Standards for the Content of the Electronic Health Record

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Abstract

A descriptive, cross-sectional study was performed to measure the awareness, use, and validity of the minimum content recommended in the American Society for Testing and Materials (ASTM) standards for content and structure of electronic health records. A Web-based survey was developed and used as the primary tool to collect this data. Data was collected from a random sample of healthcare facilities from across the country, vendors, and volunteers. Thirteen percent of respondents had an electronic health record (EHR) system fully in place while 10 percent did not have or did not plan to have an EHR system. The majority of respondents (62 percent) used a vendor system for EHR development. The majority of respondents were not aware or slightly aware of the ASTM E1384 standards. Respondents believed that the minimum data elements outlined in the ASTM standards should be included in all EHR systems. Data items such as educational level, patient instructions related to disposition, problem numbers, treatment plan ID, provider agency ID code, and medication date of last refill should not always be included in EHR systems.

Introduction

The emergence of the EHR brings anticipation about future uses, including the sharing and exchanging of information among divergent systems. A major issue that needs to be addressed in order to accomplish this sharing and exchange is the development and use of standard data elements and data content in the EHR.

Large vendor corporations, healthcare organizations, and small start-up companies are developing EHRs. Each of these groups has the flexibility to develop their system as they see fit. It is expected that organizations will incorporate the ASTM E1384 Standard Guide on Content and Structure of Electronic Health Records and the corresponding ASTM E1633 Coded Values for Electronic Health Records into their system, however; this may not occur. Therefore, it is important to assess if those who purchase and use these systems are aware that these standards exist, and to measure the extent of usage of these standards. It will also be helpful to see if the content of the standards are meeting users' needs, so future revisions can address any deficiencies or problem areas.

Literature Review

According to the ASTM E1384 Standard Guide for Content and Structure of the Electronic Health Record [1] the EHR serves all of the functions of the traditional health record with many advantages.

Some of these advantages include:

1. a unified repository of healthcare information
2. information that is accessible from multiple sites
3. more efficient communication between healthcare providers

4. cross-patient retrievals will provide statistics needed by clinical, outcomes, and health service researchers as well as administrators and managers
5. better defined policies and procedures to improve healthcare practice
6. a longitudinal health record that can be developed more efficiently and effectively

However, as advantageous as it may be to develop an electronic health record, certain standards on the content of the health record are necessary in order to meet this goal. As Mary Brandt, MBA, RHIA, CHE, CHP, states, "until healthcare providers collect and maintain data in a standard format according to widely accepted definitions, it is nearly impossible to link data from one site to another. The lack of health informatics standards is one barrier to broad implementation of computer-based patient records."[2]

The advantages to having standards for the EHR are numerous. Some of these include:

1. providing a clear description of the data elements that will be included in an EHR
2. identifying essential data elements such as temperature and blood pressure
3. standardizing the field length, data type, and content of each data field
4. improving the degree of granularity
5. accommodating varying degrees of granularity in the recording of the same clinical information within one patient's record
6. accommodating both structured and free-text reporting
7. relating the major entities of the record to the identified record segments
8. matching data elements across systems for extensive patient care reporting, overall improvement in the quality of patient care, and the development of a longitudinal health record[1,2,3]

It has been reported that customers are using or planning to use Standard E1384 in their computer patient record (CPR) projects. It has also been noted that current customers are using the standard as a reference in designing and building CPR data.[4] However, the author did not state how this data was presented, collected, and analyzed from the consumers. Also, this was reported in 1996 and therefore does not include the new edition of the E1384 and E1633 standards. To our knowledge, no other survey-based study has been performed that examines the awareness, use, and fulfillment of user's needs of the most recent ASTM E1384 standards and E1633 coded values for the EHR.

Therefore, it is important to determine if different healthcare facilities and vendors are using or planning to use E1384 standards and E1633 coded values in their EHR projects as well as determining if they are aware the standards exist and whether the standards are meeting their needs in the development of the EHR. The Health Insurance Portability and Accountability Act of 1996 (HIPAA) calls for recommendations to be made to the Secretary of Health and Human Services on uniform data standards for patient medical record information. While the government is not requiring but recommending standards related to interoperability, data comparability, and data quality for EHR systems, this is a major step into the development of specific standards requirements.[5,6,7] It is therefore important and timely to determine the awareness, use, and validity of the ASTM standards for the content and structure of EHRs and their corresponding coded values.

