*, ed. Rosemary Stevens, Charles E. Rosenberg, and Lawton R. Burns (New Brunswick: Rutgers University Press, 2006), 251–53.

20. Zink, *Anyone, Anything, Anytime*, 30–39.

21. Ibid., 40–41. This model was known as "The Pontiac Plan."

22. Bell, *The Ambulance*, 334, and Hoffman, "Emergency Rooms," 257–58.

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employer-based hospitalization insurance covering substantial portions of hospitalization costs, many patients preferred utilizing hospital-based services for acute treatment rather than calling or visiting a private physician whom they would be paying out of pocket.

SPECIALIST PHYSICIANS AND EFFORTS TO IMPROVE PREHOSPITAL CARE

While some physicians were working inside the hospital to improve trauma care, another group turned to their own experiences on the battlefields of Europe and Asia to think about new ways to treat patients before they reached the emergency room. As Brian J. Zink has argued, World War II and the Korean War were formative experiences in the history of emergency medicine. Not only did these conflicts expose physicians and paraprofessionals to the triage model, but also, through the Veteran's Administration, a model of specialty-driven, hospital-based, physician practice was prioritized.[23] Even those physicians who were not veterans were often trained by or worked closely with other physicians or paraprofessionals with battlefield medical experience.

Dr. J. D. Farrington provides an important example of how physicians attempted to apply the lessons from battlefield medicine to civilian life. As an orthopedic surgeon, Farrington had worked with the Chicago Fire Department to improve its ambulance service before moving north to Minocqua, Wisconsin, in 1966.[24] Recognizing the problems that came with the influx of nearly twenty-seven thousand tourists into the resort town every summer, Farrington organized a local rescue service. His observations resulted in an article, "Death in a Ditch," first published in the May/June 1967 *Bulletin of the American College of Surgeons*. "Death in a Ditch" provided photographs and other illustrations of new medical techniques, such as spinal immobilization, and also provided a list of suggested equipment for rescue vehicles. Many of the techniques and much of equipment the article suggested had been developed previously for military use. More importantly, "Death in a Ditch" was one of the first articles to reach an audience of civilian trauma surgeons and it helped the medical community to think

23. Brian J. Zink, *Anyone, Anything, Anytime*, 6–8.
24. Bell, *The Ambulance*, 251–52.

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critically about appropriate medical responses to accidental injury before the patient reached the hospital emergency department.[25]

In addition to surgeons, anesthesiologists like Peter Safar emerged as another specialty group interested in promoting better prehospital care. Known as "father of modern CPR," Safar was an anesthesiologist and Viennese immigrant, born in 1924. Safar came to the United States in 1950 for a surgical internship. He then took a second internship with Robert Dripp in anesthesia at the University of Pennsylvania. After spending several years in Lima, Peru, Safar moved Baltimore where he soon became the Chief of Anesthesia for Baltimore City Hospital (BCH) at the age of thirty-one. While at BCH, Safar conducted experiments on artificial ventilation and established a working relationship with the city's Fire Department around CPR and efforts to improve prehospital care.[26] In 1961, Safar accepted the chairmanship of the Department of Anesthesiology at the University of Pittsburgh School of Medicine.

Surgeons, claimed Safar, were too "focused on fractures"—anesthesiologists, by contrast, were focused on using artificial ventilation to prevent brain death or damage, whether it occurred as a result of a traumatic injury like an auto accident or was linked to an acute episode of a chronic disease like a heart attack or a stroke.[27] For this group of physicians, the interest of the federal government in auto safety merely served as an entry point to apply their research in resuscitation medicine and to formalize a claim that there was more to good prehospital care than simply treating fractures.

ACCIDENTS AND TRAFFIC SAFETY AS THE ENTRY POINT FOR FEDERAL INVOLVEMENT IN PREHOSPITAL CARE

While many physicians viewed the auto accident as an entry point for improving emergency medical care, federal bureaucrats

25. J. D. Farrington, "Death in a Ditch," *Bull. Am. Coll. Surg.*, 1967, *52*, 121–32.

26. Ake Grenvik and Patrick M. Kochanek, "The Incredible Career of Peter J. Safar, MD: The Michelangelo of Acute Medicine," *Crit. Care Med.*, 2004, *32*, S3–S7; Peter Safar, *From Vienna to Pittsburgh for Anesthesiology and Acute Medicine*, Careers in Anesthesiology, Vol. V (Wood Library-Museum of Anesthesiology, 2000), 109–58.

27. Peter Safar, "On the History of Emergency Medical Services," *Bull. Anesth. Hist.*, 2001, *19*, 4–8, 4. Daniel Fox has most forcefully made the argument that an important part of the story of twentieth-century medicine has been the acute treatment of chronic disease. Daniel M. Fox, *Power and Illness: The Failure and Future of American Health Policy* (Berkeley: University of California Press, 1993).

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conceived of the accident primarily as a failure of technology. Here, it is important to backdate federal interest in this issue—much of the historical literature surrounding the creation of EMS treats it as emerging from the 1966 publication of "Accidental Death and Disability" by the NAS-NRC. Some even argued that this report provided the causal spark for the EMS component of the Highway Safety Act.[28]

The perception of the auto accident as a major social problem was established by the mid-1920s, following several decades of carnage on the American roadways. During the years before World War II, blame for accidents was assigned to reckless drivers, or "morons on the macadam."[29] Prevention of auto accidents was limited to the passage of speed laws and reckless driving statutes by local jurisdictions; federal involvement mainly consisted of two national conferences on traffic safety convened by Herbert Hoover during his time as Secretary of Commerce. After the passage of the 1956 Interstate Highway Act, a newly created Interdepartmental Highway Safety Board managed attempts at multiagency coordination surrounding auto safety.[30]

In addition to concern over road designs, the postwar years also saw an increased public and private focus on redesigning vehicles to mitigate the effects of accidental injury. Beginning with aircraft in the late 1930s, Hugh De Haven started to research the effect of accidents on the human body. By the 1950s, De Haven had popularized what he called the "second collision" or the idea that all

28. R. A. Cowley, "Accidental Death and Disability: The Neglected Disease of Modern Society—Where Is the Fifth Component," *Ann. Emerg. Med.*, 1982, *11*, 582–85. John Howard, "Historical Background to Accidental Death and Disability: The Neglected Disease of Modern Society," *Prehosp. Emerg. Care*, 2000, *4*, 285–89, 285.

29. David Blanke, *Hell on Wheels: The Promise and Peril of America's Car Culture, 1900–1940* (Lawrence: University Press of Kansas, 2007), 106. For information on the federal and private efforts related to automobile accident prevention, see Joel W. Eastman, *Styling vs. Safety: The American Automobile Industry and the Development of Automotive Safety, 1900–1966* (Lanham: University Press of America, 1984), 115–76.

