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An Evaluation of the Role of the Originator of Catastrophic Edits/ Data Overwrites within the Veteran Health Administration

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Objective: To determine which job function causes or creates a large number of Catastrophic Edit/ Data Overwrites within VHA.

Methods: The study is based on data extracted from the Catastrophic Edits Monthly Reports reported by the HC IdM Team staff on the CEs that have occurred on the MPI. Catastrophic Edits (CEs) reported by the HC IdM team between November 2011 through December 2012 are examined.

Result: Out of the 2736 Potential Identity Changes, 115 actually resulted in a CE. The number of CEs created by each job title ranged from 1% by Employee Health Clerk to 28% by Eligibility Clerk. Out of the 115 CEs created, a total of 32 were created by the Eligibility Clerks. The next highest job title was the Enrollment/Registration Clerks with 21 CEs created.

Conclusion: Of the 4% of CEs reported, Eligibility Clerks created 28% of those CEs and Enrollment/Registration Clerks created 18% of CEs reported during this time period. The findings provide insight to the HC IdM staff as well as other managers for the users who need additional training or realignment in the workflow. Further work is required to expand and identify factors contributing to incidents causing CEs.

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In 1998, the Master Patient Index (MPI) was implemented to provide the ability to link all active patient records across the VHA (Veterans Health Administration) enterprise and facilitates the sharing of patient electronic health information with in the VHA (Department of Veterans Affairs, 2009). Since the implementation of the MPI, there has been a significant increase in the number of occurrences of catastrophic edits to patient identity traits. Catastrophic Edit (CE) are changes to a patient's electronic health record that result in the record being changed to that of another patient, caused by, but not limited to, edits to patient identity data (such as name, Social Security Number (SSN), date of birth, gender) and/or erroneous merging of two or more distinct patient records into a single record within Veterans Health Information Systems and Technology Architecture (VistA) (Department of Veterans Affairs, 2009).

In 2001, the Health Care Identity Management (HC IdM) Program was established to maintain the integrity of the MPI. In maintaining the MPI, the HC IdM team staff is responsible for monitoring changes to the identity of existing records. When edits are made to the identity traits of a patient's record in the local VistA system, the MPI is alerted of potential catastrophic edits (Department of Veterans Affairs, 2009). While monitoring the changes, it has been discovered a recurring

issue of catastrophic edits to patient identity traits. These edits are often a result of an inappropriately editing of an existing record through mis-selection or error. These errors can affect administrative, clinical, and billing processes as well as affect patient care causing a significant patient safety risk.

The purpose of this study is to investigate the role (job title) of the originator of the Catastrophic Edits/Data Overwrites to identify the correlation between the role and the number of Catastrophic Edits within the Veteran Health Administration. The objective of this study is to determine which job function causes or creates a large number of Catastrophic Edits/ Data Overwrites within VHA. In earlier studies, the specific role of the person who actually created the CE was not evaluated. The results found from this study will allow the HC IdM team's management to determine which staff (role/job title) that is responsible for the entry of administrative and demographic information that needs more extensive training. The finding of this study will provide information to add to professional literature to help reduce the numbers of identity data overwrites that could cause a catastrophic or patient safety events.

Literature Review

The purpose of this literature review is to present literature from previous studies to lead to research that can evaluate correlation between the role of data entry staff and the number of errors done. There are several studies and researches conducted that focuses on the patient safety incident involving human computer related incidents. With heightening the awareness of these issues, some of the

errors could be avoided. This literature review will examine data on the patient safety incidents and errors that occur in the process of entering and retrieving information is composed of numerous studies involving patient information system.

Over 100 studies were retrieved in the initial screening, 11 of the articles titles and abstracts had some aspect of the related criteria. The articles were reviewed in-depth. I excluded 9 of the articles because the articles were too specific to the accuracy of computerized order entry or the articles had no mention of error relating to entering and retrieving information. Of the 2 articles chosen to review, Magrabi, Ong, Runciman, & Coiera's (2010) conducts a descriptive analysis to examine computer related patient incidents across one Australian state. The other article (Ash, Berg& Coiera, 2003) draws on a series of qualitative research studies in the US, the Netherlands and Australia with ethnography observation in healthcare setting and semi-structured interviews with health professionals.

