

# Gastrostomies in Older Patients: The 1990 National Hospital Discharge Survey

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**Background:** Although many published case series have described patients' experiences after gastrostomy placement, generalizing from the results of case series can present problems. The purpose of this study was to examine gastrostomy placement among hospitalized older patients in a nationally representative sample.

**Methods:** Using the 1990 National Hospital Discharge Survey, age, sex, race, primary and secondary diagnoses, and mortality were described for hospitalized patients aged 65 years and older having gastrostomies. Age-specific placement rates were calculated using mid-1990 Census Bureau population estimates.

**Results:** In 1990 an estimated 85,400 patients aged 65 years and older were discharged from hospitals with gastrostomies. Frequent primary diagnoses included cerebrovascular disease (19 percent), pneumonia with or without aspiration (12 percent), neoplasm (11 percent), and fluid and electrolyte disorders (9 percent). The in-hospital mortality rate was 16 percent. Age-specific rates for gastrostomy increased from 1.2 per 1000 for those aged 65 to 74 years to 10.8 per 1000 for those aged 85 years and older.

**Conclusions:** In 1990 older hospitalized patients had gastrostomies with surprising frequency, and their in-hospital mortality rate was substantial. An estimated 1 percent of the US population aged 85 years and older was discharged from a hospital in 1990 with a gastrostomy. (J Am Board Fam Pract 1998;11:187-92.)

The use of feeding tubes for older patients provokes considerable debate over ethical<sup>1-5</sup> and quality-of-life<sup>6,7</sup> concerns. Few population-based descriptive data exist, however, regarding the use of gastrostomies in older patients. Although many have described experiences from selected patient samples, particularly with percutaneous gastrostomy placement and follow-up, generalizing those results can be problematic.

The use of gastrostomies in the growing elderly population is important to examine for several reasons. First, the introduction in the early 1980s of percutaneous endoscopic gastrostomy (PEG)<sup>8</sup> might have led to increasing gastrostomy placement in older patients. According to the National Hospital Discharge Survey (NHDS), between 1988 and 1993 the number of patients aged 65 years and older who had gastrostomies increased from approximately 61,000<sup>9</sup> to 108,000.<sup>10</sup> Furthermore, in 1993 an estimated 83,000 pa-

tients had PEGs<sup>10</sup> (procedure coding before 1990 does not allow comparably distinguishing PEGs from gastrostomies inserted operatively). Second, describing the characteristics and outcomes for older patients enterally fed by gastrostomy should lead to a more informed decision when considering gastrostomy placement. Finally, while patients having gastrostomies are often compromised, the intent is usually long-term feeding; how frequently do older patients with gastrostomies fail to survive hospitalization?

To provide a basis for exploring these issues, this study describes gastrostomy use in a nationally representative sample of older patients using the 1990 NHDS.<sup>11</sup>

## Methods

The NHDS is a nationwide survey of patients discharged from noninstitutional short-stay hospitals in the 50 states, excluding all federal, military, and Veterans Administration institutions.<sup>11</sup> The 1990 NHDS data were collected from 474 hospitals; the complex sample design of the survey allows estimating national frequencies for diagnoses, procedures, and mortality. Up to seven diagnoses and four procedures were recorded for each discharge. Diagnoses are listed in the order recorded on abstract forms, except acute myocardial infarction,

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**Table 1. Characteristics of Older Patients With Gastrostomies, 1990 National Hospital Discharge Survey.**

Characteristics	Number*	Rate per 1000 Population†
<i>Age, years</i>		
65-74	21,000	1.2
75-84	31,600	3.1
85 and older	32,800	10.8
<i>Sex</i>		
Male	31,500	2.5
Female	53,800	2.9
<i>Race</i>		
White	58,900	2.1
African-American	11,700	4.7
Not stated or other	14,700	—
Total‡	85,400	2.7

\*Rounded to the nearest hundred.

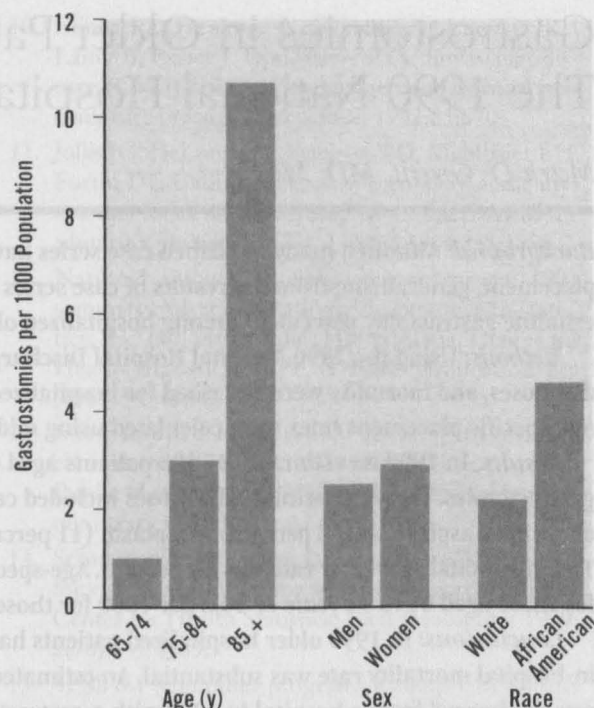
†Number of gastrostomies divided by mid-1990 census estimates for age-, race-, and sex-specific subgroups.