30. By the late 1950s, Executive Branch agencies with interests in auto safety included the HEW, the Department of Defense, and the General Services Administration. The Interdepartmental Highway Safety Board, which was established in 1960, rarely met and proved to be duplicative after the establishment of the DOT in 1966. See James M. Beggs, Undersecretary of Transportation to Ronald P. Mayo, Director Bureau of the Budget, undated, Interdepartmental Highway Safety Board, 1969–70, Records of the National Highway Traffic Safety Administration, Organization and Planning Files 1970–72, Record Group 416, National Archives and Records Administration II, College Park, Maryland (hereafter NARA II).

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crashes involved collision not just between the vehicle and an object, but also another between the occupant and vehicle.[31] Central to De Haven's work on "crashworthiness" was the emergence of risk factor epidemiology and its use of data collection to better understand the potential causes of injury and chronic disease.[32] This link between epidemiology and traffic safety was given a significant boost in 1967 when an epidemiologist, Dr. William Haddon Jr., was appointed the founding director of the National Highway Safety Bureau within the fledgling Department of Transportation.[33]

One important effect of work like De Haven's and Haddon's was to help to create larger cultural change about the responsibility for the cause of accidental injury toward thinking of the accident less as an individual failure and more as a problem of public health.[34] Daniel Patrick Moynihan reflected the ascendancy of this new position in his 1968 "Report of the Secretary's Advisory Committee on Traffic Safety." He wrote, "*for over half a century traffic safety was seen primarily as a problem of individual behavior when in fact it should have been considered a problem of public health.*"[35] By redefining the accident as a problem of public health, physician actors were able to not only claim legitimacy for their involvement but also were able to

31. Amy Beth Gangloff, "Medicalizing the Automobile: Public Health, Safety, and American Culture, 1920–1967" (PhD diss., Stony Brook University, 2006) and Eastman, *Styling vs. Safety*, 209–40. Physicians also played an important role in promoting safe auto design. As early as the 1930s, Dr. Claire L. Straith, a Detroit-area plastic surgeon, experimented in his personal automobile with foam padding on the dash and seatbacks. Straith was able to meet with Walter P. Chrysler and many of his ideas were integrated into the 1937 Dodge. Over the next several decades, he continued to lobby carmakers to improve the interior safety of their vehicles. For more on Straith, see Eastman, *Styling vs. Safety*, 181–85, and http://www.pbs.org/wgbh/nova/transcripts/2605car.html (accessed March 14, 2011).

32. Gangloff, "Medicalizing the Automobile," 290–98. For information about the development of risk factor epidemiology and its relationship to chronic disease, see Allan Brandt, "'Just Say No': Risk, Behavior, and Disease in Twentieth-Century America," in *Scientific Authority & Twentieth-Century America*, ed. Ronald G. Walters (Baltimore, Maryland: Johns Hopkins University Press, 1997).

33. Biography of William Haddon Jr., NHSB Director's Subject Files, 1966–68, Sec. Advisory Committee Traffic Safety, HEW 1967–66, RG 416, Box 4, NARA II.

34. Carol A. MacLennan, "From Accident to Crash: The Auto Industry and the Politics of Injury," *Med. Anthropol. Q.*, 1988, *2*, 233–50, 238.

35. United States Department of Health Education and Welfare, Secretary's Advisory Committee on Traffic Safety, *Report of the Secretary's Advisory Committee on Traffic Safety* (Washington, DC, 1968), 7. Italics in the original text.

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cast themselves as the appropriate advocates to lobby for legislative solutions.

THE 1966 HIGHWAY SAFETY ACT AND FEDERAL SUPPORT FOR EMS

By the mid-1960s, Congress faced pressure from scientists like Haddon and De Haven, consumer advocates like Ralph Nader, and an American public that increasingly looked to the federal state to act as a regulator of the public's safety. For its part, Congress, according to a 1966 report to the House of Representatives, recognized that in the wake of an auto accident, it was "essential that every possible resource be mobilized to save lives, lessen the severity of injuries, protect property, [and] restore the movement of traffic."[36] The legislative solution that emerged was the 1966 Highway Safety Act.

While the act included a wide variety of provisions that went beyond EMS, it nevertheless represented an important shift in thinking about the federal government's responsibility for preventing and treating accidental injuries. Under Standard 11 of the 1966 act, Congress tied improvements in EMS to highway construction dollars, requiring that several minimum standards be met to keep federal dollars flowing. These standards included:

> (1) There are training, licensing and related requirements (as appropriate) for ambulance and rescue vehicle operators, attendants, and dispatchers.
> (2) There are requirements for types and numbers of emergency vehicles, including supplies and equipment to be carried.
> (3) There are requirements for the operation and coordination of ambulance and other emergency care systems.
> (4) There are first-aid training programs and refresher courses for emergency services performed, and the general public is encouraged to take first-aid courses.
> (5) There are criteria for the use of two-way communication.

36. William P. Haddon, "The Role of the National Highway Safety Agency," in Proceedings, American Medical Association Committee on Emergency Medical Services (Conference on Emergency Medical Services, Ambassador Hotel, Chicago, Illinois, April 6–7, 1967), 8–9, Med. Sci. Committee on Emergency Medical Services, Relationship to American Medical Assoc., NAS-NRC Archives.

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(6) There are procedures for summoning and dispatching aid.
(7) There is an up-to-date, comprehensive plan for EMS, including facilities and equipment, definition of areas of responsibility, agreements for mutual support, and communication systems.[37]

The federal government left it up to the states to determine what shape their highway safety programs would take in light of the required standards, but vested oversight authority within the DOT's National Highway Safety Bureau, later renamed the National Highway and Traffic Safety Administration. States were given until December 31, 1968, to submit a highway safety program meeting these guidelines.[38] Standard 11 provided the opening that medical leaders were looking for—the federal government brought dollars to the table for experimentation, but remained committed to local experimentation and implementation until uniform standards for prehospital care could be created.

THE AMERICAN MEDICAL ASSOCIATION AND THE NAS-NRC: OVERLAPPING MEMBERSHIP AND UNCLEAR ROLES, 1966–68

By 1967, the federal government was willing to provide physicians and first responders with money to conduct local experiments, but the question remained about how to translate local success stories into workable national guidelines and standards. Organized medicine provided a logical starting point for interested policymakers. While the ACS played an important early role, it was not the only professional organization with an interest in standardizing prehospital care. Looking to manage the cacophony of discordant voices shouting toward a shared goal, in 1966 the American Medical Association's House of Delegates approved the creation of a committee to "liaison with other health groups to improve emergency medical care."[39]

Meeting for the first time in 1967, the Committee was composed of representatives from the American Medical Association (AMA); the

37. Geoffrey Gibson, "Emergency Medical Services." *Proc. Acad. Pol. Sci.*, 1977, *32*, 121–35, 122–23.

38. Ibid., 123. According to Gibson, the threat of federal highway construction fund withholding was never carried out.

39. Letter to Keith Cannon from F. J. L. Blassingame, December 12, 1966, Division of Medical Sciences, Committee on Emergency Medical Services, EMS-Emergency Medical Services Committee on Relationship to the American Medical Association, NAS-NRC Archives.