Magrabi, Ong, Runciman, & Coiera (2010) searched 42616 patient safety events incident reported 2003 to 2005 by public hospital clinician to the Advanced Incident Management System. They examined 123 incidents that were computer related incident. Of the 123 incidents retrieved, four duplicates and eight incidents that did not relate to patient safety were removed, leaving 111 incidents. Of the 111 incidents, eight were described as an improvement in patient safety due to Information Technology (IT) and four were unresolvable, leaving 99 incidents. Information input issues accounted for the largest category with 31% of the incidents. These issues included were related incorrect human data entry such as incorrect selection of patient and typographical errors. Information output data

accounted for 20% of incidents, which included problems with human-computer interaction such as error in interpreting, printed information due to poor quality or data retrieval errors (Magrabi, Ong, Runciman, & Coiera, 2010).

Ash, Berg and Coiera (2003) discussed errors in the process of entering and retrieving information in or from the system based on ethnographic observations and semi-structured interviews with healthcare professionals. They discussed in detail the problem of a human-computer interface that is not suitable for a highly interruptive use context. By health care professional often being interrupted by patients, telephones and other colleagues, the mismatch between interface and use context often resulted in a juxtaposition error. A juxtaposition error is an error caused when something is close to something else on the screen and the wrong option is too easily clicked in error (Ash, Berg and Coiera, 2003). The authors found there were instances of patient confusion when orders were entered for the wrong patient. They also found that overly structure data entry led to a loss of cognitive focus. The use of many screens or need to switch between screens results in error.

The goal of this review is to present literature from several studies that will lead to more quantitative works that can evaluate correlation between the role of data entry staff and the number of errors done. Because these (Ash, Berg, Coiera) were qualitative studies, they do not give how certain errors occurred. The study (Ash, Berg, Coiera) lacked detail information regarding interviewees such as level of expertise or medical specialty. Despite the limitations, these studies produced useful finding in such a way to offset further research with human-computer related patent safety incidents.

Methods

This study examined Catastrophic Edits (CEs) reported by the HC IdM team staff between November 2011 through December 2012. The study is based on data extracted from the Catastrophic Edits Monthly Reports reported by the HC IdM Team staff on the CEs that have occurred on the MPI. The data extracted from the CE Monthly Reports include: the date the CE was logged, the site/facility/Veterans Integrated Service Network (VISN) where the CE occurred, date and time the CE occurred, the role of the originator. Due to privacy and security policies of the Veteran Heath Administration (VHA), the sites and VISNs of the CEs have been de-identified. The role or functional job title of the medical center staff who created the CE options consists of the following job titles: Administrator of the Day (AOD), Clinic Clerk, Clinical (Medical/Surgical) Staff, Eligibility Clerk, Employee Health Clerk, Enrollment/ Registration Clerk, Health Eligibility Center (HEC) Staff, MPI Point of Contact (POC), Personnel/Human Resources (HR) Clerk, Privacy Officer, Supervisors, Veteran Benefits Administration (VBA) Office Staff, Ward Clerk and Other. The options for how the CE occurred include: Manual, Primary View Updates, Catastrophic Merge, Upload, and unknown, Mismatch/Auto Link.

The data collected from the Monthly CE Reports was compiled using Microsoft Excel. The data was extracted and entered in separate MS Excel worksheets. The data extracted was entered in MS Excel worksheets and categorized by titles of the originator, sites, VISNs, and how the CE occurred. The sites and VISNs were compiled and later de-identified using random alphabets to

identify the VISNs involved. The number of CEs created and the job title of the creator of the CE were calculated and a bar graph was formulated to identify the actual number of CEs created by each job title. The de-identified VISNs and the number of CEs were calculated and a bar graph was formulated to identify the number of CEs occurred in each VISN. The number potential CEs calculated against the number of actual CEs each month was charted and a bar graph was formulated to compare the potential CEs vs. the actual CEs.

