Appendix C - Descriptive Analysis

A detailed descriptive analysis of the Hazard Manager was conducted in a two-step-process:

- The first step was to determine how often each question in the Hazard Manager was answered, skipped by the user or skipped by the system out of 495 (the total number of hazards). A system skip was defined as the rendering of a question and set of answers moot, as the result of a user selecting a certain answer in a higher-order question. For example, when the user indicated that patient harm did not occur, the patient harm scale in the Hazard Manager then became moot (skipped by the system).

- The second step was to determine how often each answer choice for a particular question was selected when the question was not skipped. The denominator is smaller for these lower-order questions, due to the skip logic of the higher order questions.

The results of this two-step descriptive analysis can be found in a series of tables in the pages to follow. The first step of the descriptive analysis, determining how often each question in the Hazard Manager was answered, can be found in the left-most column of each table. The second step of the descriptive analysis, determining how often each answer choice for each question was selected when the questions was not skipped, can be found in the columns to the right of each question.

To understand whether variation existed by study site, the question and answer most frequently selected on each screen of the Hazard Manager was graphed by test site. The total number of hazards contributed by a test site was used as the denominator for each bar on each graph. The graphs for each screen of the Hazard Manager can be found directly after their corresponding descriptive analysis tables.

Table: Discovery Page – Results of Descriptive Analysis

Discovery Page Question	Answer Choice	Selected
When was the Hazard Discovered? Selected: 67.7% (n=335) User Skipped: 32.3% (n=160) System Skipped: n/a	**Out of 335 hazards with "When was the Hazard Discovered?" answered, the following options were selected:** ***(Only one selection possible)***	
	Calendar Date	100% (n=335)
	Calendar Time	3.9% (n=13)
Who Discovered the Hazard? Selected: 93.7% (n=464) User Skipped: 6.3% (n=31) System Skipped: n/a	**Out of 464 hazards with "Who Discovered the Hazard?" answered, the following options were selected:** ***(Only one selection possible)***	
	End User	57.8% (n=268)
	Local IT	13.2% (n=61)
	Medical Records	1.9% (n=9)
	Safety Personnel	2.4% (n=11)
	Patient of Caregiver	1.9% (n=9)
	HIT Vendor	18.5% (n=86)
	3rd-Party Content Vendor	0.2% (n=1)
	Researcher	0.4% (n=2)
	Regulator	0.2% (n=1)
	Other	3.5% (n=16)

Table: Discovery Page – Results of Descriptive Analysis

Discovery Page Question	Answer Choice	Selected
Was the Hazard associated with a shift change? Selected: 69.9% (n=346) User Skipped: 30.1% (n=149) System Skipped: n/a	**Out of 346 hazards with "Was the Hazard Associated with a Shift Change?" answered, the following options were selected:** ***(Only one selection possible)***	
	Yes	2.0% (n=7)
	No	98% (n=399)
Which Shift? Selected: 0.6% (n=3) User Skipped: 0.8% (n=4) System Skipped: 98.6% (n=488)	**Out of 3 hazards with "Which Shift?" answered, the following options were selected:** ***(Only one selection possible)***	
	First-to-Second Shift	33.3% (n=1)
	Second-to-Third Shift	66.7% (n=2)
	Third-to-First Shift	0
Stage of Discovery? Selected: 88.5% (n=438) User Skipped: 11.5% (n=57) System Skipped: n/a	**Out of 438 hazards with "Stage of Discovery?" answered, the following options were selected:** ***(Multiple selections possible)***	
	Software Specification	0.9% (n=4)
	Vendor Programming	1.6% (n=7)
	Customer Configuration	0.9% (n=4)
	Customer Programming	0.2% (n=1)
	Testing	7.5% (n=33)
	Training	0.9% (n=4)
	Go-Live	1.6% (n=7)
	Production Use	88.8% (n=389)
	Upgrade	5.5% (n=24)

Table: Discovery Page – Results of Descriptive Analysis

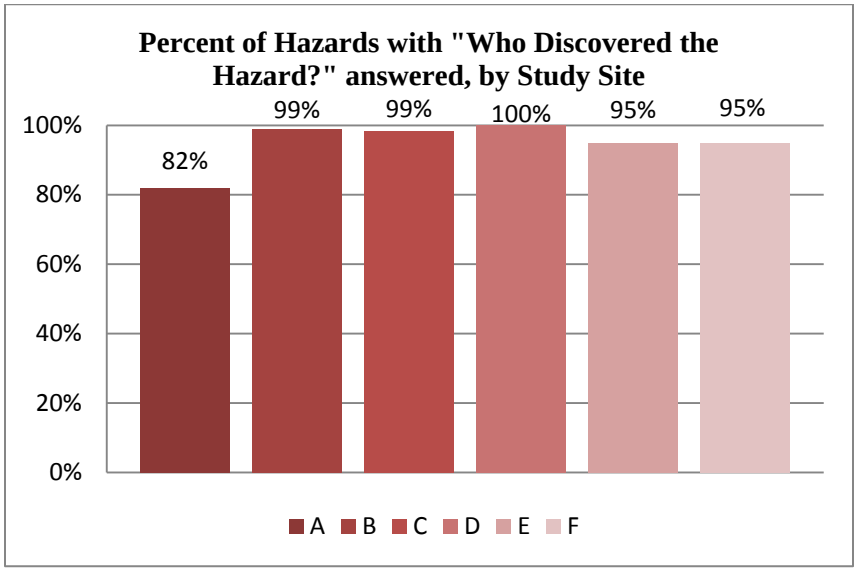
Discovery Page Question	Answer Choice	Selected
How long has the hazard existed in the system? Selected: 35.6% (n=176) User Skipped: 64.4% (n=319) System Skipped: n/a	**Out of 176 hazards with "How long has the Hazard Existed in the System?" answered, the following options were selected:** ***(Open text fields; only one selection possible)***	
	Hours	11.4% (n=20)
	Days	24.4% (n=43)
	Months	67% (n=118)
How was the Hazard Discovered? Selected: 83.4% (n=413) User Skipped: 16.6% (n=82) System Skipped: n/a	**Out of 413 hazards with "How was the Hazard Discovered?" answered, the following options were selected:** ***(Only one selection possible)***	
	Prospective Risk Analysis	2.2% (n=9)
	Usability Testing	8.5% (n=35)
	Electronic Report	0.2% (n=1)
	Error Log	0.7% (n=3)
	Chart Review	1.9% (n=8)
	End-User Report	66.1% (n=273)
	Patient Report	1.0% (n=4)
	Retrospective Analysis	8.2% (n=34)
	Other	11.1% (n=46)

Table: Discovery Page – Results of Descriptive Analysis

Discovery Page Question	Answer Choice	Selected
How was the Hazard Published? Selected: 92.5% (n=458) User Skipped: 7.5% (n=37) System Skipped: n/a	**Out of 458 hazards with "How was the Hazard Published?" answered, the following options were selected:** ***(Multiple selections possible)***	
	Internal Report	83.8% (n=385)
	Sent to HIT Vendor	12.5% (n=57)
	3rd-Party Content Vendor Communication	2.4% (n=11)
	User Group Communication	0.9% (n=4)
	Published Report	1.3% (n=6)
	Received from HIT Vendor	19.2% (n=88)

Table: Discovery Page – Results of Descriptive Analysis

In an effort to understand whether variation existed between test sites in terms of selecting Discovery options, Discovery options most frequently selected in the Hazard Manager were graphed by test site using the total number of hazards within a site as the denominator.