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American Academy of General Practice; the American Academy of Pediatrics; the American College of Physicians; the ACS; the American Hospital Association; the American Public Health Association; the American Society of Anesthesiologists; the NRC; and the U.S. Public Health Service.[40] The AMA Committee established a broad purview for setting goals to influence the "identification" of problem areas within prehospital care, "coordination" of community and medical resources, and "implementation" of research and manpower requirements.[41]

The AMA Committee also provided an initial forum for a number of future NAS-NRC Committee on Emergency Medical Services members to become acquainted with each other and to establish working relationships between themselves and a broader organized medical community. Early in the AMA's Committee's tenure, many hoped that it would become the primary voice of organized medicine's efforts to lobby the federal government for direct intervention and funding. John Howard, one of the authors of "Accidental Death and Disability" and an NAS-NRC Committee member, summed up this line of thinking in a letter he wrote to Sam Seeley in October 1966: "If the Liaison group drew up program or standards necessary for adequate transportation, communication, emergency rooms etc.," claimed Howard, "there would be that much less work to be done by the NRC and the American Trauma Association." Yet, he also worried that such an inclusive group might become rudderless. His solution was to stack the AMA Committee with NAS-NRC members, thus creating a leadership for the AMA's body that "in all probability . . . must come from the academy."[42]

In a letter written in July 1967, Seeley expressed his own hopes and concerns for the AMA committee and the role of organized medicine in general in setting federal standards surrounding prehospital care:

> I am deeply concerned that its activities might lag. I feel that the time has arrived when we should insist that the AMA committee show evidence of action. . . . The time is ripe for formal proposals to emerge

40. Letter to John Howard from F. J. L. Blassingame, March 1, 1967, in ibid.

41. AMA Committee on Emergency Medical Services Meeting Minutes, May 13, 1967, in ibid.

42. Letter from John Howard to Sam Seeley, October 25, 1966, Med. Sci. Committee on Emergency Medical Services, Relationship to American Medical Assoc. 2., NAS-NRC Archives.

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> from separate organizations and from the AMA committee as a whole to be submitted to the PHS, the NIH and the Bureau of Traffic Safety for financial support. *We should be telling these agencies what should be done and set up the mechanism within organized medicine to do it. Otherwise, we will be the victims of directed research and federal dictation....* The AMA committee should be the implementing body and we [the NAS-NRC] should continue to provoke it to action.[43]

Seeley's and Howard's hopes for the AMA's Liaison committee fell flat—increasingly members who shared joint affiliations saw the NAS-NRC model, with its direct links to federal agencies, as a more expedient method to insert organized medicine's voice into federal efforts to improve prehospital care.

FROM LOCAL EXPERIMENT TO PUBLIC POLICY

Since the NAS-NRC committee did not create its own demonstration programs, it looked to the local experiments conducted by its membership for ideas to incorporate into its recommendations to federal agencies. Two specific local examples conducted in Pittsburgh, Pennsylvania, by Dr. Peter Safar will illustrate how the committee translated local experiments into national level policy recommendations.[44]

43. Letter from Sam Seeley to John Howard and Oscar Hampton, July 21, 1967, Med. Sci. Committee on Emergency Medical Services, Relationship to American Medical Assoc., NAS-NRC Archives. Emphasis added.

44. In addition to Safar's contributions, non-NAS-NRC committee members developed other EMS programs across the country. Some of the most important include programs in Los Angeles and Seattle. Both cities were early adopters of ambulance programs that provided specialized care for cardiac patients and their efforts, each led by local fire departments, were important first steps in providing firefighter-staffed ambulance service with a strong medical component. For more information about both programs, see Bell, *The Ambulance*, 289–94. Another important program led by a noncommittee member was the effort in Illinois to create an emergency medical services system. This plan was crafted by Chigago-area surgeon Dr. David Boyd, who became well known to the NAS-NRC Committee in his later role as the Director of Emergency Medical Services at the Department of Health, Education, and Welfare. Each level would provide increasingly sophisticated levels of care for the patient and each level of trauma center would also be linked by a standardized communication system, uniformly trained paramedical personnel, and improved ground and air ambulance service. After the passage of the EMSS Act in 1973, this plan became a national model as regionalization of services became an increasing priority for the federal state. For more on the Illinois Plan, see David Boyd, Mary M. Dunea, and Bruce Flashner, "The Illinois Plan for a Statewide System of Trauma Centers," *J. Trauma*, 1973, *13*, 24–31, and David Boyd, "A Symposium on the Illinois Trauma Program: A Systems Approach to the Care of the Critically Injured," *J. Trauma*, 1973, *13*, 275–84.

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FREEDOM HOUSE AMBULANCE SERVICE AND PARAMEDIC TRAINING STANDARDS

One important local experiment for shaping Committee action on both paramedic training standards and ambulance design standards was conducted by Peter Safar beginning in 1967. Safar's experiments with paramedic training standards and ambulance design grew from a unique partnership with Freedom House Enterprises, a nonprofit that emerged in January 1967 in the city's Hill District as a way to capture federal monies to promote job training and the establishment of African American businesses. Ambulance service arose out of a partnership among Freedom House Enterprises, the Maurice Falk Medical Fund, and Presbyterian-University Hospital funded by the Office of Economic Opportunity, the Model Cities program, and through private foundation grants. At the request of the hospital's president, Safar assumed medical leadership of Freedom House's ambulance service, but quickly delegated the day-to-day operations first to his colleague in the Anesthesiology Department Dr. Donald Benson and later to Dr. Nancy Caroline, who was at that time a fellow in Critical Care Medicine at the University of Pittsburgh.[45] Men and women from predominately African American neighborhoods staffed Freedom House Ambulance Service. Thirty-eight percent of trainees had not completed high school and many had what Safar and Benson called "chaotic employment histories."[46]

Today Freedom House is usually cast as a civil rights story.[47] While this was an important part of the program, for Safar and the membership of the Committee on Emergency Medical Services, Freedom House Ambulance Service served as an experimental vehicle where ideas could be tested before they were formally suggested to the Executive Branch. In a 1972 article "Mobile Intensive Care by 'Unemployable' Blacks Trained as Emergency Medical

45. Peter Safar, "On the History of Emergency Medical Services," 4–5.

46. Don M. Benson, Gerald Esposito, Jerry Dirsh, Raymond Whitney, and Peter Safar, "Mobile Intensive Care by 'Unemployable' Blacks Trained as Emergency Medical Technical (EMT's) in 1967–69," *J. Trauma*, 1972, *12*, 408–21, 408.

47. Chuck Staresinic, "Send Freedom House!," *Pitt. Med.*, February, 2004, 32–34; Joe William Trotter and Jared N. Day, *Race and Renaissance: African Americans in Pittsburgh Since World War II* (Pittsburgh: University of Pittsburgh Press, 2010), 127–28.