Results

From November 2011 to December 2012, a total of 2736 Potential Identity Changes occurred. Out of the 2736 Potential Identity Changes, 115 actually resulted in a CE (Table 2). Table 3 shows the job title of the CE originator in ascending order by the number of CEs created. The number of CEs created by each job title ranged from 1% by Employee Health Clerk to 28% by Eligibility Clerk. Figure 2 shows a bar graph of the percentage of CEs created by job title. Out of the 115 CEs created, a total of 32 were created by the Eligibility Clerks. The next highest job title was the Enrollment/Registration Clerks with 21 CEs created. The MPI POCs and the other job title ranked close with MPI POCs creating 15 CEs and Other creating 16 CEs. The Employee Health Clerks created the lowest number of CEs with 1 CE created followed by the AOD with 2 CEs and VBA Regional Office Staff with 3 CEs. There is a significant difference between the job titles which created the highest number of CEs created compared to the job title which lowest number of CEs.

Table 4 lists the total number CEs created in each VISN (de-identified) in ascending order. The total number of CEs created in each VISN ranged from 0 to 17. VISN A and B had the highest number of CEs created with VISN A creating 17 CEs and VISN B creating 16 CEs. VISN T, VISN U, VISN V and VISN W did not create any CEs in this timeframe. Figure 3 shows a bar graph of the percentage of CEs created in each VISN in descending order. The average number of CEs created by a VISN is 5. There is a significant difference between the VISNs that created the highest number of CEs and the lowest number of CE.

Discussion

In this study various tools were used to examine the role or functional job title of the medical center staff that created the CE on the MPI. The findings reveal that out of the number Potential Identity Changes, 4% actually resulted in a CE, which is considered relatively high compared to the medical staff's goal of creating less than 1% of CEs. This study found that the job titles with the highest occurrence of CEs are Eligibility Clerks and Enrollment/Registration Clerks. The VISNs with the highest number of CE occurrence was also evaluated. There was no significance found with the VISNs and the number of CEs actually occurred.

There were several limitations to this study. This study was limited to VA facilities and a select group of users which may not be generalized to other institutions using other methods. These finding may be less applicable to other health care institutions or users that edits data within records. Another limitation was in cases where the job title of the CE was undetermined or unknown, the CE was

documented and counted in the “Other” section for this study. This may have caused underrepresentation of the job title of the user who created the CE. This study was also limited to edits made to a fixed selection of identity traits on the MPI. Lastly, the Catastrophic Edit report used to examine the CEs that have occurred may contain errors or inaccuracies in documentation.

Conclusion

Of the 4% of CEs reported, Eligibility Clerks created 28% of those CEs and Enrollment/Registration Clerks created 18% of CEs reported during this time period. Eligibility Clerks and Enrollment/Registration clerks work in a high traffic multifunctional work environment that results in errors caused by mis-clicking, interruptions, entering and retrieval of wrong patient. According to Magrabi, Ong, Runciman & Coiera, most information input problems were associated incorrect data entry such as incorrect selection of the patient name, data entry in incorrect fields and typographical errors. Factors reported included lack of training, failure to carry out a duty, high cognitive workload and effects of multitasking (2010). Although there are limitations, this study provides insight to the HC IdM staff as well as other managers for the users who need additional training or a need for realignment of the workflow process. The findings of this study produced useful information about the users to which yields to further research with identifying various causes of CEs. Since this study did not evaluate the actual causes of the CEs, further work is required to expand and identify factors contributing to incidents causing CEs.

Reference:

Adelman, J., Kalkut, G., Schechter, C.B., Weiss, J. M., Berger, M. A., Reiddman, S. H., .Southern, W. N. (2012). Understanding and preventing wrong patient electronic orders: a randomized controlled trail. Journal of the American Medical Informatics Association. doi 10 1136/amiajnl-2012-001055.

Ash, J., Berg, M., & Coiera, E. 2003. Some Unintended Consequences of Information Technology in Health Care: The Nature of Patient Care Information System-related Errors. Journal of the American Medical Informatics Association 11, 2. doi:10.1197/jamia.M1471.