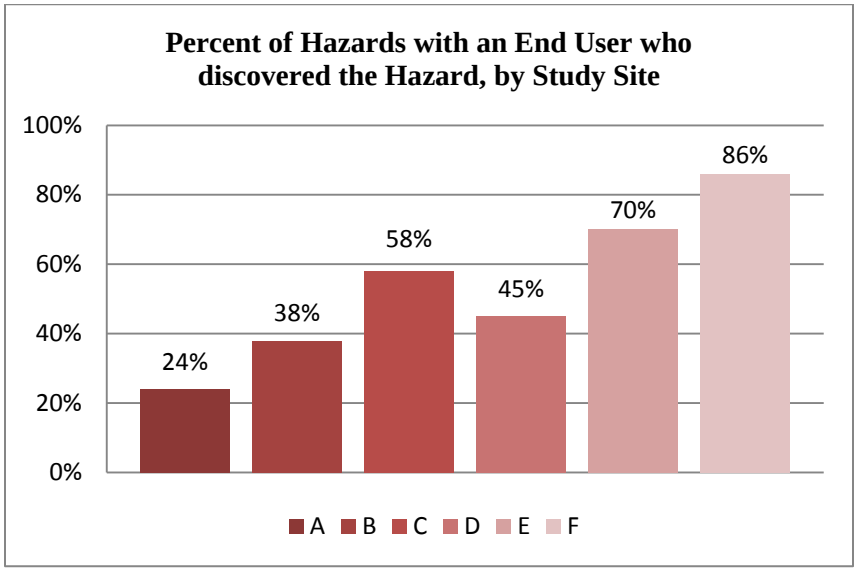


Table: Causation Pages – Results of Descriptive Analysis

Causation Category	Factor	Selected
Usability Selected: 49.7% (n=246) User Skipped: 50.3% (n=249) System Skipped: n/a	**Out of 246 hazards with Usability, the following factors were selected:** ***(Multiple selections possible)***	
	Difficult Information Access	29.7% (n=73)
	Difficult Data Entry	23.6% (n=58)
	Excessive Demands on Human Memory	10.2% (n=25)
	Confusing Information Display	28.5% (n=70)
	Inconsistent Information Display	28% (n=69)
	Mismatch between HIT function and clinical reality	28% (n=69)
	Inadequate or Confusing Feedback to User	23.2% (n=57)
	Electronics-induced Credulity (excessive trust)	3.7% (n=9)
	Other	3.7% (n=9)

Table: Causation Pages – Results of Descriptive Analysis

Causation Category	Factor	Selected
Data Quality Selected: 26.3% (n=130) User Skipped: 73.7% (n=365) System Skipped: n/a	**Out of 130 hazards with Data Quality, the following factors were selected:** ***(Multiple selections possible)***	
	Incorrect patient information	43.1% (n=56)
	Information linked to the wrong patient	22.3% (n=29)
	Faulty reference information	13.1% (n=17)
	Miscalculation of a result by (HIT software)	3.1% (n=4)
	Lost Data	30.8% (n=40)
	Inaccurate Natural Language Processing	0
	Other	11.5% (n=15)
Clinical-Decision Support Selected: 16.2% (n=80) User Skipped: 83.8% (n=415) System Skipped: n/a	**Out of 80 hazards with Clinical-Decision Support, the following factors were selected:** ***(Multiple selections possible)***	
	Faulty Recommendation	20% (n=16)
	Missing Recommendation	56.3% (n=45)
	Clinical Content Inadequate	8.8% (n=7)
	Decision-Engine Logic Inadequate	7.5% (n=6)
	Inappropriate level or automation	16.3% (n=13)
	Other	7.5% (n=6)

Table: Causation Pages – Results of Descriptive Analysis

Causation Category	Factor	Selected
Software Design Selected: 52.1% (n=258) User Skipped: 47.9% (n=237) System Skipped: n/a	**Out of 258 hazards with Software Design, the following factors were selected:** ***(Multiple selections possible***	
	Faulty vendor implementation/configuration recommendation	16.7% (n=43)
	Inadequate clinical content (including 3rd-party)	3.1% (n=8)
	Unusable in software-implementation tools	0.4% (n=1)
	Sub-optimal interfaces between applications	16.3% (n=42)
	Unnecessary/unauthorized sharing of PHI	1.2% (n=3)
	Non-configurable software	1.9% (n=5)
	Faulty Design	73.3% (n=189)
	Other	2.3% (n=6)
Implementation Selected: 9.1% (n=45) User Skipped: 90.9% (n=450) System Skipped: n/a	**Out of 45 hazards with Implementation, the following factors were selected:** ***(Multiple selections possible)***	
	Inadequate software change control	40% (n=18)
	Inadequate project management	24.4% (n=11)
	Inadequate control of user access	17.8% (n=8)
	Unpredictable elements of the patient's record available only on paper/scanned documents	11.1% (n=5)
	Other	24.4% (n=11)

Table: Causation Pages – Results of Descriptive Analysis

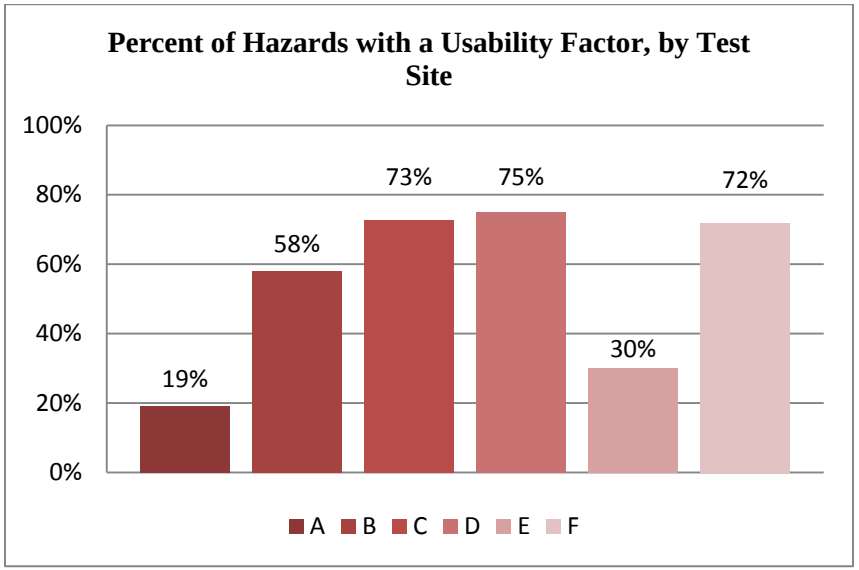
Causation Category	Factor	Selected
Hardware Selected: 2.6% (n=13) User Skipped: 97.4% (n=482) System Skipped: n/a	**Out of 13 hazards with Hardware, the following factors were selected:** ***(Multiple selections possible)***	
	Insufficient user hardware	7.7% (n=1)
	User hardware poorly located	7.7% (n=1)
	User hardware not working or malfunctioning	46.2% (n=6)
	Back-end hardware failure	23.1% (n=3)
	Slow HIT response	23.1% (n=3)
	Other	30.8% (n=4)
Other User Factors Selected: 17% (n=84) User Skipped: 83% (n=411) System Skipped: n/a	**Out of 84 hazards with Other Use Factors, the following factors were selected:** ***(Multiple selections possible)***	
	Fatigue	2.4% (n=2)
	Lack of professionalism	6% (n=5)
	Unforced User Error	94% (n=79)