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Technicians (EMT's) in 1967–69," Safar explicitly spelled out Freedom House's experimental functions, saying:

> Working in conjunction with Freedom House Enterprise, Inc. (FHE) whose primary goal is to develop businesses in the ghetto districts of Pittsburgh, the authors undertook a project which attempted: (a) to offer dignified, rewarding employment to ghetto residents; (b) to improve emergency ambulance service in one of Pittsburgh's slums; (c) **to demonstrate prehospital life-support in the community by mobile intensive care units (MICU's), with the hope of eventually establishing MICU service area-wide**; (d) **to test curricula for training emergency medical technicians in hospital-based programs as a pilot project for national recommendations**; and (e) **to test the feasibility of newly-defined ambulance design and equipment recommendations.**[48]

By prioritizing these objectives, Safar was able to situate Freedom House as an important laboratory for ambulance design and personnel training between 1968 and the service's collapse in 1975.

One of the most important lessons learned from Freedom House was that an intense training program could overcome a lack of medical knowledge or other educational deficiencies and build an appropriate medical skill set for first responders. This was important in light of the prevailing assumptions about who would be providing emergency medical care. The standard assumption, as highlighted in *Emergency Care of the Sick and Injured*, was that ambulance attendants or local public safety officials who had a bare minimum of medical knowledge would provide emergency care.[49]

Freedom House's training program modified the ACS assumptions—certainly these new first responders would not have physician-level medical training, but through intensive study and practical experience they would be able to provide a much higher level of care than simple first aid, as the story of James Parker demonstrated. The training program consisted of roughly twelve weeks of basic education, thirty-five hours of first aid, fifty hours of anatomy, nearly forty hours of resuscitation training, 172 hours of clinical training including work in the operating room, delivery room, emergency ward, morgue, and the supervised observation of and participation in

48. Benson et al., "Mobile Intensive Care," 408. Emphasis added.
49. American College of Surgeons, *Emergency Care of the Sick and Injured*, vi.

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the anesthetization of surgical patients. Additionally, one full week of guided field experience with other ambulance services and an additional nine months of on-the-job monitoring were required.[50] In the late 1960s, this type of aggressive training curriculum was unfeasible for the limited resources of many communities since it required access to a large teaching or community hospital and a base level of knowledgeable and willing physicians who could make time to mentor and train paramedic candidates.

If this advanced level of training was unfeasible for most communities, why spend time creating new training standards rather than simply convince American physicians to staff ambulances? In both the Soviet Union and Northern Ireland, physicians regularly rode on ambulances but in the United States, Safar claimed that "lack of physician staffed ambulances in this country should have long ago pointed out the need for ambulance attendants with paramedical training and professional status."[51] He argued that this lack of support stemmed from different professional norms between the two continents—in Safar's estimation, U.S. physicians were too driven by professional specialization and thus, he argued, that they had forgotten, or did not care to think about, the importance of prehospital care. For him, the way to resolve the problem of fragmentation and to get more comprehensive medical care outside of the hospital was to create a new paramedical specialty composed of medically trained and properly supervised extensions of the physician.[52]

Supplementing Safar's argument about medical overspecialization is an acknowledgment of the rapid increase in the cost of providing medical care from the late 1960s to the present. Even with federal

50. Benson et al., "Mobile Intensive Care," 410.

51. For information about Belfast and the creation of physician-staffed mobile coronary care units, see Mary G. McGeown, "The Thirtieth Anniversary of Pre-Hospital Coronary Care in Belfast," *Ulster Med. J.*, 1996, *65*, 3–4. For information on the state of EMS in the Soviet Union, see Peter Safar, M.D. and Herbert Rosomoff, M.D, "Impressions on Emergency Care in Prague and Moscow," Safar Files, Box Unnamed, NRC E.M. Care Com Past, Pittsburgh, Pennsylvania: Safar Center for Resuscitation Research, University of Pittsburgh. Quote is from Peter Safar, Gerald Esposito, and Don M. Benson, "Emergency Medical Technicians as Allied Health Professionals," *Anesth. Analg.*, 1972, *51*, 27–34, 27. Esposito was later a consultant to the NAS-NRC Committee on Emergency Medical Services, most likely at Safar's suggestion.

52. Safar et al., "Emergency Medical Technicians as Allied Health Professionals." One could also link the creation of a paramedical specialty to concerns over a shortage of qualified physicians that followed the publication of the Bane Report in 1959. See Ludmerer, *Time to Heal*, 209–15.

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reimbursement of treatment through Medicare and Medicaid, costs to hospitals for treatment, the provision of services, and the procurement of medical technology increased rapidly during the late 1960s and early 1970s. As both Paul Starr and Rosemary Stevens have demonstrated, this inflation played a critical role reshaping how medical professionals and hospital administrators approached the treatment of disease and injury.[53] The allied health personnel model represented a way to save money—it cost less far less to train and employ paramedics than to educate physicians in the specifics of emergency care and to release them from the hospital service to ride on the ambulance.

The NAS-NRC Subcommittee on Ambulance Services, an offshoot of the larger Committee on Emergency Medical Services, therefore operated within the constraints of the undesirability among physicians of ambulance assignments and the high cost of physician-staffed ambulance service as they crafted a training program. Seeing the creation of a new paramedical specialty as the only viable option for improving prehospital trauma care, committee members carefully assessed what pieces of their own professional sovereignty they were willing to delegate.

THE NAS-NRC COMMITTEE AND PARAMEDIC TRAINING STANDARDS

At the April 1967 meeting of the full NAS-NRC Committee on Emergency Medical Services, members agreed to a formal request by the Public Health Service (PHS) to craft a basic training program for ambulance attendants.[54] The intervention of the PHS was part of a larger boundary dispute between the DOT and the HEW over the location of federal efforts to encourage the development of EMS. DOT and HEW had operated under an informal memorandum of understanding, written but never signed, that located all responsibility for EMS "up to the point of arrival at the emergency room door" with DOT.[55] Despite the clear location of

53. Stevens, *In Sickness and in Wealth*, 293–310; Starr, *The Social Transformation of American Medicine*, 379–83.

54. Minutes of the Second Meeting of the Committee on Emergency Medical Services, April 6–8, 1967, Medical Sciences: Com on Emergency Med Services General, 1967, 3, NAS-NRC Archives.

55. Memo from NHSB Director Douglas Toms to Secretary of Transportation John Volpe, June 4, 1970, Responsibility for Emergency Medical Services, NHSTA Office of

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paramedic training within DOT's purview under Standard 11 of the 1966 Highway Safety Act, PHS leaders believed that they had a vested interest in the provision better prehospital care. For its part, the NAS-NRC Committee viewed any action on standardizing training programs as critical, no matter where the formal request had come from. In fact, while the PHS solicited the Committee's involvement, the training program the NAS-NRC created was used to form the basis of DOT's mandate to promote training requirements under the Highway Safety Act.[56]

A task force led by J. D. Farrington produced a training manual in March 1968 titled "Training of Ambulance Personnel and Others Responsible for Emergency Care of the Sick and Injured during Transport." This manual offered little in the way of actual curriculum and instead recommended areas for further study as well suggesting areas that should be addressed when building a training course. For example, the report suggested that training programs should teach not only life-saving skills like immobilization and injury control, but also proper communication skills inside and outside the emergency department, the use of uniforms to designate the ambulance attendant as an allied health provider, and an ability to complete standardized and usable records and reports of medical procedures administered and actions taken while in the field.[57]

The NAS-NRC recommendations, which included "70–72 hours of didactic, classroom, practice, and demonstration sessions plus 10 hours of in-hospital observation and instruction," were designed to be implemented in tandem with a training course designed by the American Society of Orthopedic Surgeons (AAOS). This relationship was far from accidental. Since 1964,

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Organization and Planning Files, 1970–72, HY 3 Emergency Services (ES) 1970, Record Group 416, NARA II.