Objectives

The objective or purpose of this project was three fold and included the following:

1. To measure one's awareness of the ASTM E1384 Standard Guide on Content and Structure of Electronic Health Records and the corresponding ASTM E1633 Coded Values for Electronic Health Records.
2. To affirm the usage of the ASTM E1384 Standards and ASTM E1633 Coded Values in Electronic Health Records that currently exist or are being developed.
3. To validate the usefulness of the ASTM E1384 Standards and ASTM E1633 Coded Values in existing EHRs and identify areas of improvement for future revisions.

Methodology

Research Design

A descriptive, cross-sectional research study was performed to measure the awareness, use, and validity of the minimum content recommended in the ASTM E1384 Standard Guide on Content and Structure of Electronic Health Records and the corresponding ASTM E1633 Coded Values for Electronic Health Records. A Web-based survey was developed and used as the primary tool to collect this data.

Research Methods

The research methodology for this study was divided into several parts. The first part included the development and design of the survey, which was the most important tool for this study. The second part included choosing the sample of recipients and an appropriate sample size. The third part included distribution of the cover letter and survey in the most appropriate medium for recipients. Our goal was to provide the cover letter and survey via an electronic format so that recipients could access the survey through an e-mail containing a link to the URL and therefore return the survey quickly. Follow-up of non-responders was also conducted through e-mail, fax, and mail. The fourth part of the methodology included analyzing the data once it was collected. Since the survey was developed electronically, data was easily managed directly from the survey to an appropriate database. However, many of the results were obtained by fax and therefore the data had to be entered manually. The study was submitted to the University of Pittsburgh's Institutional Review Board for review and approval at the exempt level.

The survey was organized into the following six parts:

1. demographic data on the individual completing the survey
2. awareness of ASTM E1384 standards and E1633 coded values
3. type of EHR system in place or in the development stage
4. minimum essential data set (EHR data view of all settings) which data items are in place or will be put in place if in the development stage
5. data elements that respondents believe should be added or removed
6. additional comments

The survey was developed to include a mix of both close-ended (quantitative) and open-ended (qualitative) type questions. The survey was pilot tested on a random sample of five to 10 different facilities and organizations for their input on the content of the survey only. Two individuals were shadowed when completing the survey online to see if there were any problems with access and movement along the Web-based survey. A draft of the survey was presented to the ASTM E1384 committee in Boston during its annual meeting. Comments from all groups were included when changes were made to the survey.

After the evaluation and modification of the survey, the final version was posted on a Web server for easy access by recipients. An individual, non-identifying number was included in the URL so that tracking of the respondents could be performed for follow-up purposes. No identifying information was collected in relation to their responses except this ID number. A separate database was maintained and included only the ID number, facility name, phone number, and other information so that follow-up could be performed. Recipients could click on a particular data element and receive a full definition of the data element as well as what a master table (MT) included and so forth. For the paper format version, definition of the data elements was attached to the survey.

Sample

The method of stratified random sampling was used to select a sample of healthcare facilities for the study. The population of healthcare facilities in the United States that were identified in the American Hospital Association database (numbering approximately 6,000) was stratified by state and by type of facility such as acute, sub-acute, long term care (LTC), ambulatory care, rehabilitation and so forth. Using a systematic random number procedure, a random sample was drawn from each subgroup of facilities formed by cross-classifying the facilities according to both state and type. The second component of the total sample was made up of vendors of EHR/CPR systems. All vendors on the most recent list of information system vendors published every year by Healthcare Informatics magazine and all of the EHR vendors on the list of those reviewed by the American Academy of Family Physicians were included in the sample (approximately 58). The third component of the sample included volunteers or those individuals that wanted to participate in the study.

Volunteers received information about the study through e-mail alerts from AHIMA and through a summary of the study that was put on the AHIMA and ASTM Web sites. A summary of the study was also included in one issue of Advance and

volunteers were also solicited at a local conference in Pennsylvania. To be certain that facilities that had an EHR in place were included in the total sample, the final component of the samples were made up of all healthcare organizations recognized by the Nicholas E. Davies CPR Recognition Program instituted by CPRI-HOST (approximately 14). Therefore, a total of 1,129 surveys were distributed to the groups noted above via e-mail/Web, fax, and mail. Our goal was to obtain approximately 450 surveys from all groups based on our sample size calculation.