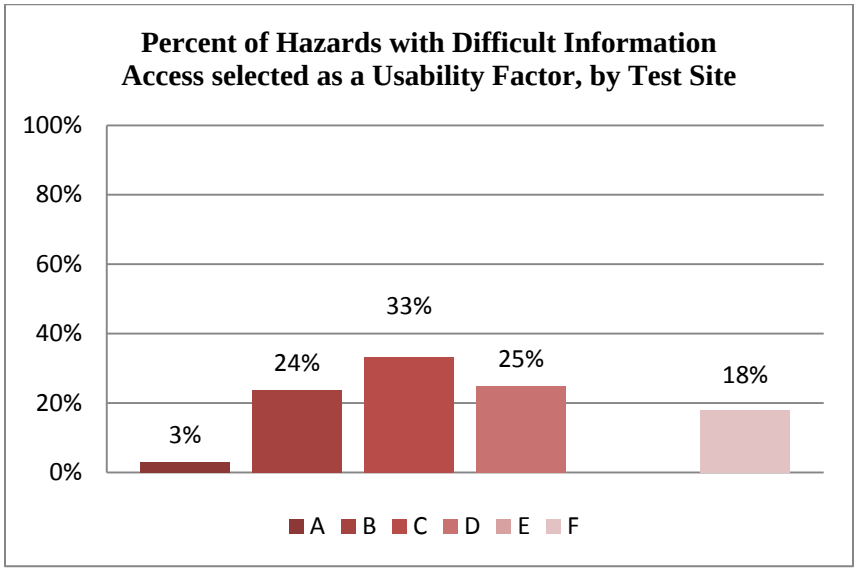
Table: Causation Pages – Results of Descriptive Analysis

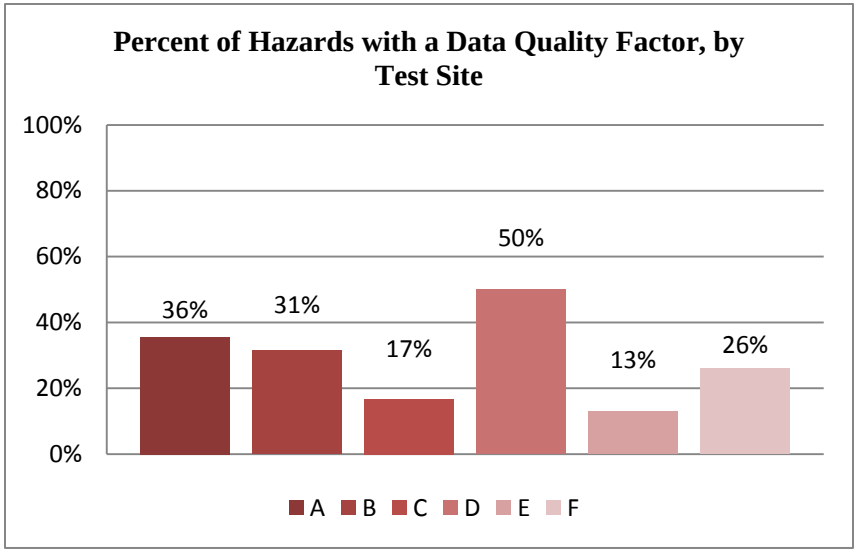
Causation Category	Factor	Selected
Other Organizational Factors Selected: 26.5% (n=131) User Skipped: 73.5% (n=364) System Skipped: n/a	**Out of 131 hazards with Other Organizational Factors, the following factors were selected: *(Multiple selections possible)***	
	Inadequate training infrastructure	32.1% (n=42)
	Excessive workload (including cognitive)	15.3% (n=20)
	Inadequate change management	7.6% (n=10)
	Compromised communication among clinicians	16% (n=21)
	Care processes poorly defined	19.1% (n=25)
	Unclear policies	10.7% (n=14)
	Interactions with other (non-HIT) care systems	9.2% (n=12)
	Loss of pre-existing safeguards	11.5% (n=15)
	Virus or other malware	0
	Security Breach	0.8% (n=1)
	Other	18.3% (n=24)

Table: Causation Pages – Results of Descriptive Analysis

In an effort to understand whether variation existed between test sites in terms of selecting Causation factors, Causation factors most frequently selected in the Hazard Manager were graphed by test site using the total number of hazards within a site as the denominator.