56. Haddon quickly wrote to National Academy of Sciences Director Fredrick Seitz in November 1967 that his agency "noted with great interest the establishment within the Academy of a Task Force to establish the outlines of a training course for ambulance attendants." See William Haddon to Fredrick Seitz, November 8, 1967, Medical Sciences: Com on Emergency Med Services: General, 1967, NAS-NRC Archives.

57. National Academy of Sciences–National Research Council Committee on Emergency Medical Services Task Force on Guidelines for Training of Ambulance Personnel, "Training of Ambulance Personnel and Others Responsible for Emergency Care of the Sick and Injured at the Scene and during Transport" (Washington, DC,1968).

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Dr. Walter Hoyt and the AAOS had been conducting three-day paramedic training courses in Akron, Ohio.[58] In October 1967, the Committee's Professional Associate, Sam F. Seeley, received word through the NAS-NRC Committee on the Skeletal System that the AAOS had begun to assemble a training program for ambulance attendants. Seeing a shared interest, Seeley "immediately contacted" Hoyt and since it was "apparent that all concerned are striving for the same goal and that by combining efforts, a manual can be produced much sooner than expected," Seeley engineered Hoyt's membership on the Task Force.[59]

When the AAOS manual was finally published in 1971, Task Force and Committee members played a prominent role. Farrington, Hoyt, Seeley, and Oscar Hampton were members of the editorial advisory board; Safar acted as a contributor.[60] While the basic standards set by the NAS-NRC in 1968 helped to distinguish the paramedic from the ambulance attendant, many committee members, especially members like Safar who had attempted to build more substantial training courses at their home hospitals or medical schools, felt that the Task Force should also develop standards for more advanced paramedical training.

In 1969, the ACS and the AAOS convened a conference on EMS at Airlie House in Warrington, Virginia. The Airlie House Conference represented a forum for the medical community at large to assemble and attempt to create a consensus within organized medicine as to how the community as a whole should proceed with improving trauma care. The ideas generated at Airlie House would help shape the future conduct of the NAS-NRC Committee. Not surprisingly, Committee and Task Force Members once again played an important role. Members presenting at the conference included John Walters, the Director of Public Safety for Jacksonville, Florida,

58. Zink, *Anywhere, Anyone, Anytime*, 82–83. Zink notes that John Wiegenstein and Joseph Owen from the Public Health Service both simultaneously attended one of Hoyt's courses in 1967. From this chance encounter, Wiegenstein realized that there was no national organization for emergency physicians, which led him to start the process of forming the American College of Emergency Physicians.

59. Sam Seeley to Task Force on Guidelines for Training of Ambulance Attendants, November 23, 1967, Safar Files, Box Unnamed (Bankers 701), NRC Past Amb and Training, Pittsburgh, Pennsylvania: Safar Center for Resuscitation Research, University of Pittsburgh.

60. American Academy of Orthopedic Surgeons, *Emergency Care and Transportation of the Sick and Injured* (Chicago, 1971).

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who presented on urban ambulance systems; Dr. Cuthbert Owens, who presented on emergency care standards and communication; Farrington, who presented on paramedic training; Hoyt, who presented EMT training aids; and Safar, who presented on both ambulance and emergency department records and the registration, certification, and re-certification of ambulance attendants.[61]

Emboldened by the atmosphere of progress and mutual cooperation at the conference, the NAS-NRC Committee, once again acting through a smaller task force, decided to craft standards for advanced EMT training. In a letter dated February 1, 1971, to F. J. Lewis, the Acting Chief of the Emergency Medical Programs Division at NHTSA, Seeley explained their decision by saying that "although we did not receive a specific request to perform this work, we interpreted the Work Statement of December 1969 . . . to relate indirectly to the preparation of an advanced course."[62] A minimum 480 hours in length, the advanced course followed a similar model to Freedom House's curriculum, requiring clinical rotation, the use of mannequins and live animals, and a period of field exercise. However, unlike Freedom House, the advanced EMT program was designed to be selective, and was open only to those allied health personnel who had completed the basic EMT training, professionals already working in the field, or military personnel with medical training returning from Vietnam.[63]

The new course also reflected the Committee's preference for medical control of the training process. The program guidelines stated that "the program must be medically oriented and physician controlled." When allied personnel were allowed to participate in the training process, their role was to be limited to "demonstration and practice sessions."[64]

61. Anon., "Emergency Medical Services: Recommendations for an Approach to an Urgent National Problem" (Airlie Conference on Emergency Medical Services, Airlie House, Warrington, Virginia, 1969).

62. Sam Seeley to F. J. Lewis, Acting Administrator Emergency Medical Programs Division, NHSTA, February 1, 1971. Safar Files, Unnamed Box (Bankers 701), NRC Com EMS 1971, Pittsburgh, Pennsylvania: Safar Center for Resuscitation Research, University of Pittsburgh.

63. National Academy of Sciences-National Research Council Committee on Emergency Medical Services Task Force on Guidelines for Training of Ambulance Personnel, "Advanced Training Program for Emergency Medical Technicians-Ambulance," (Washington, DC, 1970), 2.

64. Ibid.

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Thus by the early 1970s, the NAS-NRC Committee on Emergency Medical Services had effectively set the agenda for the training of ambulance attendants. Using the idea of medical control and the concept of deskilling, the Committee created a new profession, defined the skill sets necessary for participation, and attempted to set criteria for admission. The days before the passage of the Highway Safety Act, with mortician- and volunteer-run ambulance service, promised to fade into the rearview mirror.

BUILDING THE MODERN EMERGENCY ROOM ON WHEELS: THE ESTABLISHMENT OF AMBULANCE DESIGN CRITERIA

As professional roles changed, the NAS-NRC Committee also sought to actively reshape the physical space where the EMT worked—the ambulance. By the mid-1960s, it was no longer enough for the ambulance to serve only as a transport vehicle.[65] To accomplish this change, committee members tried to embed the ambulance within a new nexus of professional specialization that took into account not only the physical features of the ambulance, but also the actions of the men and women who would be riding on board. Thus interior and exterior spaces were consciously designed to allow people and technology to function usefully in an emergency situation within a confined space.