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Magrabi, F., Ong, M., Runciman, W., & Coiera, E. (2010). An analysis of computer related patient safety incidents to inform the development of a classification. Journal of the American Medical Informatics Association. 17, 663-667 doi:10.1136/jamia.2009.002444.

Appendix A Definitions

Catastrophic Edit- are changes to a patient's electronic health record that result in the record being changed to that of another patient, caused by, but not limited to, edits to patient identity data (such as name, Social Security Number (SSN), date of birth, gender) and/or erroneous merging of two or more distinct patient records into a single record within VistA.

Health Care Identity Management (HC IdM) Program- is responsible for the business stewardship of identity data within VHA. The HC IdM Program provides data integrity and supports the Master Patient Index (MPI) correlation of the VHA longitudinal patient electronic health record to external systems, such as the Department of Defense (DoD).

Master Patient Index (MPI) - The MPI is a database that contains over 14 million patient entries populated from all VHA facilities nationwide. The MPI provides the access point mechanism for linking patient's information to enable an enterprise-wide view of patient information.

Veterans Health Information Systems and Technology Architecture (VistA)- an enterprise-wide information system built around an Electronic Health Record (EHR), used throughout the United States Department of Veterans Affairs (VA) medical system, known as the Veterans Health Administration (VHA). It consists of nearly 160 integrated software modules for clinical care, financial functions, and infrastructure.

Veterans Integrated Service Network (VISN) - The VA health care system is separated geographically into 23 networks headed by medical centers, and hierarchically within each system by division level of care or type. VA VISN facilities are grouped by region, location, and type.

Appendix B List of Tables

Table 1 Catastrophic Edits Report from November 2011 to December 2012

VISN	DATE & MILITARY TIME CE OCCURRED	HOW CE OCCURRED (Manual, etc.)	TITLE OF CE ORIGINATOR
F	02/20/2001 at 18:37	Manual	Admin Officer of the Day (AOD)
F	02/20/2001 at 18:42	Manual	Admin Officer of the Day (AOD)
H	01/07/2002 at 14:35	Manual	Clinic Clerk
H	04/25/2012 at 10:46	Manual	Clinic Clerk
I	12/16/2011 at 13:05	Manual	Clinic Clerk
J	05/09/2012 at 08:59	Manual	Clinic Clerk
J	12/10/2012 at 15:12	Manual	Clinic Clerk
L	07/25/2012 at 09:54	Manual	Clinic Clerk
L	12/11/2012 at 07:55	Manual	Clinic Clerk
U	12/19/2011 at 15:33	Manual	Clinic Clerk
G	04/12/2012 at 8:09	Manual	Clinical (Medical/Surgical) Staff *
K	08/20/2012 at 12:18	Manual	Clinical (Medical/Surgical) Staff *
U	10/26/2012 at 09:48	Manual	Clinical (Medical/Surgical) Staff *
V	11/04/2011 at 13:50	Manual	Clinical (Medical/Surgical) Staff *
A	12/05/2011 at 10:12	Manual	Eligibility Clerk
A	07/09/2012 at 12:31	Manual	Eligibility Clerk
A	07/09/2012 at 15:00	Manual	Eligibility Clerk
A	09/13/2012 at 07:47	Manual	Eligibility Clerk
D	05/09/2012 at 13:18	Manual	Eligibility Clerk
F	02/15/2012 at 09:38	Manual	Eligibility Clerk
F	03/30/2012 at 16:48	Manual	Eligibility Clerk
G	06/29/2012 at 11:05	Manual	Eligibility Clerk
G	08/15/2011 at 14:08	Manual	Eligibility Clerk
G	08/22/2012 at 14:33	Manual	Eligibility Clerk
G	12/28/2012 at 13:33	Manual	Eligibility Clerk
H	11/09/2011 at 08:08	Manual	Eligibility Clerk
H	06/15/2012 at 09:00	Manual	Eligibility Clerk
I	11/01/2011 at 10:21	Manual	Eligibility Clerk
I	04/02/2012 at 14:24	Manual	Eligibility Clerk
I	03/05/2012 at 09:47	Manual/Mismatch	Eligibility Clerk
K	10/26/2012 at 08:45	Manual	Eligibility Clerk
P	11/08/2011 at 11:56	Manual	Eligibility Clerk
P	03/12/2012 at 15:19	Manual	Eligibility Clerk
P	04/25/2012 at 13:46	Manual	Eligibility Clerk
P	05/07/2012 at 08:18	Manual	Eligibility Clerk
Q	04/20/2012 at 15:14	Manual	Eligibility Clerk