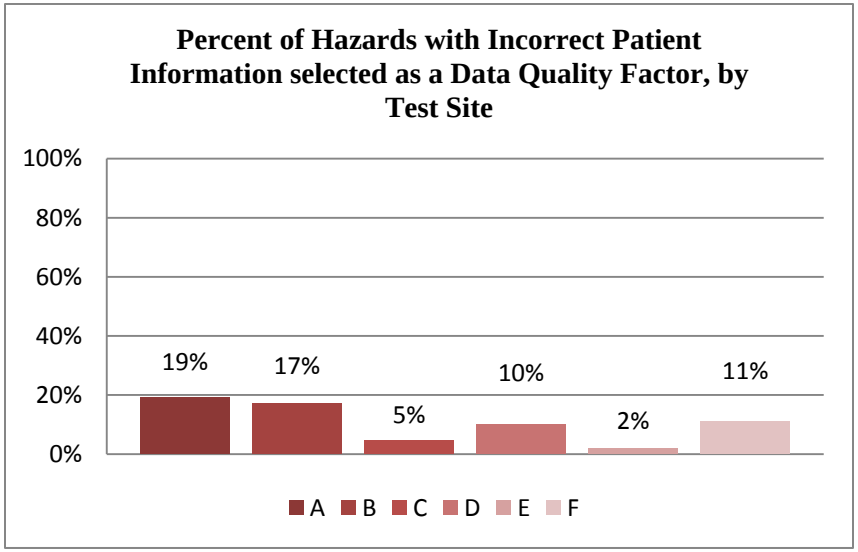
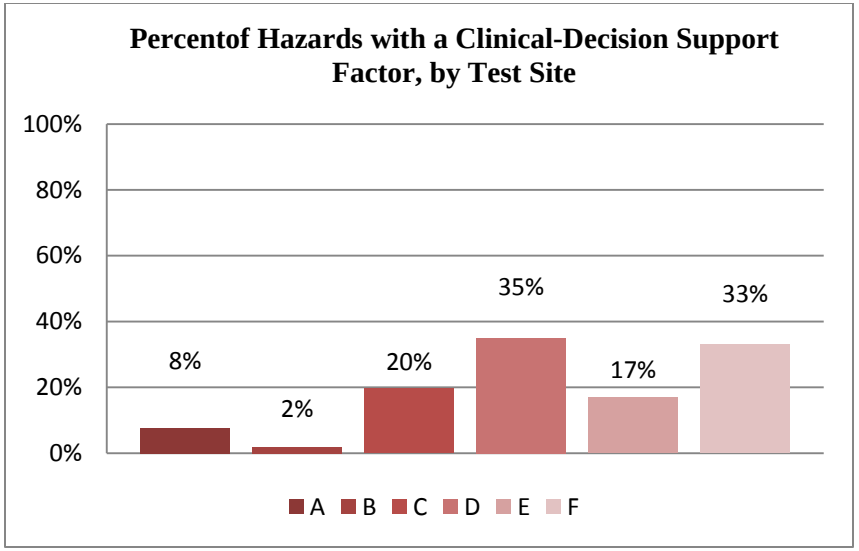
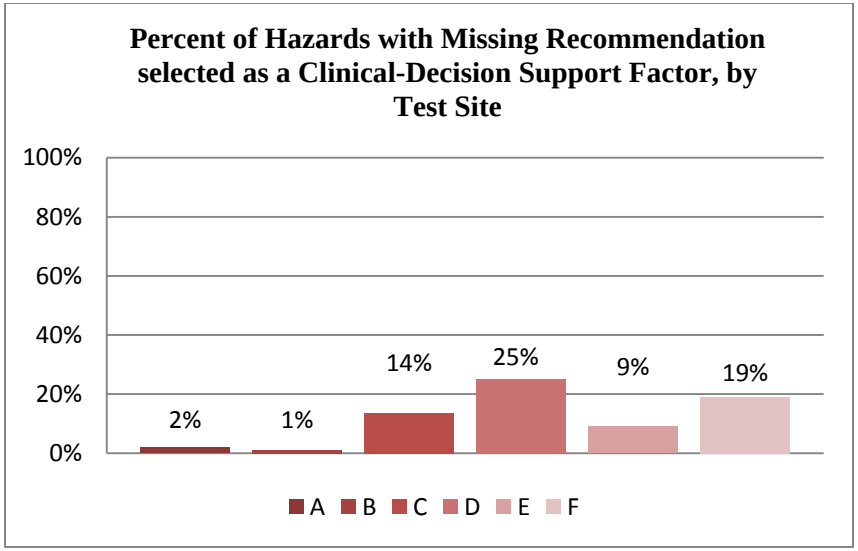
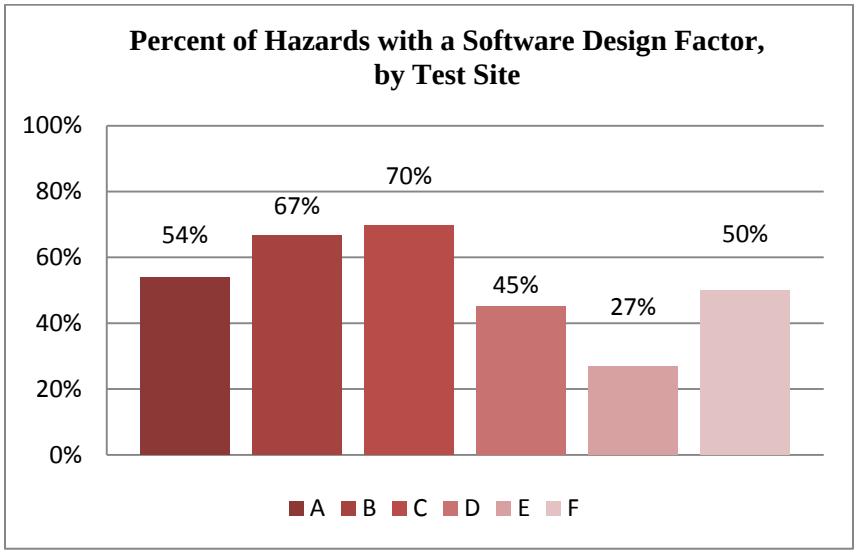


Table: Causation Pages – Results of Descriptive Analysis







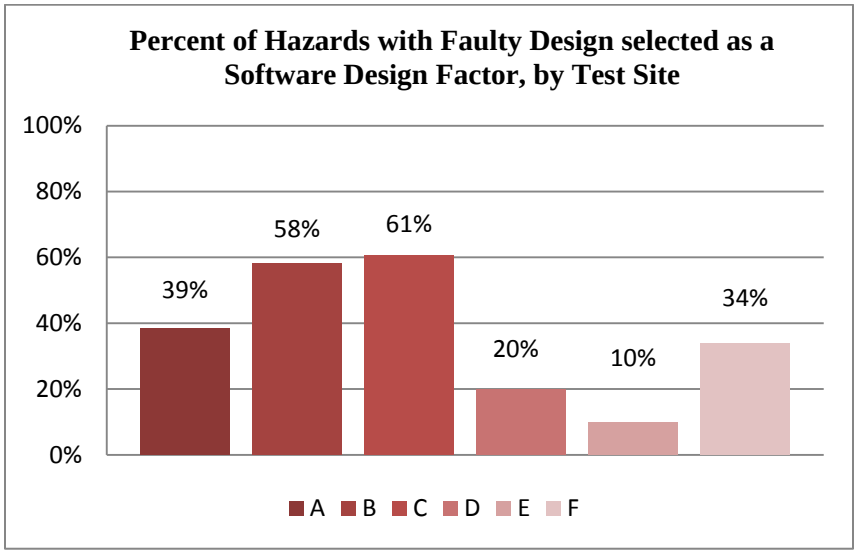
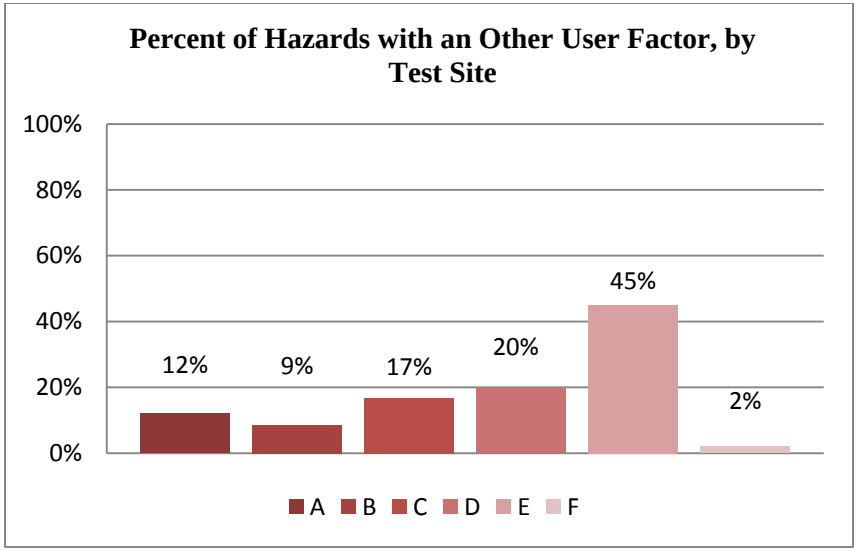
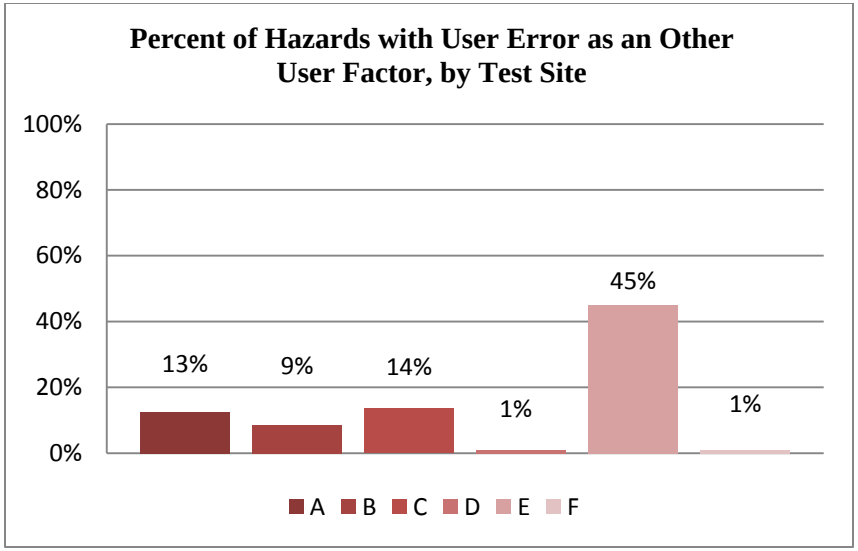
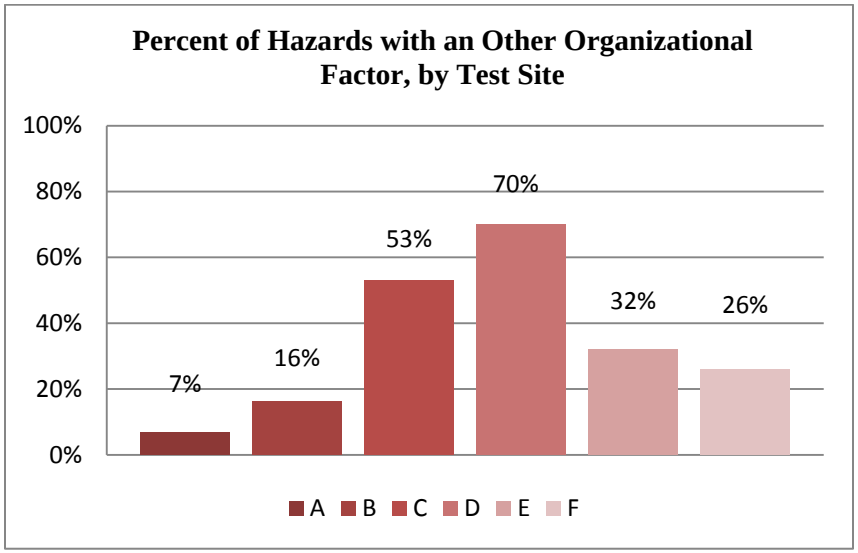