‡Numbers will not sum to total because of rounding.

which is always considered the primary diagnosis. For the less than 2 percent of discharges for which age and sex were not recorded, both were imputed based on patients with similar diagnostic profiles.<sup>11</sup>

Procedures coded according to the *International Classification of Diseases, 9th Revision, Clinical Modification* (ICD-9-CM)<sup>12</sup> as percutaneous gastrostomy (ICD-9-CM 43.11) or other gastrostomies (ICD-9-CM 43.19) were combined for analysis. Because of the complex sampling scheme, population projections or estimates are subject to error, particularly when based on few discharges. Accordingly, when the sample size (not the weighted or population projection) numbered fewer than 30, the population estimate is not reported because of possible error.<sup>11</sup> For sample sizes numbering between 30 and 59, the estimate is reported but reliability cannot be assumed and is accordingly noted.<sup>11</sup> Because there were few deaths in some subgroups (ie, fewer than 30), only the overall in-hospital mortality rate was calculated. Additionally, estimates—being approximate—were rounded to the nearest 100, and percentages to whole numbers. For reference, the total unweighted sample size was 655.

Summary diagnostic categories were grouped according to the classification scheme described by Elixhauser et al,<sup>13</sup> with a category added for swallowing disorders (ICD-9-CM 787.2 [dysphagia], 783.3 [feeding difficulties], V41.6 [problems with swallowing and mastication]). Finally, ap-



**Figure 1.** Bar heights represent number of gastrostomies placed per 1000 population according to age, race, and sex subgroups. Denominators from mid-1990 census estimates were used to calculate placement rates.

proximate age-specific rates per 1000 population for gastrostomy placement were calculated using denominators obtained from mid-1990 Census Bureau estimates.

## Results

According to the NHDS, in 1990 approximately 85,400 patients aged 65 years and older were discharged from the hospital with gastrostomies (Table 1). Sixty-six percent of the gastrostomies were recorded as PEGs, the remainder as operatively inserted gastrostomies. The estimated in-hospital mortality was 16 percent. Approximately 2.7 gastrostomies were placed per 1000 persons aged 65 years and older living in the United States in 1990. Age-specific placement rates increased from 1.2/1000 for patients aged 65 to 74 years to 10.8/1000 for those aged 85 years and older (Table 1 and Figure 1). Placement rates were greater among women than men; the rate among African Americans was more than twice that of whites.

The most frequent primary diagnoses were cerebrovascular disease (19 percent), pneumonia (12 percent), neoplasm (11 percent), and fluid and electrolyte disorders (Table 2). A primary or sec-



ondary fluid and electrolyte disorder diagnosis was recorded in 46 percent of discharges, and a nutritional deficiency in 25 percent. As expected, common secondary diagnoses (Table 2) included fluid and electrolyte disorders, urinary tract infections, nutritional deficiencies, cerebrovascular disease, pneumonia, diabetes, and congestive heart failure. One in 5 patients had dementia recorded as a primary or secondary diagnosis.

Probable common indications for gastrostomy placement from listed primary and secondary diagnoses would include swallowing disorders, nutritional deficiencies, aspiration pneumonia, or pharyngeal, laryngeal, and esophageal neoplasms.<sup>14</sup> Yet, less than one half of patients having gastrostomies (42 percent) had at least one of these diagnoses listed among the seven possibly recorded.

Finally, more than one half (55 percent) of these older patients surviving hospitalization were discharged to long-term care, although the proportion of patients so discharged varied by age: 61 percent of those aged 75 years and older, but 34 percent of those aged 65 to 74 years.

## Discussion

Investigators have reported a variety of patient experiences following gastrostomy insertion in older patients, with 30-day mortality rates varying from 0 to 30 percent or more. Studies conducted since 1980<sup>15-65</sup> suggest that the risk of short-term mortality is high, though when trying to generalize their results, problems arise: patient selection criteria differ considerably, and the length of follow-up varies from study to study. The strength of the NHDS is that it provides nationally representative data with demographic and diagnostic information as well as in-hospital mortality.