Q	08/16/2012 at 09:29	Manual	Eligibility Clerk
R	06/21/2012 at 11:47	Manual	Eligibility Clerk
R	07/05/2006 at 16:23	Manual/Mismatch	Eligibility Clerk
R	09/10/2012 at 07:33	Manual	Eligibility Clerk
S	05/11/2012 at 14:30	Manual	Eligibility Clerk
T	02/10/2012 at 13:59	Manual	Eligibility Clerk
T	09/29/2010 at 11:37	Manual	Eligibility Clerk
T	07/18/2012 at 13:30	Manual	Eligibility Clerk
U	11/15/2012 at 13:45	Manual	Eligibility Clerk
V	04/02/2012 at 09:23	Manual	Eligibility Clerk
T	07/18/2012 at 10:47	Manual	Employee Health Clerk
C	05/24/2012 at 08:28	Manual	Enrollment/Registration Clerk
C	09/10/2012 at 14:27	Manual	Enrollment/Registration Clerk
D	10/23/2012 at 15:37	Manual	Enrollment/Registration Clerk
D	11/14/2012 at 15:59	Manual	Enrollment/Registration Clerk
F	07/03/2012 at 15:03	Manual	Enrollment/Registration Clerk
F	10/15/2012 at 10:17	Manual	Enrollment/Registration Clerk
G	02/02/2012 at 10:14	Manual	Enrollment/Registration Clerk
H	04/22/2012 at 18:12	Manual	Enrollment/Registration Clerk
H	07/19/2012 at 12:08	Manual	Enrollment/Registration Clerk
H	07/23/2012 at 15:20	Manual	Enrollment/Registration Clerk
H	07/24/2012 at 15:42	Manual	Enrollment/Registration Clerk
H	08/16/2012 at 08:59	Upload	Enrollment/Registration Clerk
I	07/02/2012 at 15:22	Manual	Enrollment/Registration Clerk
J	02/28/2012 at 10:22	Manual	Enrollment/Registration Clerk
L	07/10/2012 at 21:42	Manual	Enrollment/Registration Clerk
O	02/01/2012 at 15:03	Manual	Enrollment/Registration Clerk
P	08/23/2012 at 08:18	Manual	Enrollment/Registration Clerk
T	11/17/2011 at 11:14	Manual	Enrollment/Registration Clerk
U	06/28/2012 at 12:13	Manual	Enrollment/Registration Clerk
W	11/25/2011 at 11:03	Manual	Enrollment/Registration Clerk
R	01/18/2004 at 17:14	Manual	Enrollment/Registration Clerk (DoD)
G	10/31/2011 at 11:22	Manual	HEC Staff
G	09/22/2011 at 13:05	Manual	HEC Staff
G	12/19/2011 at 10:38	Manual	HEC Staff
G	01/17/2012 at 14:35	Manual	HEC Staff
G	04/06/2012 at 07:49	Manual	HEC Staff
G	04/23/2012 at 10:09	Manual	HEC Staff
C	04/19/2012 at 14:31	Manual	MPI POC
C	11/27/2012 at 10:02	Manual	MPI POC
D	05/29/2003 at 08:18	Manual	MPI POC
G	06/18/2012 at 14:37	Manual	MPI POC
G	11/11/2012 at 09:51	Manual	MPI POC
J	12/06/2011 at 14:40	Manual	MPI POC
K	11/29/2011 at 16:15	Catastrophic Merge	MPI POC