Table: Causation Pages – Results of Descriptive Analysis







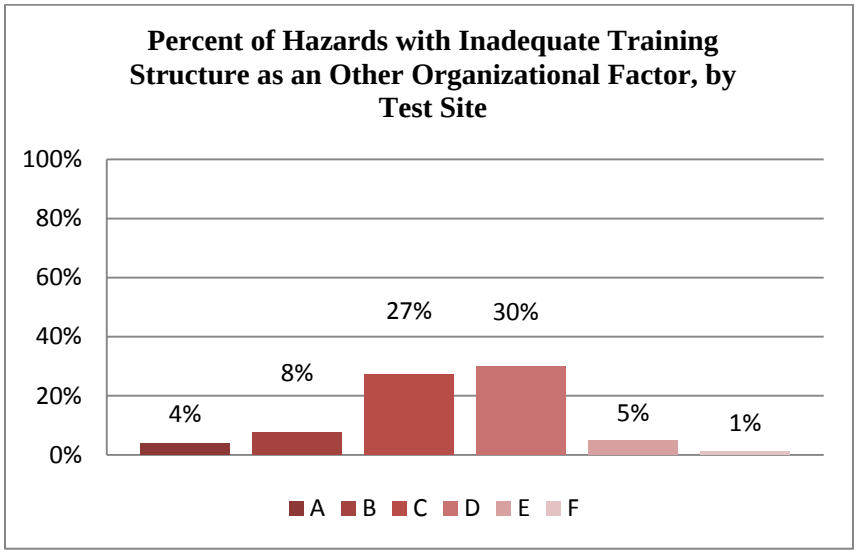


Table: Impact Page – Results of Descriptive Analysis

Impact Question	Answer	Selected
Risk of care-process compromise: Selected: 97% (n=480) User Skipped: 3% (n=15) System Skipped: n/a	**Out of 480 hazards with "Risk of care-process compromise" indicated, the following options were selected:** ***(Only one selection possible)***	
	Ruled Out Definitively	10.4% (n=50)
	Low Likelihood	28.1% (n=135)
	Moderate Likelihood	17.9% (n=86)
	High Likelihood	9.2% (n=44)
	Has Occurred – Here	31.5% (n=151)
	Has Occurred – Elsewhere	2.9% (n=14)
Type of potential care-process compromise from this hazard: Selected: 81% (n=401) User Skipped: 8.9% (n=44) System Skipped: 10.1% (n=50)	**Out of 401 hazards with "Type of Potential care-process compromise" indicated, the following options were selected:** ***(Only one selection possible)***	
	Delay in Care	32.4% (n=130)
	Omission (Inappropriate Inaction)	21.2% (n=85)
	Commission (Inappropriate Action)	39.1% (n=157)
	Other	7.2% (n=29)

Table: Impact Page – Results of Descriptive Analysis

Impact Question	Answer	Selected
Potential Impact of care-process compromise: Selected: 81.6% (n=404) User Skipped: 8.3% (n=41) System Skipped: 10.1% (n=50)	**Out of 404 hazards with "Potential Impact of care-process compromise" indicated, the following sub-attributes were selected:** ***(Only one selection possible)***	
	Low	41.1% (n=166)
	Medium	26% (n=105)
	High	32.9% (n=133)
If there was care-process compromise, how serious was it? Selected: 28.1% (n=139) User Skipped: 5.4% (n=27) System Skipped: 66.5% (n=329)	**Out of 139 hazards with "If there was care-process compromise, how serious was it?" answered, the following options were selected:** ***(Only one selection possible)***	
	Care process compromise did not reach patient	18.7% (n=26)
	Reached patient but caused no harm	32.4% (n=45)
	Harmed patient	10.1% (n=14)
	Unknown	38.9% (n=54)
When did the care-process compromise occur? Selected: 4.7% (n=23) User Skipped: 28.9% (n=143) System Skipped: 66.4% (n=329)	**Out of 23 hazards with "When did the care-process compromise occur?" answered, the following options were selected:**	
	n/a	

Table: Impact Page – Results of Descriptive Analysis

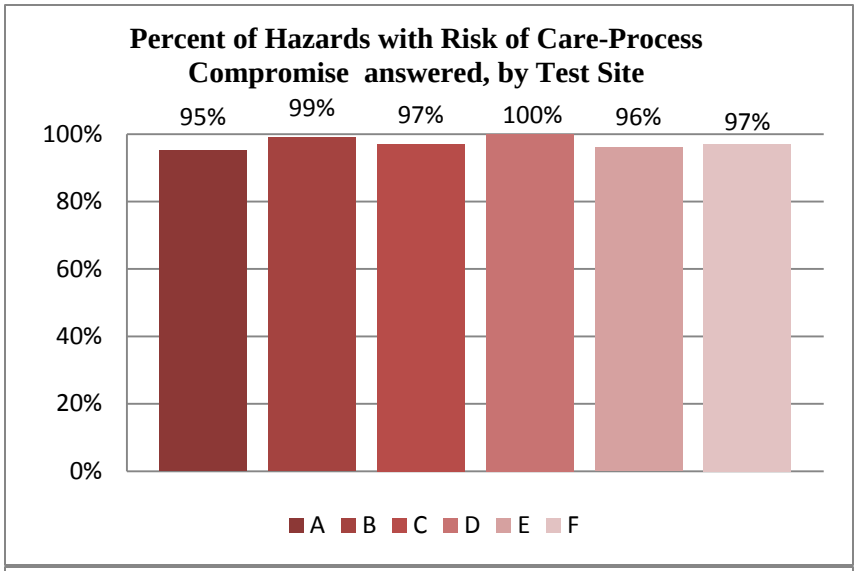
Impact Question	Answer	Selected
If there was patient harm, how serious was it? Selected: 2.6% (n=13) User Skipped: 97.4% (n=482) System Skipped: n/a	**Out of 13 hazards with "If there was patient harm, how serious was it?" answered, the following options were selected:** ***(Only one selection possible)***	
	Minor adverse effect, likely to be temporary	21.4% (n=3)
	Minor adverse effect, resolved	21.4% (n=3)
	Minor adverse effect likely to be chronic	0
	Minor adverse effect, chronic	0
	Major adverse effect, likely to be temporary	0
	Major adverse effect, resolved	42.9% (n=6)
	Major adverse effect, likely to be chronic	7.1% (n=1)
	Major adverse effect, chronic	0
	Death	7.1% (n=1)
Type of Patient Harm Selected: 2.6% (n=13) User Skipped: 0 System Skipped: 97.4% (n=482)	**Out of 13 hazards with "Type of Patient Harm" indicated, the following options were selected:** ***(Multiple selections possible)***	
	Physical	100% (n=13)
	Psychological	0
	Financial	0
	Reputational	0