Distribution of Survey

Each of the facilities randomly selected as well as vendors, CPRI participants, and volunteers were contacted by phone or e-mail to explain the study, determine if the facility was willing to participate, and to obtain the name, address, e-mail address, fax, phone, and other contact information of the individual most capable and knowledgeable to answer questions related to the EHR/CPR standards. The facility was assured that their responses would remain completely confidential and only aggregate data was used in the reporting of the results. Participants were also told that they would receive a copy of the results, a complimentary copy of the Journal of AHIMA, and their name would be submitted into a drawing to win $200. Once the name of the individual who will complete the survey was obtained, he or she was contacted via e-mail and a copy of the cover letter and survey was provided via a corresponding URL. If the facility did not have access to a computer, the cover letter and survey was faxed or mailed, whichever was preferred by the facility. If the facility did not respond, a follow-up e-mail, fax, or letter and survey by mail was made available to the facility asking them to complete the survey and reiterating the importance of the study and its results.

Statistical Analysis of the Data

The quantitative data (closed-ended questions) obtained from the survey were statistically analyzed using descriptive statistics within Excel and Service Provisioning System Software. Each section of the qualitative data (open-ended questions) was analyzed by reviewing each section and categorizing it into specific sections related to the entities of the ASTM standards and the EHR.

Results

In order to obtain the desired sample size of 375 based on the power calculation, the population was over-sampled by sending out 1,129 surveys. The results were as follows, 53 percent of respondents completed the entire survey, while 73 percent completed at least one page of the desired sample size. The number of respondents varied for each question and page of the survey. The total response rate for completion of at least one page of the survey was approximately 24 percent. The total response rate for completion of all 13 pages of the survey was approximately 17 percent. The response rate varied for different groups with the volunteers having the highest rate at 43 to 59 percent. Many facilities did not believe they could complete the survey because they were not involved or planned on being involved with the development of an EHR system.

Respondents completed demographic data consisting of highest educational degree, major, and credential. It was found that 45 percent of the respondents had a baccalaureate degree, 21 percent had a master's degree, 14 percent had an associate degree, and three percent had a doctorate (Table 1). Forty-nine percent majored in HIM and 14 percent in business. Respondents also majored in healthcare administration (eight percent), information science (four percent), nursing (four percent), education (three percent) and medicine (three percent). Other majors made up 12 percent of the total and included history, English literature, biology, communications, math, biochemistry, microbiology, physiology, and home economics (Table 2). The most common credential was the RHIA (42 percent) followed by the RHIT (23 percent) (Table 3).

The next section of the survey provided a definition of the EHR and then asked respondents the current stage of their EHR system. It was found that 27 percent were in the planning stage, which included an initial stage of the EHR system and involved identification of the purpose and features of the proposed system. Another 26 percent were in the modular installation phase, which included implementing an EHR system to include portions of the entire system and then adding components over time. Thirteen percent stated their system was fully in place and 11 percent stated it was in development, meaning it included the conceptual and physical design. Ten percent of the respondents stated that they have no plans to develop an EHR or that they have none in place at this time. The majority of respondents that stated that they have no plans to develop an EHR were found to be RHIAs or RHITs working in healthcare facilities and only four were found to be volunteers. However, even the volunteers were credentialed and worked in healthcare facilities, so their background was not different than the other

respondents. Respondents that chose the category, "other" (13 percent) included individuals who were software developers, consultants, or vendors and they did describe the type of system they were involved with. Others stated that they were involved in a different EHR system than described above (Table 4).

When asked what type of EHR system was in place, respondents reported vendor (62 percent), in-house development (18 percent) and other (20 percent). "Other" included vendor and in-house combination systems, a combination of multiple systems, joint ventures between large vendors, and modified vendor systems (Table 5). When asked about their role within the EHR system, 29 percent stated coordinator, nine percent designer, and nine percent responded developer (Table 6). However, fifty-three percent chose "other" and various titles were described. Some of these titles are listed below:

Integrator and trainer (2)	IS strategic developer
Software developer	System administrator
Consultant	Customer support engineer
Product specialist	Implementation coordinator
Sponsor and implementer	Support role
Part operations/implementation/designer	Advisor
Facilitate quality meeting to discuss issue with CPR (3)	Consultant (7)
Provide input for HIM functions and applications (2)	Administration
Team leader/coordinator	Spokesperson
End user (3)	Director of HIM