K	04/03/2003 at 10:02	Manual	MPI POC
P	01/04/2012 at 17:30	Catastrophic Merge	MPI POC
R	03/19/2012 at 08:45	Manual	MPI POC
R	10/15/2012 at 10:47	Manual	MPI POC
T	11/30/2011 at 10:34	Manual	MPI POC
T	11/30/2011 at 13:07	Manual	MPI POC
T	11/13/2012 at 11:55	Manual	MPI POC
W	11/15/2012 at 07:00	Manual	MPI POC
A	05/14/2005 at 09:24	Manual	Other *
D	12/30/2011 at 17:40	Manual	Other *
G	12/08/2009 at 22:04	Mismatch/Auto-Link	Other *
I	01/18/2012 at 10:32	Manual	Other *
P	04/18/2007 at 09:28	Manual	Other *
P	11/19/2012 at 17:00	Upload	Other *
P	11/20/2012 at 07:05	Upload	Other *
P	11/20/2012 at 07:26	Upload	Other *
P	11/20/2012 at 08:13	Upload	Other *
P	11/20/2012 at 08:13	Upload	Other *
P	11/20/2012 at 08:17	Upload	Other *
P	11/20/2012 at 08:30	Upload	Other *
P	11/20/2012 at 08:37	Upload	Other *
P	11/20/2012 at 08:02	Upload	Other *
P	11/20/2012 at 07:12	Upload	Other *
U	08/07/2012 at 14:35	Manual	Other *
A	12/02/2011 at 13:57	Manual	Supervisor
G	11/30/2012 at 15:02	Manual	Supervisor
K	03/10/2010 at 10:47	Manual/Catastrophic Merge	Supervisor
T	01/06/2012 at 11:26	Manual	Supervisor
U	09/25/2012 at 14:47	Manual	Supervisor
W	02/01/2012 at 11:35	Manual	Supervisor
W	07/06/2012 at 14:37	Manual	Supervisor
J	04/25/2012 at 07:51	Manual	VBA Regional Office Staff
T	12/16/2011 at 12:41	Manual	VBA Regional Office Staff
W	11/15/2011 at 13:02	Manual	VBA Regional Office Staff

Table 2 Total Potential ID Change and Catastrophic Edits

	Total Potential ID Changes	Total Catastrophic Edits
Nov 2011	80	10
Dec 2011	87	8
Jan 2012	90	9
Feb 2012	82	8
Mar 2012	92	4
Apr 2012	103	12
May 2012	100	6
Jun 2012	359	8
Jul 2012	344	13
Aug 2012	352	8
Sep 2012	715	4
Oct 2012	158	5
Nov 2012	79	17
Dec 2012	95	3
Total	**2736**	**115**

Table 3 Job Title of Catastrophic Edits Originators

TITLE OF CE ORIGINATOR	CEs Created	% of CEs Created
Admin Officer of the Day (AOD)	2	2%
Clinic Clerk	8	7%
Clinical (Medical/Surgical) Staff	4	3%
Eligibility Clerk	32	28%
Employee Health Clerk	1	1%
Enrollment/Registration Clerk	21	18%
HEC Staff	6	5%
MPI POC	15	13%
Other	16	14%
Supervisor	7	6%
VBA Regional Office Staff	3	3%
Total	**115**	

Table 4 Total Catastrophic Edits by VISNs (De-Identified)

VISN	CE's	VISN	CE's
A	6	M	0
B	0	N	0
C	4	O	1
D	5	P	17
E	0	Q	2
F	6	R	6
G	16	S	1
H	9	T	10
I	6	U	6
J	5	V	2
K	5	W	5
L	3		

Appendix C List of Figures

Figure 1 Number of Catastrophic Edits Created (Nov 2011 to Dec 2012)