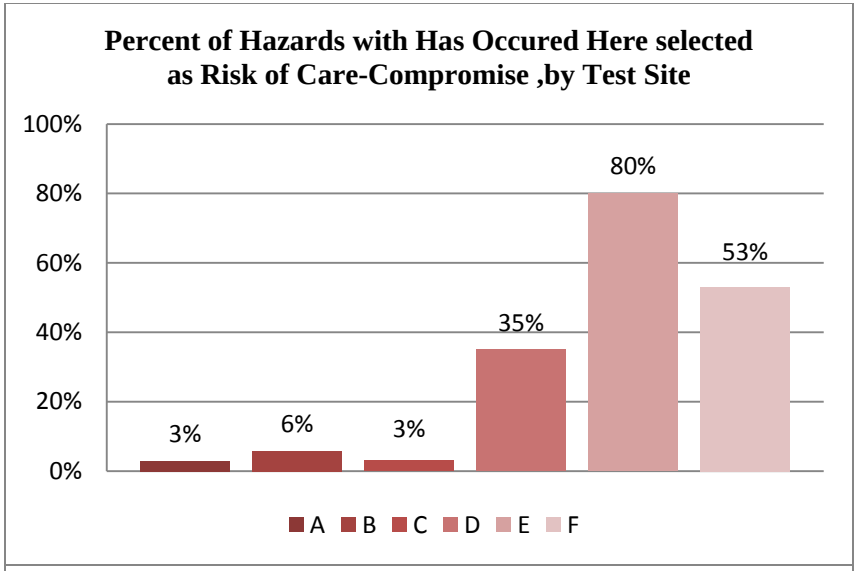
Table: Impact Page – Results of Descriptive Analysis

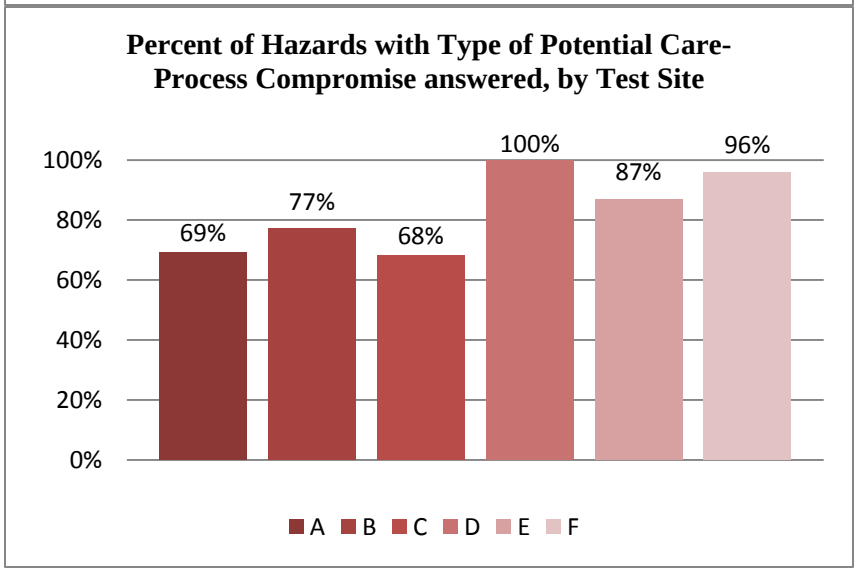
Impact Question	Answer	Selected
When was the patient harm identified? Selected: 1.2% (n=6) User Skipped: 1.6% (n=8) System Skipped: 97.2% (n=481)	**Out of 6 hazards with "When was the patient harm identified?" answered, the following options were selected:**	
	n/a	

In an effort to understand whether variation existed between test sites in terms of selecting Impact options, Impact options most frequently selected in the Hazard Manager were graphed by test site using the total number of hazards within a site as the denominator.

Table: Impact Page – Results of Descriptive Analysis







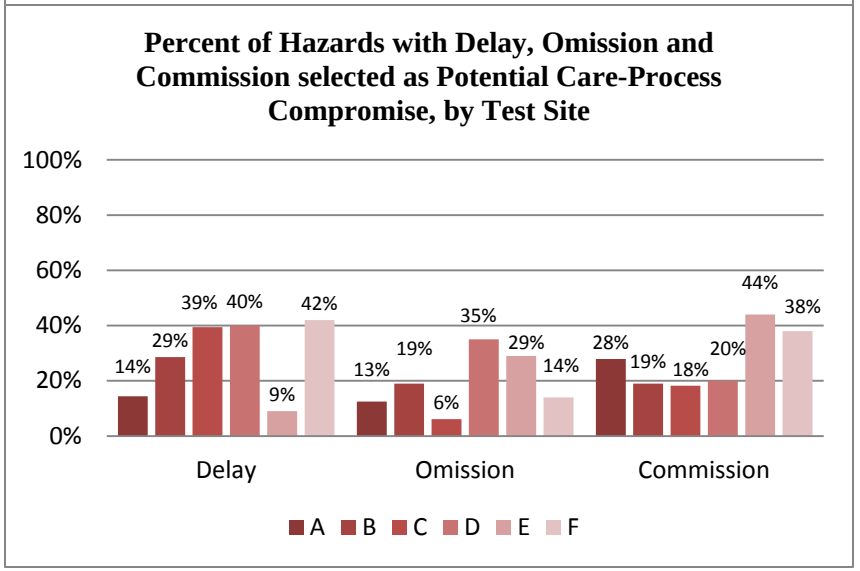
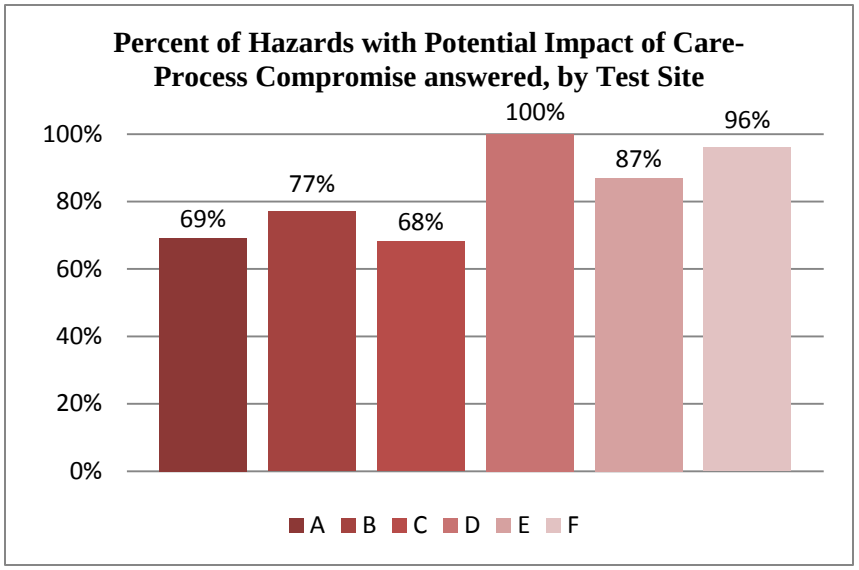


