BEYOND THE DRG: UTILIZING SECONDARY DIAGNOSES — THE NEXT STEP

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OBJECTIVES

Review the history of ICD codes
Describe ICD nomenclature
Differentiate between principle and secondary diagnoses
Outline database development
Describe descriptive and inferential statistical methods
Show examples of statistical data used to make managerial decisions

HISTORY OF ICD CODES

The International Classification of Diseases (ICD) has its origins in the1850s. The first edition, known as the International List of Causes of Death, was adopted by the International Statistical Institute in 1893.

The ICD-8 was introduced as the basis for coding diagnostic data for official morbidity and mortality statistics in the United States in 1968.

The ICD-9-CM 6th edition was issued for October 1, 2008.

The ICD-10 system will replace the ICD-9 on October 1, 2013.

ICD-9-CM CODE NOMENCLATURE

ICD is used to translate diagnoses of diseases and the health problems from words into an alphanumeric code.

ICD-9-CM codes are composed of three, four, or five digits. The first three digits indicate the heading of a category which may be further subdivided for detailed classification by the 4th or 5th digit.

EXAMPLE ICD-9-CM CODES

482	Other Bacterial Pneumonia
482.9 (4th modifier)	Bacterial Pneumonia unspecified
999.31 (5th modifier)	Infection due to central venous catheter

TYPES OF DIAGNOSES

Principal diagnosis: the condition established after study to be chiefly responsible for occasioning the admission of the patient to the hospital for care (Bronnert, 2008). The principal diagnosis assignment is based on the documentation by the providers.

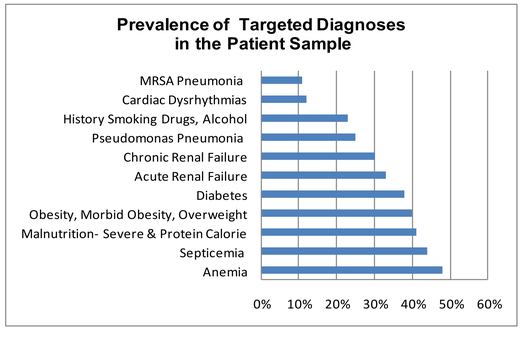
Secondary diagnoses: all conditions that coexist at the time of admission, that develop subsequently, or that affect the treatment received and/or the length of stay. Diagnoses that relate to an earlier episode which have no bearing on the current hospital stay are to be excluded (Bronnert).

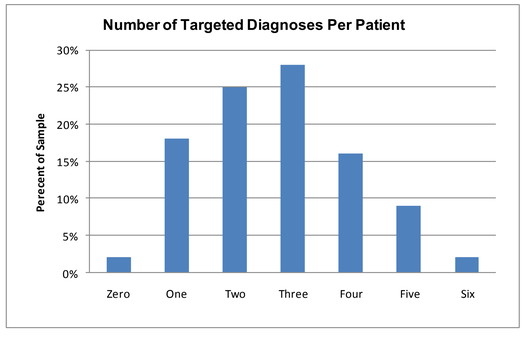
Additional diagnostic codes: assigned for diagnoses that require clinical evaluation, therapeutic interventions, diagnostic procedures, extended lengths of stay, or increased care or monitoring (Ashton, et al., 2005).