Respondents were then asked about the awareness of the ASTM E 1384 standards for the structure and content of the electronic health record and ASTM E1633 standards for coded values used in the EHR. It was found that 75 percent of respondents stated that they had little or no awareness of ASTM E1384 standards, and 78 percent stated that they had little or no awareness of the ASTM E1633 coded values. Only six to seven percent stated that they knew enough or very much for either of the ASTM standards. The majority (56 percent) of the respondents that did know about the ASTM standards were found to be credentialed as an RHIA or RHIT with a bachelor's or master's degree in IS (one); HIM (four); business (two); healthcare administration (two); and adult education (one). Only four individuals that did know about the standards were not credentialed and had degrees in various areas including a bachelor's degree in philosophy, computer science/biochemistry, and French. There was also one MD.

However, the deciding factor for awareness of the standards seemed to lie in whether there was an EHR system fully in place and their role with the EHR system. The majority of respondents (72 percent) who were aware of the ASTM standards stated that they had either installed systems or had a system fully in place or were in the modular-installation phase of the EHR. All respondents either worked as vendor consultants installing systems (six); as designer/developers (three); coordinators (five); implementation specialists (one); or director/manager of HIMS (two) (Tables 7 and 8).

Specific **minimum** data elements taken from the ASTM E1384 standards were then listed to determine if respondents thought these data elements were included or should be included in their existing or proposed EHR system. The first set of data elements included "administrative patient." This entity included personal data elements, data elements indicating legally binding directions or restraints on patient healthcare, release of information, and financial data. The top three data elements that respondents believed should be included or they already include in their existing EHR system were patient name (97 percent), gender (96 percent), and permanent address (93 percent). The top three data elements that respondents believed should NOT be included were educational level (51 percent), birthplace (41 percent), and ethnic group (29 percent) (Table 9).

The next set of data elements were related to the encounter entity that captures facts related to the events that took place in the healthcare environment. Certain information that characterizes the time, place, and circumstances of the initiation of the encounter are included. The top three data elements that respondents believed should be included or they already include in their existing EHR system were date/time of encounter (98 percent), encounter type (97 percent) and treatment/facility name

(94 percent). The top three data elements that respondents believed should NOT be included were disposition patient instructions (20 percent), episode ID (17 percent), and authentication/signature (13 percent) (Table 10).

The problem entity included specified clinical problems, a diagnosis summary and stressor exposure, an ongoing list of clinically significant health status events and factors (both resolved and unresolved) in a patient's life. The top three data elements that respondents believed should be included or they already include in their existing EHR system were problem name (77 percent), problem current status (71 percent), and date of problem onset (71 percent). The top three data elements that respondents believed should NOT be included were problem numbers (33 percent), problem name at encounter (25 percent), and problem name at care (21 percent) (Table 11).

The treatment plan entity included data entries that direct a patient's treatment and detailed data on deliverance of orders and compliance with any diagnostic or therapeutic plans, whether written, oral, or standing. The top three data elements that respondents believed should be included or they already include in their existing EHR system were date/time of order (87 percent), treatment plan (text) (86 percent), and the care/treatment plan text (85 percent). The top data element that respondents believed should NOT be included were treatment plan ID (36 percent) (Table 12).

The provider entity contains in one place the descriptive data about each provider/practitioner and may be referenced when recording data about the events of healthcare. The top three data elements that respondents believed should be included or they already include in their existing EHR system were provider/practitioner name (97 percent), practitioner name (93 percent), and provider type (86 percent). The top three data elements that respondents believed should NOT be included were provider agency ID code (37 percent), practitioner current role (25 percent) and practitioner address (24 percent) (Table 13).

The history entity includes the long-term relevant natural family and patient history and signs that would aid practitioners in predicting or diagnosing illness, actual or potential alterations in health, or predicting outcomes of the patient's care. The top three data elements that respondents believed should be included or they already include in their existing CPR system were health history (92 percent), history/social (text) (90 percent), and history-taking event date (86 percent). The top data element that respondents believed should NOT be included was source of history/contact name (20 percent) (Table 14).