Table: Impact Page – Results of Descriptive Analysis



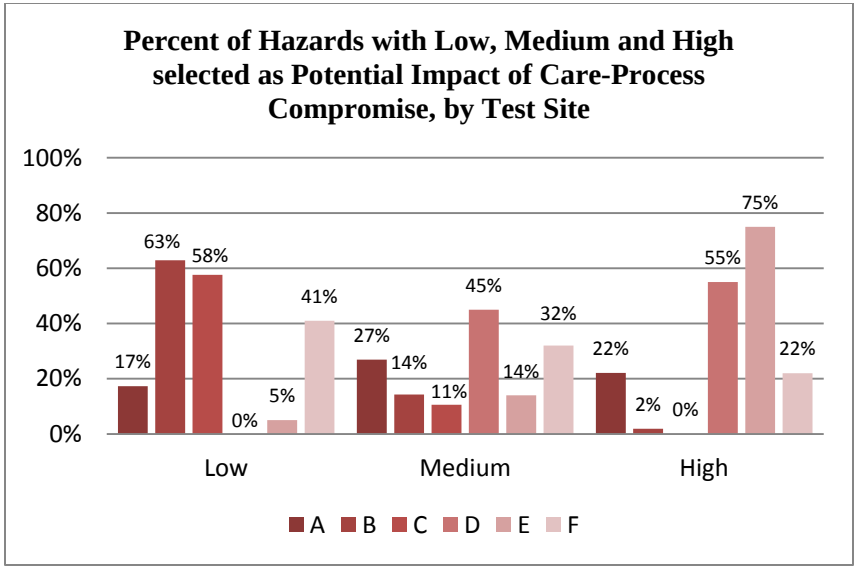


Table: Corrective Action Page – Results of Descriptive Analysis

Corrective Action Question	Answer	Selected
Hazard Mitigation Plan: Selected: 43.2% (n=214) User Skipped: 56.8% (n=281) System Skipped: n/a	**Out of 214 hazards with "Hazard Mitigation Plan" answered, the following options were selected:** ***(Only one selection possible)***	
	Do not implement affected software	4.7% (n=10)
	Implement only after written risk acceptance	27.6% (n=59)
	Not mitigation plan required	48.6% (n=104)
	No mitigation feasible	80.8% (n=173)
Activity Status: Selected: 84.7% (n=419) User Skipped: 15.3% (n=76) System Skipped: n/a	**Out of 419 hazards with "Activity Status" answered, the following options were selected:** ***(Only one selection possible)***	
	In Progress	38.7% (n=162)
	Case Closed: Resolved	57.8% (n=242)
	Case Closed: Not Resolved	3.6% (n=15)
Date (Initial): Selected: 13.7% (n=68) User Skipped: 86.3% (n=427) System Skipped: n/a	**Out of 68 hazards with "Date" (initial) answered, the following options were selected:**	
	n/a	
Date (Definitive): Selected: 22.2% (n=110) User Skipped: 77.8% (n=385) System Skipped: n/a	**Out of 110 hazards with "Date" (definitive) answered, the following options were selected:**	
	n/a	

Table: Corrective Action Page – Results of Descriptive Analysis

Corrective Action Question	Answer	Selected
Urgency (Initial): Selected: 54.1% (n=268) User Skipped: 45.9% (n=227) System Skipped: n/a	**Out of 268 hazards with "Urgency" (Initial) answered, the following options were selected:** ***(Only one selection possible)***	
	Fix or remove from use within 24 hours	28.4% (n=76)
	Fix or remove from use within 72 hours	6.3% (n=17)
	Fix or remove from use within 1 month	20.5% (n=55)
	Fix or remove from use within 6 months	13.4% (n=36)
	No fix or removal possible	14.6% (n=39)
	No fix or removal required	16.8% (n=45)
Urgency (Definitive): Selected: 56.4%% (n=279) User Skipped: 43.6% (n=216) System Skipped: n/a	**Out of 279 hazards with "Urgency" (Definitive) answered, the following options were selected:** ***(Only one selection possible)***	
	Fix or remove from use within 24 hours	25.8% (n=72)
	Fix or remove from use within 72 hours	6.4% (n=18)
	Fix or remove from use within 1 month	20.4% (n=57)
	Fix or remove from use within 6 months	26.9% (n=75)
	No fix or removal possible	6.1% (n=17)
	No fix or removal required	14.3% (n=40)

Table: Corrective Action Page – Results of Descriptive Analysis

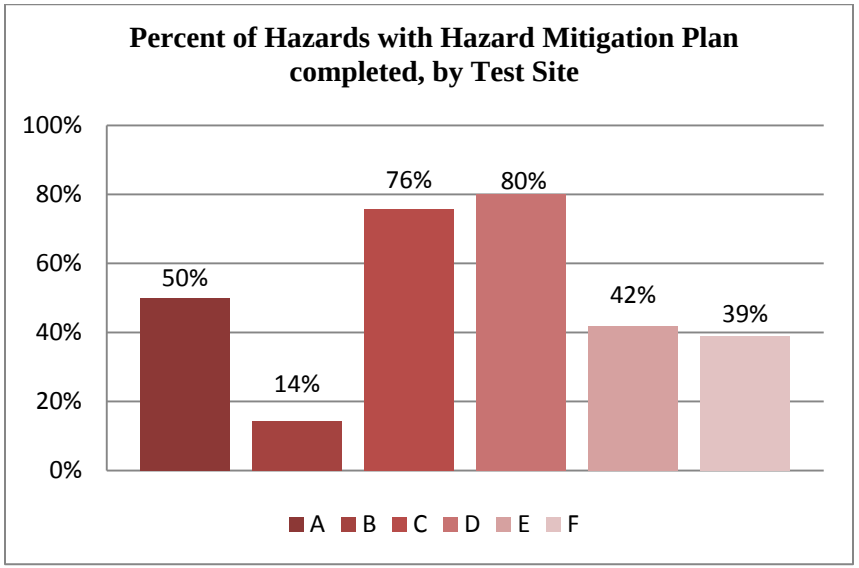
Corrective Action Question	Answer	Selected
Completeness of Fix (Initial): Selected: 52.5% (n=260) User Skipped: 47.5% (n=235) System Skipped: n/a	**Out of 260 hazards with "Completeness of Fix" (Initial) answered, the following options were selected: (Only one selection possible)**	
	Completeness of Fix Partial	40.8% (n=106)
	Completeness of Fix Complete	36.9% (n=96)
	Completeness of Fix Non Feasible	10.4% (n=27)
	Completeness of Fix None Needed	11.9% (n=31)
Completeness of Fix (Definitive): Selected: 61.8% (n=306) User Skipped: 38.2% (n=189) System Skipped: n/a	**Out of 306 hazards with "Completeness of Fix" (Definitive) answered, the following options were selected: *(Only one selection possible)***	
	Completeness of Fix Partial	27.8% (n=85)
	Completeness of Fix Complete	64.4% (n=197)
	Completeness of Fix Non Feasible	3.9% (n=12)
	Completeness of Fix None Needed	3.9% (n=12)
Plan (Initial): Selected: 40.8% (n=202) User Skipped: 59.2% (n=293) System Skipped: n/a	**Out of 202 hazards with "Plan" (Initial) answered, the following options were selected:**	
	n/a	
Plan (Definitive): Selected: 45.1% (n=223) User Skipped: 54.9% (n=272) System Skipped: n/a	**Out of 223 hazards with "Plan" (Definitive) answered, the following options were selected:**	
	n/a	