For much of the twentieth century, the physical form of the ambulance varied across community lines. In rural America, as the NAS-NRC noted in "Accidental Death and Disability," the mortician's hearse served as the primary ambulance. In other communities, with local volunteer fire services or paid ambulance providers, the ride to the hospital was often undertaken in a vehicle similar to the mortician's hearse—a stretched Cadillac, Pontiac, or other wagon-type vehicle was outfitted with rudimentary rescue equipment such as first-aid kits and oxygen breathing apparatuses.[66] Limited workspace inside the cabin handicapped the attendant's ability to perform

65. Committee on Trauma and Committee on Shock, "Accidental Death and Disability," 13–15.

66. State Department of Education, Division of Vocational Education, ed., "Ohio Trade and Industrial Education Service: Emergency Rescue Squad Manual" (Columbus: Ohio State University Press, 1959). From Safar Collection, Library of Peter Safar, Safar Center for Resuscitation Research, University of Pittsburgh, Pittsburgh, Pennsylvania. http://www.superiorcoaches.com/history.asp (accessed November 2010).

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complex rescue operations on the patient in transit. Variations on the wagon-type ambulance existed for rescue squads that needed either increased internal storage and towing capacity or the ability to operate over rough terrain. Prior to the involvement of the NRC's Committee on Emergency Medical Services, heterogeneity dominated the ambulance design—no national standard in terms of design or on-board equipment existed. The creation of uniform ambulance design standards followed a similar path to paramedic training—once again committee members' local experiments contributed to discussions and influenced the committee's policy recommendations.

INTERNATIONAL INFLUENCES AND HOMEGROWN INGENUITY: PETER SAFAR AND AMBULANCE DESIGN

During a visit to Prague and Moscow in 1963, Safar realized that the physical form of the ambulance would need to be modified if a new paramedical specialty was to be created. In a paper based on the visit, he described his ride on a type of Soviet ambulance that had been designed to accommodate resuscitation. The ambulance was "of Russian make and looked like a Volkswagen bus" and "was equipped with emergency artificial ventilation equipment (mouth-to-mouth S-tube, pressure-cycled automatic oxygen resuscitator; tracheal intubation equipment); sterile packs for tracheotomy, thoracotomy, venous cut-down and arterial cut-down; electrocardiograph; DC external–internal defibrillator; and fluids, including regular dextran."[67] Many of these features would later be folded into the American Society of Anesthesiologists and the NAS-NRC recommendations for ambulance design and equipment.

Back in the United States, Safar blended European advances in ambulance design with his own experiences with trauma care. He actively sought out allies like Richard Brose, who was in charge of emergency medical programs at the Pennsylvania Department of Health.[68] Using a Cadillac hearse-type ambulance built by the Superior Coach Company, and operated by the volunteer Eureka Hose Company of Tarentum, Pennsylvania, Safar and Brose

67. Safar and Rosomoff, "Impressions on Emergency Care in Prague and Moscow," 50. Safar also noted that this type was only one of several types of ambulances used by the Soviets. Other variants ranged from purpose-built vehicles to recycled limousines that required patient loading through the trunk opening. Ibid., 49–51.

68. Safar, *From Vienna to Pittsburgh*, 208.

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modified the vehicle and then described their design in a 1965 article in the *Archives of Surgery*, which outlined a working model of an alternative type of ambulance designed to provide "modern care for the unconscious, nonbreathing, and pulseless patient during transportation."[69] This ambulance reflected several key medical innovations that separated it from earlier transport vehicles.

One important modification in Safar and Brose's prototype was the reconfiguration of the interior arrangement of the patient compartment, making the attendant's seat at the side of the litter collapsible and placing the attendant's primary seat at the head of the patient.[70] This change reflected Safar's training as an anesthesiologist; in the operating room, the anesthesiologist sat at the patient's head as a way to monitor vital signs and provide resuscitation as necessary. The new seat position also gave the attendants more room to operate and allowed them to provide both chest compressions and artificial ventilation.

In 1967, Safar and Gerald Esposito addressed the spatial limitations of the hearse-type ambulance by utilizing a new type of vehicle, choosing a Chevrolet C-10 utility vehicle instead of the more traditional Cadillac hearse as their ambulance platform. Not only did the C-10 provide more interior space, it also satisfied another important criterion—it could be converted into a fully functional mobile intensive care unit for around $10,000.[71] While the C-10 was better than hearse-derived models, it still was too small for Safar. In subsequent experiments, he pursued two other modifications to the ambulance vehicle type. The first was to substitute a Ford Econoline van for the C-10. The second drew from the results of a preexisting collaboration between Baltimore Fire Battalion Chief Martin McMahon and the Swab coach company to create a modular ambulance. Inspired by McMahon's results, Safar

69. Peter Safar and Richard A. Brose, "Ambulance Design and Equipment for Resuscitation," *Arch. Surg.*, 1965, *90*, 343–48.

70. In his memoirs, Safar notes that he actually pioneered this change during his time at Baltimore City Hospital in the late 1950s. Nevertheless, it receives prominent treatment in his article with Brose. Safar, *From Vienna to Pittsburgh*, 148. He also reflected that the ambulance he rode on in the Soviet Union had a similar interior arrangement, writing "the patient's stretcher was placed so that the operator could approach him from the vertex, with a small seat there next to the wall-mounted anesthetic machine." Safar and Rosomoff, "Impression on Emergency Care in Prague and Moscow," 51.

71. Peter Safar, Gerald Esposito, and Donald Benson, "Ambulance Design and Equipment for Mobile Intensive Care," *Arch. Surg.*, 1971, *102*, 163–71, 169.

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and Esposito created their own version of a "*custom-made box-like compartment* to be carried on a truck chassis." In an article published in the *Archives of Surgery* in 1971, they claimed that their modular experiment conformed to all subsequently established national recommendations with one exception: their design failed to allow for unfettered movement by the attendant between the driver's and patient's compartments.[72]

THE NAS-NRC COMMITTEE AND AMBULANCE DESIGN STANDARDS

On a mild spring day in 1967, Sam Seeley received a phone call from Robert Smith of the Washington office of the Ford Motor Corporation. Smith called to invite Seeley, as the representative of the NAS-NRC, to travel to Ford's headquarters in Dearborn, Michigan, to participate in a working group that would design a commercially viable line-built ambulance.[73] Seeley responded to Smith's invitation by informing him "that there are at present no nationally endorsed standards of design, construction or safety requirements and, in fact, an 'ambulance' is rarely defined." He suggested "that representatives of the motor vehicle industry, physicians, engineers, law enforcement agencies, federal agencies concerned with health services, and others might profitably appraise the current ambulance situation to determine whether guidelines for the specifications of ambulances are, in fact, needed and, if so, whether it would be profitable to explore ways and means of developing standards."[74] Days later, four representatives from Ford were sitting at a table at the National Academy of Sciences meeting with representatives from the National Highway Safety Agency (NHSB's precursor in the Commerce Department); the Public Heath Service;

72. Safar, *From Vienna to Pittsburgh*, 148, and Safar, Esposito, and Benson, "Ambulance Design and Equipment for Mobile Intensive Care," 169. Emphasis in original. For more details on McMahon's creation of the modular box-on-frame ambulance, see Bell, *The Ambulance*, 220–24. McMahon also became an active member of the NAS-NRC committee. For more on the relationship between the two men, see Safar, *From Vienna to Pittsburgh*, especially page 147.

