

Is the number of traffic fatalities in American hospitals decreasing?

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Abstract

Fatality Analysis Reporting System (FARS) data from 1977 to 2002 record a decreasing number of traffic fatalities taken to a hospital compared with traffic fatalities not taken to a hospital. In this study, we calculated the proportions of decedents reportedly taken to a hospital each year in each state, and the proportions surviving at least 1 h. We also used death certificate data from the National Center for Health Statistics (NCHS) for 1979–1999 to categorize the proportion of motor vehicle fatalities in each state by hospital patient status. The annual number of traffic fatalities decreased slightly over the period of observation. The proportion of decedents recorded in FARS as transported to a hospital fell from about 73 to 43%. However, this proportion decreased abruptly at certain times in some states, suggesting previous misclassification. The proportion surviving at least 1 h remained relatively constant. NCHS data showed a decline in the proportion declared dead in hospitals from 62 to 51%, including a decline in the proportion declared dead on arrival (DOA) from 20 to 8%. Along with occasional misclassification in some states, the decrease in cases transported only to be pronounced DOA could explain why FARS data show a decrease in deaths after hospital transport.

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1. Introduction

Over the past 30 years, considerable effort and funding in the United States have gone into the development of pre-hospital and interhospital systems of emergency care for the victims of acute injury. Evaluating the effect of these systems has been limited by the difficulty in obtaining reliable, population-based data relating acute medical and paramedical care to outcomes. A potential source of information for such studies is the Fatality Analysis Reporting System (FARS, known prior to 1998 as the Fatal Accident Reporting System) of the National Highway Traffic Safety Administration (NHTSA).

Nathens et al. (2000) used FARS data to associate the presence of a state trauma system with a decreased risk of death from motor vehicle collisions, although the authors admitted that “injuries with a high on-scene fatality rate will not benefit

from the presence of a trauma system”. Several other studies have noted that the number of deaths following transportation to a hospital, as reported by FARS, appears to be decreasing compared with the number not resulting in hospitalization (Mullins et al., 1994; Brown et al., 2000; Clark, 2003). If true, such a trend might be cited as evidence that hospital care of injured patients had improved. The purpose of this study was to determine whether FARS data are sufficiently reliable to justify such a conclusion.

2. Materials and methods

The Institutional Review Board at our hospital was informed of this study and judged it exempt from review according to National Institutes of Health rules for existing data “if the sources are publicly available”.

FARS data were downloaded via anonymous File Transfer Protocol from a NHTSA internet site for 1975–2002 (US DOT, 2002a). An Analytic User’s Guide was also obtained from the internet site (Tessmer, 2004). Data were analyzed

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using Stata (Intercooled Version 7.0, Statacorp, College Station, TX).

FARS is a census of all traffic-related motor vehicle crashes in the United States resulting in a fatality within 30 days of the event. It includes information on the collision (e.g., state, county, date, and time), the vehicles (including driver information), and each person involved (e.g., age, sex, whether hospitalized, date of death up to 30 days after the crash, and time of death). These data have been collected from existing documents by government agencies in each state since 1975, are frequently updated, checked for consistency, and standardized in cooperation with NHTSA, and are available to the public by mail or internet (US DOT, 2002a).

For each year of FARS data, the person-level file was used to determine the state where the fatal crash had occurred, the “lag time” elapsed between crash and death, and whether the decedent had been transported to a hospital. “Lag times” had not been computed before 1982, and transportation to a hospital had not been recorded before 1977. For 1999–2000, the hospital-related variable had been expanded to include “died at the scene” and “died en route”, then in 2001–2002 these latter categories had been included as a separate variable labelled “DOA”.

The numbers of traffic deaths for each year starting in 1977 were totaled, along with the numbers for whom the “lag time” elapsed between crash and death was at least 1 h. In addition, for each year we calculated the proportions of decedents for which the “lag time” was at least 1 h and the proportions for which the decedent was recorded as having been transported to a hospital. These proportions were separately calculated for each year for each of the 50 states and District of Columbia.

Public-use death certificate data were also obtained from the National Center for Health Statistics (NCHS) on compact discs for the years 1979, 1984, 1989, 1994, and 1999 (US CDC, 2004). Prior to 1999, cases were included in the standard NCHS category of “motor vehicle accidents” if the underlying cause of death had been coded using the International Classification of Diseases, Ninth Revision (ICD-9) as E810–E825; in 1999, cases

were included in this category if the underlying cause had been coded using the International Classification of Diseases, Tenth Revision (ICD-10) as V02–V04, V09.0, V09.2, V12–V14, V19.0–V19.2, V19.4–V19.6, V20–V79, V80.3–V80.5, V81.0–V81.1, V82.0–V82.1, V83–V86, V87.0–V87.8, V88.0–V88.8, V89.0, or V89.2.

The “hospital status” field from the NCHS death certificate data (indicating the place of death and decedent’s hospital status) was tabulated for the United States and for individual states. In all years, “Hospital” subcategories included “Inpatient”, “Outpatient or admitted to Emergency Room”, “Dead on Arrival”, or “Patient status unknown”. Prior to 1994, there was an additional Hospital subcategory of “Patient status not on certificate”, and the non-Hospital categories consisted of “Other institutions providing patient care”, “All other reported entries”, and “Hospital and patient status not stated”. Starting in 1994, the non-Hospital categories consisted of “Nursing home”, “Residence”, “Other”, and “Place of death unknown”.

3. Results

The total annual number of traffic fatalities in the United States recorded by FARS or NCHS has decreased somewhat over the years of available data (Fig. 1). The proportion of decedents recorded in FARS as having been transported to a hospital has fallen from 73 to 43% (Fig. 2). Over a similar time period, the proportion of decedents declared dead in hospitals (including “Dead on Arrival”) decreased from 62% in 1979 to 51% in 1999 (Fig. 2 and Table 1), while the proportion of decedents declared dead in hospitals excluding those “Dead on Arrival” varied only minimally between 42 and 45% (Fig. 2 and Table 2). The proportion of decedents in FARS surviving at least 1 h has likewise remained nearly constant (Fig. 2).

During the period 1977–1980, about 6.7% of decedents were classified in FARS as “unknown” with respect to whether they had been transported to a hospital; since 1980,

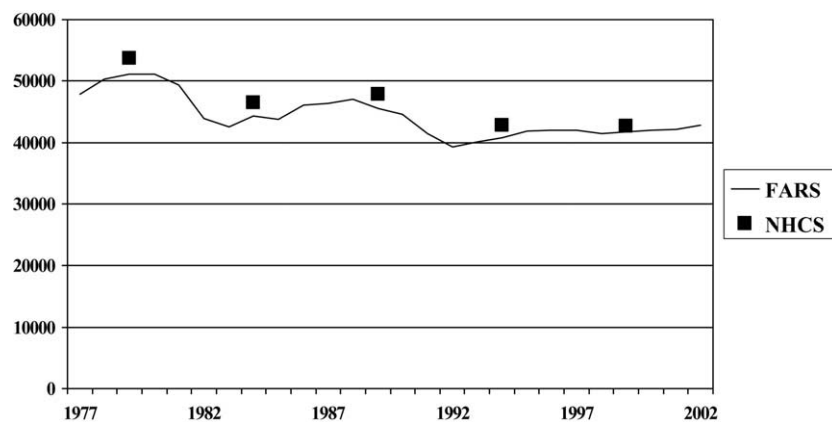


Fig. 1. Annual number of traffic fatalities in the United States as reported by FARS 1977–2002 and NCHS in the given years.

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