ICD-9-CM CODE ANALYSIS—GOING BEYOND THE PRINCIPAL DIAGNOSIS

- Study involves a total of 5257 ICD-9-CM codes collected for the 263 prolonged mechanically ventilated patients studied across facilities in 4 states.
- Approval from Institutional Review Boards and Organization administrators obtained before data collection began.
- Maximum number of codes allowed for input with the organization's coding software system was 20 codes per patient.
- Selected data were transferred, without modification, to an Excel spreadsheet for initial analysis.
- Codes were grouped by the three digit categories; totaling 3813 ICD-9-CM codes.
- Comorbid disease illnesses of the chronically ill patient were selected based on the national and world issues of chronic disease related diagnoses of obesity, diabetes, and substance abuse.
- Additional secondary diagnoses were selected based on a higher percentage of the mix of the 3813 codes for the 263 patients.
- Targeted secondary diagnoses included 1)obesity 2)diabetes, 3)history of smoking, drugs, alcohol, 4)chronic renal failure 5)acute renal failure, 6)malnutrition both severe and protein calorie, 7)anemia, 8)cardiac dysrhythmias, 9)septicemia, 10)methicillin resistant pneumonia due to staphylococcus aureaus (MRSA), and 11)pneumonia due to pseudomonas.
- Secondary diagnoses were targeted as possibly having a role in Length of Stay (LOS) and Discharge Outcomes.
- Total targeted ICD-9-CM codes accounted for over 36 percent of the overall secondary diagnoses for the patients studied.
- Categorical data were converted into numerical values for analysis in SPSS 15. Example: M=0 and F=1
- Cross-tabulations and chi square tests were conducted to assess associations between nominal variables (secondary diagnoses and discharge destinations).
- Additional results were reported using descriptive and inferential statistics.
- Database will be used for further studies within the Organization.

State	Age at Discharge	Gender	DRG	DiagCode1	DiagCode2	DiagCode3	DiagCode4	482	482.1	482.0	482.30	482.41
State 1	73	M	207	5185	4821	70703	5070	1	1	0	0	0
State 1	72	F	207	51881	03840	5601	25541	0	0	0	0	0
State 2	78	M	207	51881	2760	4821	5119	1	1	0	0	0
State 2	77	F	3	51881	0389	99591	4821	1	1	0	0	0
State 3	80	F	207	51881	5990	4821	1622	1	1	0	0	0
State 3	53	M	4	51881	5070	4821	4820	1	1	1	0	0
State 3	77	F	207	51881	5180	53641	6822	0	0	0	0	0
State 4	69	M	207	51881	48230	5180	0389	1	0	0	1	0
State 4	66	M	3	5119	51881	41091	4821	1	1	0	0	0
State 4	71	F	207	51881	41081	48241	4271	1	0	0	0	1
TOTAL SECONDARY CODES								8	6	1	1	1





DATA CLASSIFICATION

Statistical methods were chosen based on level of measurements

- *Nominal* : Can only be classified and counted, cannot quantify rank. There is no order to the labels. Example—gender
- *Ordinal*: Know the order or rank. Example—low medium high, or good better best superior
- *Interval*: Numerical date in which the difference between the values is a constant size. Example– temperature
- *Ratio*: Has characteristics of Interval level, but the "0" point and the ratio between 2 numbers are meaningful. Example– wages and weight

ANALYSIS : DISCHARGE DESTINATIONS (3 LEVELS) AND TARGETED SECONDARY DIAGNOSES

Research question: Is there an association between the targeted secondary diagnoses and discharge destinations (3 levels)?

- The study used contingency tables and chi square analysis in SPSS 15 to analyze the relationships between the 11 targeted secondary diagnoses and discharge destination.
- The original nine discharge destination categories were collapsed into three levels due to insufficient number of data points for some cells.
- To minimize chances of making a Type I error, the Bonferroni approach was used requiring a p value less than .005 for significance.

Outcome Measure	*df*	Pearson X^2	*p*	*Cramer's V*
Obesity, Morbid Obesity, Overweight	2	14.7	.001	.24
Pseudomonas Pneumonia	2	1.14	.57	.07

Discharge destination (3 levels) and obesity/overweight diagnoses were found to be significantly associated, Pearson X^2 (2, N = 263) = 14.71, p = .001, Cramer's V = .24, indicating a moderate association.
The hypothesized association between discharge destination (3 levels) and pseudomonas pneumonia was not significant.

LIMITATIONS

Accuracy of coding diagnoses dependent upon:

- amount and quality of information at admission,
- communication amongst patients and providers,
- clinician's knowledge and experience with the illness,
- clinician's attention to detail, paper trail of the record both in electronic and written form,
- the coder's training and experience, and
- facility quality controls.

REFERENCES

Ashton, C., Cook, K., Hurdle, J., O'Malley, K., Price, M., & Wildes, K. (2005). Measuring diagnoses: ICD code accuracy. *Health Services Research (40)*5 Pt 2, 1620-1639.

Bronnert, J. (2008). Coding in long-term care hospitals: How Medicare distinguishes LTCHs from other providers. *Journal of AHIMA (79),*4, 74-76.