The results obtained from the 1990 NHDS—the substantial in-hospital mortality rate and the array of primary and secondary diagnoses—suggest that the older hospitalized patients having gastrostomies were compromised. Placement rates were highest among those aged 85 and older, women, and African Americans. Surprisingly, these data indicate that in 1990 approximately 1 of every 100 persons aged 85 years and older living in the United States was discharged from a hospital with a gastrostomy. While the higher placement rate among women is consistent with their longer survival, it is more difficult to explain the more than twofold increased rate among African Americans

**Table 2. Percentage of Frequent Primary and Secondary Diagnoses Among Older Patients With Gastrostomies, 1990 National Hospital Discharge Survey.**

Diagnoses	Percent of Total
<i>Primary diagnoses</i>	
Cerebrovascular disease	19
Pneumonia	12
Neoplasm	11
Fluid or electrolyte disorder	9
<i>Secondary diagnoses</i>	
Fluid or electrolyte disorder	37
Urinary tract infection	25
Nutritional deficiency	21
Dementia	18
Cerebrovascular disease	17
Pneumonia	17
Diabetes	16
Congestive heart failure	13
Chronic obstructive pulmonary disease	12
Ischemic heart disease	12
Neoplasm	11
Decubitus ulcer	11
Swallowing disorders	11
Intestinal disorders*	8
Respiratory failure*	6
Complications	5
Sepsis*	4
Esophageal disorders*	4

From a projected 10,333,000 discharges among patients aged 65 years and older.

\*Sample size was between 30 and 59, and estimate might not be reliable.

compared with whites. The Hospital Cost and Utilization Project found that in 1987 African Americans had gastrostomies placed at a rate almost twice that of whites.<sup>66</sup> The racial disparity could be due to differences in stroke risk<sup>67</sup> or attitudes toward life-sustaining therapies.<sup>68</sup> Yet one must also note that the accuracy with which race was recorded in the NHDS has been questioned when considering these differences.<sup>69</sup>

Interestingly, dementia was listed as a primary or secondary diagnosis in 20 percent of patients. Because dementia as a discharge diagnosis lacks both sensitivity and specificity,<sup>70</sup> however, the true proportion might be higher or lower. Whereas the diagnostic coding of dementia subsets could not be examined due to small sample sizes, the high prevalence of cerebrovascular disease suggests that vascular dementias might have been overrepresented in the sample.<sup>71</sup>

Although determining indications for gastrostomy placement from discharge data is potentially difficult, listed diagnoses nevertheless contain considerable information. Consistent with suggested indications for a PEG,<sup>14</sup> nutritional deficiencies, inability to swallow, aspiration with pneumonia, or pharyngeal, laryngeal, and esophageal neoplasms are the most apparent reasons for gastrostomy placement. Yet one of these diagnoses was listed for fewer than one half of patients. Although it is possible that poor diagnostic coding by physicians and hospital personnel account for the low number of these diagnoses, it is more curious that only one quarter of patients had a nutritional deficiency diagnosis. Perhaps nutritional deficiencies occurred in almost all patients, yet they were not diagnosed.<sup>72</sup> The diagnosis might also not have been retrievable because the number of diagnoses exceeded the seven allotted fields in the NHDS files (39 percent of patients had seven recorded diagnoses).

Although the strength of the NHDS is the representativeness of the sample and the ability to calculate national rates, this study has limitations. First, only the overall in-hospital mortality can be reliably estimated. Second, we did not assess the use of nasogastric feeding tubes. Among patients who had a nasogastric feeding tube preceding a gastrostomy, the nasogastric tube could have caused either morbidity or even death. Lastly, administrative discharge data obtained from the NHDS do not contain sufficient clinical detail to allow examining potential predictors of mortality or to analyze morbidity.

Still, some have questioned whether enteral feeding by gastrostomy prolongs life.<sup>73</sup> The risk of aspiration accompanying nasogastric and PEG feedings could be similar,<sup>74</sup> with jejunostomy possibly required to prevent aspiration.<sup>75</sup> The potential complications and the high mortality rate among patients with gastrostomies have caused some to suggest that a permanent feeding tube be deferred unless survival seems probable.<sup>76</sup> For practitioners, results obtained from the NHDS appear to support that view. Furthermore, that the PEG procedure is readily available and often well tolerated does not mean the clinical and ethical consequences of its use should not be carefully considered.

In conclusion, the 1990 NHDS data show many gastrostomies placed among older patients with a

considerable in-hospital mortality rate. While enteral feeding by gastrostomy might be life-sustaining for some, for others it could have little benefit. Although these data do not indicate which patients would benefit, some questions must be raised regarding the increasing use of gastrostomies among older patients.

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