The observation assessment/exam entity characterizes the patient's health status in tandem with the history. The entity may include a general or specialty medical or dental exam or assessments by nursing, dietary, social service, therapy or dental hygiene specialists, or all of these. The top three data elements that respondents believed should be included or they already include in their existing EHR system were date and time of exam (91 percent), health assessment (91 percent), and exam findings (90 percent). The top data element that respondents believed should NOT be included was patient-generated functional health status (22 percent) (Table 15).

The diagnostic test entity includes the documentation of the results from the clinical laboratory, radiology, nuclear medicine, pulmonary function, and any other diagnostic examinations. The top data elements that respondents believed should be included or they already include in their existing EHR system was test report (text) (89 percent). The top data element that respondents believed should NOT be included was microbial organism attribute that includes a list of attributes for a microbiological organism (10 percent) (Table 16).

The episode entity included detailed information about all healthcare events. The top data element that respondents believed should be included or they already include in their existing EHR system was chief complaint (91 percent). The top data element that respondents believed should NOT be included was authenticator/signature (12 percent) (Table 17).

The last data element examined was service instance entity, which includes immunizations, medications, operations and anesthetic treatment. The top three data elements that respondents believed should be included or they already include in their existing EHR system were medication dose (90 percent), medication frequency (89 percent), and medication prescription date (88 percent). The top data element that respondents believed should not be included was medication date of last refill, which includes the date of each refill of the prescription (22 percent) (Table 18).

Overall, no major differences were seen across vendors, healthcare providers, or those who volunteered to answer the survey in relation to data element content. Individuals more involved with an EHR system seemed to know more about the standards and tended to offer more qualitative comments. The qualitative comments received are included in Appendix A and include data elements that should be added for specific sections, data elements that should be removed for specific sections, and additional comments for specific sections.

Conclusions

This study was able to provide some beginning information on the type of EHR system healthcare facilities have in place, as well as their awareness of ASTM standards and the specific minimum data elements they believe should be included in an EHR. This study will be helpful to ASTM in the revision of future standards, as well as to different healthcare facilities in building EHR systems. It is extremely important to include standards in the design and development of any EHR system. By including standards such as the ones included here from ASTM, a longitudinal health record becomes more feasible. With a longitudinal health record comes the ability to provide continuity of care, effective outcomes management, and improved epidemiological research; all of these improve the quality of patient care.

Table 1: Demographics of Respondents—Education

Highest Educational Degree	Number	Percentage
GED	2	1
AHIMA correspondence course	8	3
Doctorate	8	3
High school diploma	15	6
Other	21	8
Associate degree	39	14
Master's degree	57	21
Bachelor's degree	121	45
Total *	271	101

* Does not equal 100% due to rounding

Table 2: Demographics of Respondents—Major

	Number	Percentage
Health information technology	3	1
Computer science	4	1
Psychology/Biology	5	2
Medicine	8	3
Education	9	3
Information science	11	4
Nursing	12	4
Healthcare administration	23	8
Other	36	12
Business	41	14
Health Information Management	145	49
Total *	297	101

* Does not equal 100% due to rounding

Table 3: Credential		
	Number	Percentage
CCS-P	6	2
MD	6	2
Registered nurse (RN)	7	2
Health/medical information	10	3
CCS-P	15	5
No credential	32	10
Other	36	11
RHIT	74	23
RHIA	134	42
Total	320	100

Table 4: Stage of EHR System		
	Number	Percentage
No plans/do not have one	24	10
Development	28	11
Fully in place	33	13
Other	32	13
Modular installation	66	26
Planning	68	27
Total	251	100

Table 5: Type of System		
	Number	Percentage
Developed in house	35	18
Other	38	20
Vendor	117	62
Total	190	100

Table 6: Role with EHR System		
	Number	Percentage
Designer	20	9
Developer	20	9
Coordinator	63	29
Other	115	53
Total	218	100

Table 7: Awareness of ASTM E1384 Standard Guide on Content and Structure of EHR		
	Number	Percentage
Very much	8	3
Enough	9	4
Moderate mount	43	18
No	81	34
A little	97	41
Total	238	100

Table 8: Awareness of ASTM E1633 Coded Values for EHR		
	Number	Percentage
Very much	5	2
Enough	10	4
Moderate amount	38	16
A little	84	36
No	99	42
Total	236	100

