

Supplementary Online Content

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eAppendix. Selection of *ICD-9* and CPT Codes to Identify Procedures for Enteral Access for Feeding Tubes

This supplementary material has been provided by the authors to give readers additional information about their work.

eAppendix. Selection of *ICD-9* and CPT Codes to Identify Procedures for Enteral Access for Feeding Tubes

The appropriate use and accuracy of *ICD-9* procedure codes and CPT codes to capture surgical or endoscopic access for tube placement is important to the validity of this work, especially given that our analyses examined 8 years of feeding tube insertions. Our starting points were reference books and online coding information on CPT and *ICD* codes for a number of years (2000, 2004-2007). In addition, we took the following steps.

- i. We contacted several GI speciality practice groups to review the billing codes that they used during inpatient and outpatient insertion of feeding tubes.
- ii. We reviewed previous published research that reported use of feeding tubes using *ICD* and/or CPT codes.
- iii. For *ICD-9-CM* codes, we reviewed CMS site that documented the codes and publishes their changes with time in the form of yearly updates to providers. These updates were available from 2001 (see for example, http://www.cms.hhs.gov/ICD9ProviderDiagnosticCodes/04_addendum.asp#TopOfPage). For 1999 and 2000, we reviewed the information available via FTP at the CDC web site. The CDC has a document that reports change over time from 1989 (see <http://www.cdc.gov/nchs/data/icd9/icd9cv10.pdf>).
- iv. For CPT codes, we reviewed prior publications (e.g., CPT newsletter) that was available for purchase on the AMA web site.
- v. Finally, we discussed our coding with persons at CMS and RESDAC.

Our final list with notation about historical changes is as follows.

ICD-9

- 43.11 Percutaneous endoscopic gastrostomy tube
- 43.19 Permanent or temporary gastrostomy tube
- 44.32 Endoscopic conversion of gastrostomy to J tube (note this code was introduced in 2001, with clarification in 2002 per CMS web site).

CPT codes

- 432.46 Direct placement of PEG endoscopically
- 437.50 Gastrostomy tube placement
- 436.53 Laproscopic surgical gastrostomy - used in prior publication to indicate access for enteral feeding.
- 438.30 Open gastrostomy without Stamm procedure
- 438.32 Open gastrostomy with Janeway procedure
- 443.72 Insertion of PEG tube
- 443.73 Conversion of percutaneous G to J Tube
- 743.50 Invalid after 12/31/2007, but prior indicates professional fee for radiologist fee for assistance in PEG

Please note as of 2008, there were major changes in CPT codes with the addition of several new codes. This did not effect the proposed analysis, but persons wanting to conduct future studies must account for these recently implemented changes in CPT coding.

Because of our data extraction, we examined *ICD* and CPT codes that indicated a conversion of G to J tube. Our sample required that there was no evidence of feeding tube based on review of the MDS and Medicare billing data for at least one year. Based on that review, we chose to include the codes that indicated a conversion of a G tube to a J tube given that we had no evidence of a feeding tube on the MDS and no evidence of surgical or endoscopic procedure for a G tube. So this procedure code was the first evidence of the endoscopic insertion of feeding tube. These codes accounted for 81 of the feeding tube insertions.

Additionally, we performed analyses that examined whether hospitals differed in their CPT and *ICD-9* coding. The table examines the use of our proposed codes among hospitals in the highest and lowest decile of the rate of surgical or endoscopic feeding tube insertion as well as by the major associations reported in this manuscript. As shown in the table below, 94.7% of the feeding tubes inserted were PEG tubes and 4.6% were surgically placed gastrostomy tubes. There was little variation in the type of procedures between hospitals that varied in feeding tube insertion rates and the main independent measures.

	PEG tube	Surgically Place Gastrostomy	Other codes
Overall	94.7	4.6	0.7
For Profit	95.5	4.0	0.5
Lowest decile ICU Use	92.0	7.0	1.0
Highest Decile ICU Use	96.2	3.5	0.3
Lowest decile feeding tube Use	90.5	7.8	1.7
Highest Decile feeding tube Use	96.0	3.6	0.4
Less than 101 beds	93.0	6.6	0.4
Greater than 310 beds	95.6	3.6	0.8