73. Sam Seeley, M.D. to Members of the Informal Meeting on Design of Ambulances, March 22, 1967, in NRC: Com on Emergency Medical Services: Subcom on Ambulance Services Task for on Medical Requirements for Ambulance Design and Equipment, 1967–68, NAS-NRC Archives.

74. Ibid.

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representatives from the State of Nebraska; and the Chairman of the Division of Medical Sciences of the NAS.[75]

The solicitation of medical opinion by the Ford Motor Company presented the committee with an opportunity to remove some of the constraints that coach-built ambulances imposed on the provision of en route care. New ambulances, the thinking went, could enable the use of new technologies, such as bag-valve resuscitation, and new methodologies, such as en route closed chest cardiac massage. In light of his experimentation and previous publishing on ambulance design, Safar emerged as the preferred candidate to chair the Task Force on Medical Requirements for Ambulance Design and Equipment.

The Task Force met for the first time on April 29, 1968. In a memorandum for the record, Seeley claimed that the major focus of the Task Force was to determine "space requirements for patients, attendants" and to identify "equipment . . . in order that ambulance attendants can properly carry out the function prescribed in the training guidelines report."[76] Safar arrived at the first subcommittee meeting ready. In his capacity as the chairman of the American Society of Anesthesiologists Committee on Acute Medicine, Safar had already prepared a report that made suggestions for how to standardize ambulance design and equipment.

At the first meeting, Safar presented this draft, having distributed it in advance, for members to comment on. Seeley called it a "strawman" and intended it to serve as a starting point for discussion.[77] Consequently, much of the meeting revolved around making changes to Safar's "strawman" as the Task Force debated the proper role of auditory and visual warning devices, on-board

75. Sam Seeley, Memorandum for the Record, March 22, 1967, in NRC: Com on Emergency Medical Services: Subcom on Ambulance Services Task Force on Medical Requirements for Ambulance Design and Equipment, 1967–68, NAS-NRC Archives. Representatives from Ford included a member from the Research and Planning Department, the Assistant to the company's Automotive Safety Director, a representative from the Fleet Sales and Leasing Office, and the Executive Engineer from the Safety Program.

76. Ibid.

77. Ibid. It is not clear that the document served the purpose of a classic strawman as much as a discussion piece to generate comment. Seeley writes of the draft "this document was distributed in advance of the meeting to members of the Task Force and approximately twenty consultants. It is to serve as a 'strawman' for the development of a complete report by the Task Force."

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communication and recording devices, the internal and external design of any proposed vehicles (including a push for a design that accommodated variable terrain and road conditions that could be encountered by rescue vehicles in geographically diverse areas of the country), and the provision of oxygen and suction technologies. At adjournment, Safar and the Task Force agreed to continue the discussion via mail and telephone.[78] The result was the publication of "Medical Requirements for Ambulance Design and Equipment" by the NAS-NRC in late 1968. This booklet fulfilled its role as guiding document for an engineering committee to consider as it tried to translate medical requirements into design reality.[79]

A committee in the National Academy of Engineering (NAE) was then convened at the request of DOT to expand on the standards contained in the slim booklet and to help translate the Task Force's suggestions into design standards. Chaired by John Baerwald from the Highway Traffic Safety Center at the University of Illinois, Urbana, the NAE committee was broadly construed and included representatives from both Ford and General Motors, the heating and cooling industry, as well as two women, Dr. Irma M. West and Marie C. Dunn, who were tasked with bringing a gendered perspective to ambulance design. Several holdovers from the Committee on Emergency Medical Services Task Force, including Safar, McMahon, and Farrington, provided continuity between the original NAS-NRC subcommittee and the new NAE committee.[80]

The NAE Committee's final report was published in 1969 as *Ambulance Design Criteria* and it contained many of the Safar-chaired Task Force's recommendations, including a push for an attendant's

78. Ibid.

79. National Academy of Sciences-National Research Council Task Force on Medical Requirements for Ambulance Design, "Medical Requirements for Ambulance Design and Equipment" (Washington, DC, 1968).

80. John E. Baerwald, "The Interdisciplinary Development of Ambulance Design Criteria," *Highway Research Rec.*, 1970, *332*, 54–62; Irma M. West, M.D. to Roland J. Sigafoo, April 24, 1969, in Division of Medical Sciences, Committee on Emergency Medical Services, MED: Committee on Emergency Medical Services General, 1967–70, NAS-NRC archives. Safar spent much of 1969–70 on leave and consequently delegated much of his NAE committee responsibilities to Don Benson and Gerry Esposito. See Peter Safar to R. J. Sigafoo, Executive Secretary Committee on Ambulance Design Criteria, June 10, 1969, Safar Files, Box Unnamed (Bankers 701), National Research Council Committee on Emergency Medical Services 1968 to 1969, Pittsburgh, Pennsylvania: Safar Center for Resuscitation Research, University of Pittsburgh.

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seat at the patient's vertex, sufficient cabin space to perform CPR, the need for mobile suction, the installation of hospital-to-ambulance communication equipment, and a minimum capacity of two patients and two attendants, depending on life support needs.[81]

The NAE Committee also pushed for visual uniformity in ambulance design. Key recommendations included the now-ubiquitous "Omaha orange" and white color scheme, blue flashing lights, and the word "AMBULANCE" written backwards along the hood so that drivers could identify oncoming ambulances in their rearview mirrors. [82] Air-conditioned panel vehicles were also recommended to enhance patient privacy and comfort.[83]

Like the recommendations made by the NAS-NRC Task Force on Medical Requirements for Ambulance Design and Equipment, the recommendations made by the NAE committee were not legally binding. Nevertheless, as Gerry Esposito noted in a letter to Sam Seeley, major coachbuilders like the Superior Coach Company (the company that Ford outsourced its ambulance bodies to) recognized that the prevailing winds of regulation could create new market opportunities for savvy coachbuilders and were "embarking upon a design program to meet the suggested standards." Basing his observations on a site visit to Superior's Lima, Ohio, headquarters, Esposito concluded, "they seem to have pretty accurate information about them."[84] In the same letter, Esposito also noted that other

81. For Task Force recommendations, see Draft Meeting Minutes, April 29, 1968, in Division of Medical Sciences, Committee on Emergency Medical Services, Med. Com. Committee on Emergency Medical Services, Subcom. on Ambulance Services, Task Force on Medical Requirements for Ambulance Design and Equipment, NAS-NRC archives. For highlights of NAE recommendations, see Baerwald, *The Interdisciplinary Development of Ambulance Design Criteria*, 57.

82. Baerwald, *The Interdisciplinary Development of Ambulance Design Criteria*, 57; National Research Council, Press Release, September 17, 1969, announcing the release of The National Research Council-National Academy of Engineering's Ambulance Design, Criteria Report Safar Files, Box Unnamed (Bankers 701), National Research Council Committee on Emergency Medical Services 1968 to 1969, Pittsburgh, Pennsylvania: Safar Center for Resuscitation Research, University of Pittsburgh.

83. The Freedom House Econoline ambulances featured many of these design recommendations including the reversed "ambulance" on the hood, cabin air conditioning, and the orange and white color scheme. Safar et al., "Ambulance Design and Equipment for Mobile Intensive Care," 168–69.