Table 9: Data Elements Included or Will Include in EHR System: Administrative Patient Entity							
	Yes		No		N/A		Total
	#	%	#	%	#	%	#
Education level	75	36%	105	51%	27	13%	207
Birth place	105	50%	87	41%	18	9%	210
Ethnic group	140	66%	61	29%	12	6%	213
Personnel authorizing release	145	68%	57	27%	11	5%	213
Directive to physician	144	69%	50	24%	15	7%	209
Patient rights acknowledged	147	69%	55	26%	10	5%	212
Type of record action	149	70%	50	23%	14	7%	213
Record holding location ID	149	72%	37	18%	21	10%	207
Release of info action date	160	73%	50	23%	8	4%	218
Consent signed/admit agree	158	74%	46	22%	9	4%	213
Occupation	163	75%	36	17%	17	8%	216
Universal patient health number	162	76%	32	15%	18	8%	212
Religion	171	80%	35	16%	9	4%	215
Date of earliest held entry	173	82%	25	12%	13	6%	211
Payor ID number	183	85%	16	7%	17	8%	216
Payor group number	186	85%	16	7%	17	8%	219
Address of principal payor	185	86%	16	7%	15	7%	216
Principal payment sponsor	189	87%	11	5%	17	8%	217
Payment source	191	88%	11	5%	16	7%	218
Date/time of birth	193	88%	13	6%	14	6%	220
Family member name	193	88%	16	7%	11	5%	220
Race	193	88%	16	7%	11	5%	220
Family member relationship	194	88%	15	7%	11	5%	220
Date of latest held entry	188	88%	12	6%	13	6%	213
Marital status	201	91%	9	4%	11	5%	221
Patient permanent address	206	93%	7	3%	8	4%	221
Sex (gender)	212	96%	4	2%	5	2%	221
Patient name	215	97%	0	0%	6	3%	221

Table 10: Data Elements for Encounter							
	Yes		No		N/A		Total
	#	%	#	%	#	%	#
Disposition patient instruction	146	75%	38	19%	11	6%	195
Episode ID	156	78%	34	17%	9	5%	199
Disposition destination	161	80%	22	11%	18	9%	201
Disposition type (MT)*	168	83%	20	10%	14	7%	202
Authentication/signature	169	85%	26	13%	5	3%	200
Text of note/report	169	86%	24	12%	4	2%	197
Disposition date/time	182	90%	9	4%	12	6%	203
Episode diagnosis	190	94%	7	3%	6	3%	203
Treatment facility name	193	94%	8	4%	5	2%	206
Encounter type	197	97%	3	1%	4	2%	204
Date/time of encounter	201	98%	2	1%	3	1%	206

Table 11: Data Elements for Problem							
	Yes		No		N/A		Total
	#	%	#	%	#	%	#
Problem numbers	112	58%	64	33%	17	9%	193
Problem name at encounter	127	66%	48	25%	18	9%	193
Problem name at care	134	69%	41	21%	19	10%	194
Problem date of onset	138	71%	40	21%	17	9%	195
Problem current status	138	71%	39	20%	17	9%	194
Problem name	153	77%	30	15%	16	8%	199

Table 12: Data Elements for Treatment Plan							
	Yes		No		N/A		Total
	#	%	#	%	#	%	#
Treatment plan ID	106	56%	68	36%	14	7%	188
Date/time treatment plan started	167	84%	20	10%	11	6%	198
Clinical order (full text)	168	85%	16	8%	14	7%	198
Care/treatment plan (text)	167	85%	19	10%	10	5%	196
Treatment plan (text)	168	86%	18	9%	10	5%	196
Date/time of order	174	87%	13	7%	13	7%	200

Table 13: Data Elements for Provider							
	Yes		No		N/A		Total
	#	%	#	%	#	%	#
Provider agency ID code	97	51%	70	36%	25	13%	192
Admission surgeon role	121	62%	33	17%	41	21%	195
Practitioner current role	131	68%	47	24%	14	7%	192
Anesthesiologist	132	69%	24	13%	36	19%	192
Practitioner address	134	69%	47	24%	12	6%	193
Practitioner universal ID #	141	73%	39	20%	12	6%	192
Therapy performance practitioner	140	74%	26	14%	24	13%	190
Provider address	145	74%	40	21%	10	5%	195
Admission surgeon	151	76%	10	5%	37	19%	198
Practitioner profession	152	77%	37	19%	9	5%	198
Practitioner authentication	163	84%	23	12%	8	4%	194
Provider ID number	168	86%	16	8%	12	6%	196
Provider type	170	86%	19	10%	9	5%	198
Practitioner name	184	92%	7	4%	8	4%	199
Provider/practitioner name	196	97%	0	0%	7	3%	203

