

A SIMPLIFIED PROCESS TO EXTRACT AND ANALYZE OUTCOME DATA AFTER INCONTINENCE/PROLAPSE REPAIR PROCEDURES FROM AN ELECTRONIC MEDICAL RECORD.

Hypothesis / aims of study

A prior study based on a survey of the SUFU membership identified a core list of outcome measures (OMs) that the majority of survey respondents used in their real life practice [1]. However, how to implement OMs data acquisition in a busy practice without added burden remains challenging. We developed a custom computer program for the search of progress notes in an electronic medical record and tested its yield to extract and analyze key OMs against a manually maintained database.

Study design, materials and methods

Following IRB approval, progress notes were exported from the Epic electronic medical record system into Microsoft Excel spreadsheets using Epic's Clarity application. A custom computer program was developed using the C# programming language and a built-in feature of the C# language called regular expressions. Regular expressions are rules that allow for the searching of strings of text for words and values of interest, and they are a feature available in many modern programming languages. A Microsoft Access database containing OMs has been manually maintained by data entry personnel for several years as part of an ongoing prolapse surgery outcomes study. This database served as a "gold standard" that the extracted data could be compared against. The work took place in two phases. Because there is a wealth of data contained in existing progress notes, the first phase of this research focused on extracting these OMs and comparing them to the "gold standard" OMs database. This phase confirmed that the concept was sound, but the extraction rate was not sufficient for optimal data collection. The second phase began with the development of a progress note template incorporating key incontinence and prolapse OMs to improve data accuracy and extraction rates. This template can be easily adjusted to the clinician's preference as long as it contains the essential OMs cited in the hypothesis since one of the goals of this effort was to provide some basic uniformity in data reporting. The regular expression rules were then developed to match the progress note template in Epic. This allowed for maximal data extraction and accuracy rates when the template was correctly used by clinicians. In concert with the template, the list of extraction rules can be easily modified to extract new OMs as they are identified.

Results

Phase one data extraction and accuracy rates were assessed by exporting all notes written by two providers between June 2007 and July 2011 using Epic Clarity. The data extraction program was then executed to extract the data for comparison to the "gold standard" database. The extraction rate varied widely depending on the type of the data ranging from 48.2% - 81.3% with an overall average of 53.3%. The complete results are presented in Table 1. When data was able to be extracted, the overall accuracy rate was 93.9%.

Phase two data extraction and accuracy rates were assessed by exporting all notes written by two providers using the progress note template between October and November 2012. The extraction rate improved ranging from 85.4% to 100% depending on the data type with an overall average of 91.9%. The accuracy rate with the template also improved to an overall 100%. The complete prospective results are presented in Table 2.

Table 1: Phase 1 Data Extraction – Numbers represent individual POP-Q points and individual UDI-6, IIQ-7 [2], or Quality of Life (QoL) questionnaire answers.

	POP-Q	UDI-6	IIQ-7	QoL	Overall
OMs Database	1401	2478	2324	422	6625
OMs Database Subset ¹	772	1600	1156	235	3763
Extraction	678	1545	1120	191	3534
Extraction Rate ²	48.4%	62.3%	48.2%	45.3%	53.3%
Accuracy Rate ³	87.8%	96.5%	96.9%	93.9%	93.9%

1 The subset of data from the OMs Database, when a corresponding value was present in Extraction.

2 The percent of correct matches when Extraction was compared to all OMs Database data points

3 The percentage of correct matches when data points missing from Extraction were excluded from the OMs Database and compared to this subset

Table 2: Phase 2 Data Extraction– Numbers represent individual POP-Q points and individual UDI-6, IIQ-7[2], or Quality of Life (QoL) questionnaire answers.

	POP-Q	UDI-6	IIQ-7	QoL	Overall
OMs Database	78	96	108	15	297
OMs Database Subset ¹	76	82	100	15	273
Extraction	76	82	100	15	273
Extraction Rate ²	97.4%	85.4%	92.6%	100%	91.9%
Accuracy Rate ³	100%	100%	100%	100%	100%

1 The subset of data from the OMs Database, when a corresponding value was present in Extraction.

2 The percent of correct matches when Extraction was compared to all s Database data points

3 The percentage of correct matches when data points missing from Extraction were excluded from the OMs Database and compared to this subset

Interpretation of results

While valuable data useful for random sampling can be extracted from progress note written without a template, the disciplined use of a progress note template greatly improved both the extraction and accuracy rate. This study offers hope to blend the mandatory requirements of modern day electronic medical record documentation with the effortless acquisition of important follow-up data after a variety of interventions or procedures.

Concluding message

A progress note template in concert with a computer program designed to extract the OMs it contains can improve the accuracy of data collection while minimizing the need for error-prone manual data entry. This promising approach can offer a solution to the seemingly tantalizing daily challenges of tracking a pre-established set of important outcome measures after incontinence or prolapse repair procedures.

References

1. Neurourol Urodyn. 29(5):715-718, 2010
2. Neurourol Urodyn. 1995;14(2):131-9.

Disclosures

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