84. Gerald Esposito to Sam Seeley, June 13, 1969. Safar Files, Box Unnamed (Bankers 701), National Research Council Committee on Emergency Medical Services 1968 to 1969 (Pittsburgh, Pennsylvania: Safar Center for Resuscitation Research, University of Pittsburgh). In discussing the National Academy of Engineering Committee, Bell argues that while this committee's discussion was "free and frank," its impact was limited. Bell

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coachbuilders like the National Custom Coach Company, based in Knightstown, Indiana, were "most interested in building a vehicle to meet the standards."[85]

In 1974, the General Services Administration passed federal standard KKK-A-1822, which for the first time standardized the design of ambulances purchased with federal dollars.[86] KKK-A-1822 codified many NAE-suggested design ideas already in commercial production as well as establishing the tripartite class system as a feature of modern ambulance design.[87]

CONCLUSION: EXPERTISE AND POLICYMAKING IN EMS

This article has attempted to show that simply conducting important local experiments was not enough to explain the particular outlines of how paramedic training and ambulance design standards were developed. Instead, what was needed was an intermediary body, like the NAS-NRC Committee on Emergency Medical Services, where these heterogeneous local ideas could be translated into uniform policy recommendations. This body served as a direct channel of influence for physician members into a sympathetic Executive Branch which looked to the perceived authority of the NAS-NRC and its expert members as not only legitimate, but as a voice for organized medicine.

Despite its successes, by the mid-1970s, the influence of the Committee waned as the federal government's responsibility for prehospital care began to coalesce along departmental lines. The

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writes, "although contrary to the author's expectations these criteria [proposed standards] were never legislated at a national level, the precepts being limited to vehicles purchased by federal agencies or those receiving federal funds." Bell misses the broader influence of the NAS-NRC and the NRC-NAE Committees. Member-derived advances have been critical to building the modern ambulance, regardless of the government's ability to mandate them for ambulances purchased with nonfederal dollars. As this essay has argued, NAS-NAE recommendations had an important impact on shaping the ways that private companies designed their products for the private market since no company wanted to create one model of ambulance for the federal government and another for the private market. Bell, *The Ambulance*, 298–300.

85. Esposito to Seeley, June 13, 1969, Safar Files, Box Unnamed (Bankers 701), National Research Council Committee on Emergency Medical Services 1968 to 1969, Pittsburgh, Pennsylvania: Safar Center for Resuscitation Research, University of Pittsburgh.

86. Bell, *The Ambulance*, 320–21.

87. Ibid., 321.

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passage of the 1973 Emergency Medical Systems Services (EMSS) Act fundamentally altered how EMS were funded and implemented. As part of a federal push to regionalize health care, the EMSS Act sited the locus of control for EMS services within the HEW. Predicated on a systems model of planning, the EMSS Act attempted to link all the elements of the emergency response chain together in a much more coherent manner than the Highway Safety Act.[88]

Also undercutting the authority of the Committee was a new federal commitment to geographical regionalism. Instead of a focus on local demonstration projects, the norm during the 1960s with projects like Freedom House, in 1972 the Nixon Administration moved to fund five large-scale EMS demonstration projects. Situated under the control of HEW, an agency well versed in medicine and public health, as opposed to DOT, an agency largely focused on technical solutions to accidental injury, this agency did not require the imprimatur of the NAS-NRC to have its actions seen as legitimate.[89]

Finally, the individual members of the NAS-NRC Committee also began to go their separate ways as contract funding for the committee became less regular.[90] In October 1974, at the age of seventy-one, Seeley retired after roughly a decade and a half with NAS-NRC. In a letter to Safar in September 1974, Seeley wrote that in order for the NAS-NRC Committee on Emergency Medical Services to succeed in its future endeavors, it required

88. Department of Health, Education, and Welfare, The Emergency Medical Services Systems Act, Publication Number (HSA) 75-2003 (Washington, DC, 1973).

89. HEW had never been totally absent from EMS development. The department's allocations for EMS exceeded DOT's by $25 million from 1966 to 1973. However, the diffuse structure of using the Regional Medical Programs and Comprehensive Health Planning grants led to a programmatic strategy that Geoffrey Gibson has termed "fragmented." Gibson argues that "because few program guidelines were offered and an insignificant national review of proposed EMS funding was imposed, a wide diversity of projects both between and within regions were funded under the EMS rubric and with a variable actual relationship to EMS." Thus, HEW's approach to providing funding for EMS was, according to Gibson, "pluralistic profligacy." Gibson, "Emergency Medical Services," 123–24.

90. Minutes of a Special Meeting of the NAS-NRC Committee on Emergency Medical Services, August 30, 1973, Safar Files, Box Unnamed (Bankers 701), National Research Council Committee on Emergency Medical Services 1973, Pittsburgh, Pennsylvania: Safar Center for Resuscitation Research, University of Pittsburgh.

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strong medical direction and coordination by his staff replacement.[91] In Pittsburgh, Safar continued to advocate for better emergency medical care, helped to found the Society for Critical Care Medicine, sought out regional EMS planning grants, and advocated for the expansion and municipal support of Freedom House.[92] In 1974, he was appointed by President Ford to be one of five public members on the Interagency Committee on Emergency Medical Services, established pursuant to the requirements of the 1973 EMSS Act.

A firm definition of federal responsibilities for prehospital care was what the NAS-NRC Committee and much of organized medicine had been hoping for since the passage of the Highway Safety Act. The new focus on regionalization and the subsequent reorganization of federal funding for demonstration projects spawned a new wave of EMS innovation that would carry through into the 1980s and result in the creation of statewide trauma systems, improved helicopter ambulance services, and increasingly refined standards for paramedic training. With passage of the EMSS Act and the ascendancy of the HEW as the lead federal EMS and emergency medicine agency, it finally seemed that organized medicine would have their own seat at the policymaking table.

In the years between the passage of the Highway Safety Act and the Emergency Medical Services Systems Act, the collaboration between the NAS-NRC Committee on Emergency Medical Services and the DOT resulted in uniform paramedic training and ambulance design standards. As a body of medical experts, the NAS-NRC Committee acted as an important space where physician actors could not only translate their own ideas for the improvement of trauma care into policy actions, but also where they could claim a role in trauma care for their particular medical specialty. An examination of the setting of these standards reveals an important way that physicians were able to exert their technical and cultural

91. Howard, "Sam F. Seeley, MD"; Letter from Seeley to Safar, September 8, 1974, Safar Files, Box Unnamed (Bankers 701), National Research Council Committee on Emergency Medical Services-Current, Pittsburgh, Pennsylvania: Safar Center for Resuscitation Research, University of Pittsburgh.

92. Peter Safar and Pat Sands, *University of Pittsburgh Department of Anesthesiology and Critical Care Medicine: The First 15 Years, 1961–1976* (Pittsburgh: University of Pittsburgh, 1976).

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authority to influence the creation of health-related public policy in the latter decades of the twentieth century.

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