Table 14: Data Elements for History

	Yes		No		N/A		Total
	#	%	#	%	#	%	#
Source of history—name	149	76%	38	19%	8	4%	195
History relationship source	152	78%	34	17%	9	5%	195
Current habits (MT)*	161	82%	28	14%	7	4%	196
History taking event data	168	86%	21	11%	6	3%	195
History—social (text)	178	90%	14	7%	6	3%	198
Health history	183	92%	11	6%	5	3%	199

Table 15: Data Elements for Assessment

	Yes		No		N/A		Total
	#	%	#	%	#	%	#
Patient-generated status	135	73%	40	22%	10	5%	185
Exam review of systems (MT)*	167	87%	17	9%	9	5%	193
Exam finding comment	170	89%	15	8%	7	4%	192
Exam summary (text)	170	90%	13	7%	6	3%	189
Exam findings	173	90%	12	6%	7	4%	192
Health assessment	176	91%	11	6%	7	4%	194
Date/time exam	177	91%	10	5%	8	4%	195

Table 16: Data Elements for Diagnostic Test

	Yes		No		N/A		Total
	#	%	#	%	#	%	#
Micro-organism attribute	151	80%	18	10%	19	10%	188
Test request order treatment facility	154	81%	17	9%	19	10%	190
Test request perform facility	156	81%	17	9%	19	10%	192
Micro-organism resist pattern	154	81%	16	8%	19	10%	189
Micro-organism specification	154	82%	15	8%	19	10%	188
Test request microorganism	160	83%	13	7%	19	10%	192
Test comment	160	84%	15	8%	15	8%	190
Test requests (MT)*	163	84%	15	8%	15	8%	193
Numeric measure interpret	160	85%	11	6%	18	10%	189
Numeric measure name	161	85%	11	6%	18	9%	190
Numeric measure value	163	86%	8	4%	18	10%	189
Test/exam date/time	164	86%	9	5%	17	9%	190
Test date/time result report	166	86%	10	5%	16	8%	192
Test report (text)	171	89%	6	3%	15	8%	192

Table 17: Data Elements for Episode

	Yes		No		N/A		Total
	#	%	#	%	#	%	#
Authenticator/signature	161	84%	22	12%	8	4%	191
Reason for visit (MT)*	164	86%	16	8%	10	5%	190
Clinical progress note (text)	165	87%	16	8%	9	5%	190
Clinical progress note date	166	87%	16	8%	8	4%	190
Chief complaint (text)	175	91%	9	5%	9	5%	193

Table 18: Data Elements for Service Instance							
	Yes		No		N/A		Total
	#	%	#	%	#	%	#
Med date of last refill	130	71%	40	22%	13	7%	183
Post-anesthesia assessment	136	72%	21	11%	31	16%	188
Anesthetic agent (MT)*	137	73%	20	11%	31	16%	188
Immunization name (MT)*	141	75%	32	17%	16	8%	189
Immunization date	141	75%	30	16%	16	9%	187
Post-operative diagnosis (MT)*	144	77%	15	8%	28	15%	187
Operative procedure name (MT)*	145	77%	14	7%	29	15%	188
Therapist assessment (text)	144	77%	24	13%	18	10%	186
Therapist recommendation	145	78%	24	13%	18	10%	187
Operation complication	146	78%	13	7%	28	15%	187
Operations date	149	80%	11	6%	27	14%	187
Therapy finish date	151	80%	21	11%	17	9%	189
Therapy start date	152	80%	20	11%	17	9%	189
Name of therapy (MT)*	153	81%	18	10%	17	9%	188
Med notes	152	82%	23	12%	11	6%	186
Med vehicle (table)	155	83%	17	9%	14	8%	186
Med route	158	85%	15	8%	12	6%	185
Med instruction (text)	159	86%	15	8%	10	5%	184
Med prescriber	163	87%	16	9%	9	5%	188
Med name (MT)*	166	87%	14	7%	10	5%	190
Med prescription date	166	88%	13	7%	10	5%	189
Med frequency	169	89%	10	5%	10	5%	189
Med dose	171	90%	9	5%	10	5%	190

*MT = Master Table

Notes

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