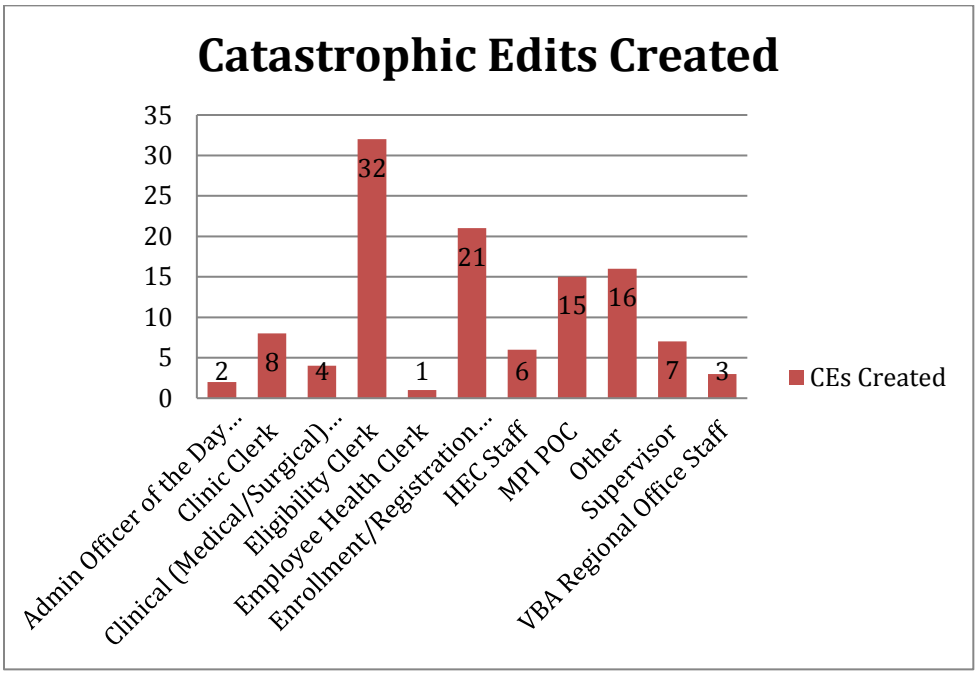

Figure 2 Percentage of Catastrophic Edits Created (Nov 2011 to Dec 2012)

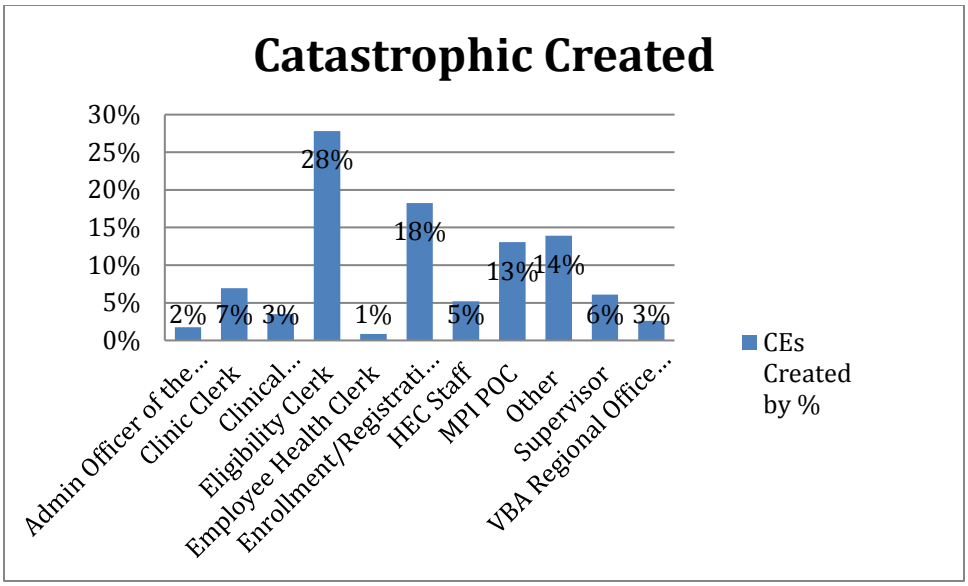

Figure 3 Catastrophic Edits by VISN (Nov 2011 to Dec 2012)