Table: Corrective Action Page – Results of Descriptive Analysis

Corrective Action Question	Answer	Selected
Fix (Initial): Selected: 50.3% (n=249) User Skipped: 49.7% (n=246) System Skipped: n/a	**Out of 249 hazards with "Fix" (Initial) answered, the following options were selected: (Multiple selections possible)**	
	Software upgrade	12.1% (n=30)
	Training for Local IT	9.2% (n=23)
	Configuration Change	30.1% (n=75)
	Custom Programming	19.7% (n=49)
	Care-Process Change	8.4% (n=21)
	Policy Change	2.8% (n=7)
	Training for End Users	53.4% (n=133)
	Other	8.0% (n=20)
Fix (Definitive): Selected: 67.7% (n=335) User Skipped: 32.3% (n=160) System Skipped: n/a	**Out of 335 hazards with "Fix" (Initial) answered, the following options were selected: (Multiple selections possible)**	
	Software upgrade	28.1% (n=94)
	Training for Local IT	8.1% (n=27)
	Configuration Change	36.4% (n=122)
	Custom Programming	18.2% (n=61)
	Care-Process Change	6.9% (n=23)
	Policy Change	3.9% (n=13)
	Training for End Users	36.1% (n=121)
	Other	7.5% (n=25)

Table: Corrective Action Page – Results of Descriptive Analysis

In an effort to understand whether variation existed between test sites in terms of selecting Corrective Action answers, Corrective Action answers most frequently selected in the Hazard Manager were graphed by test site using the total number of hazards within a site as the denominator.



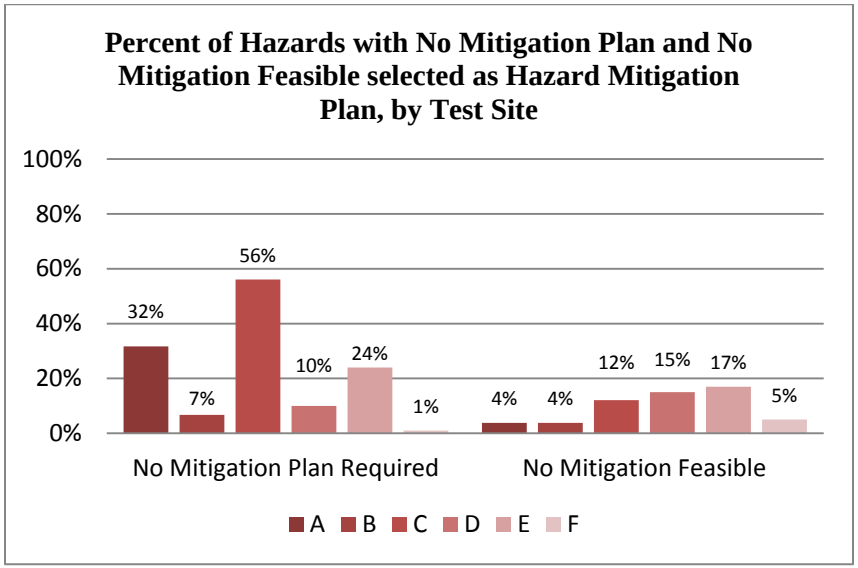
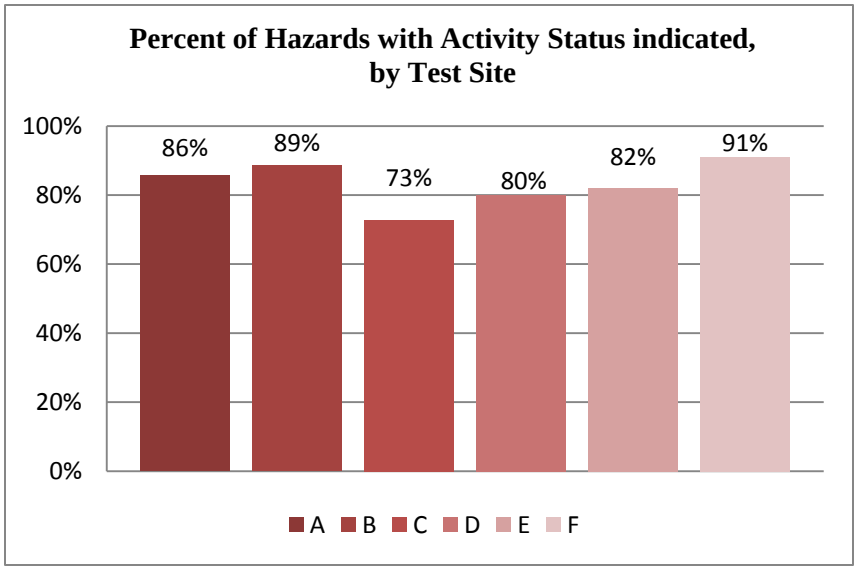
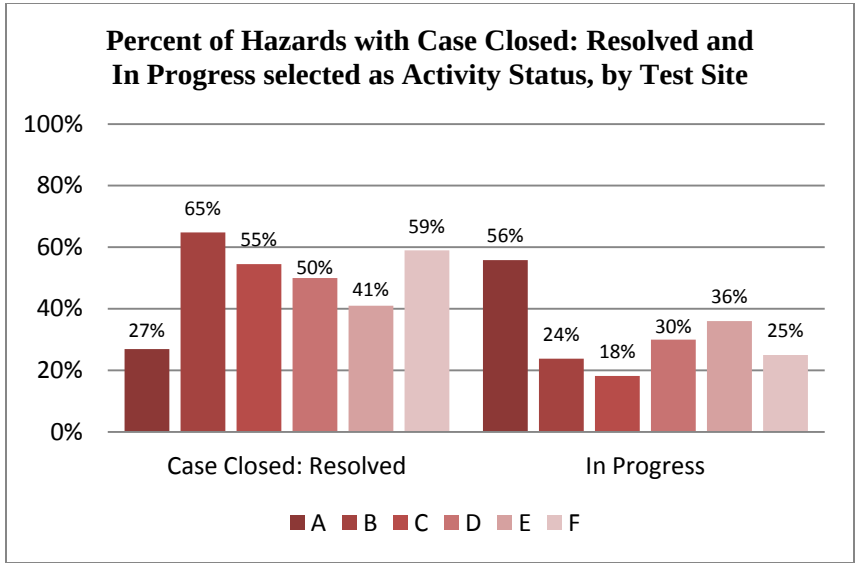
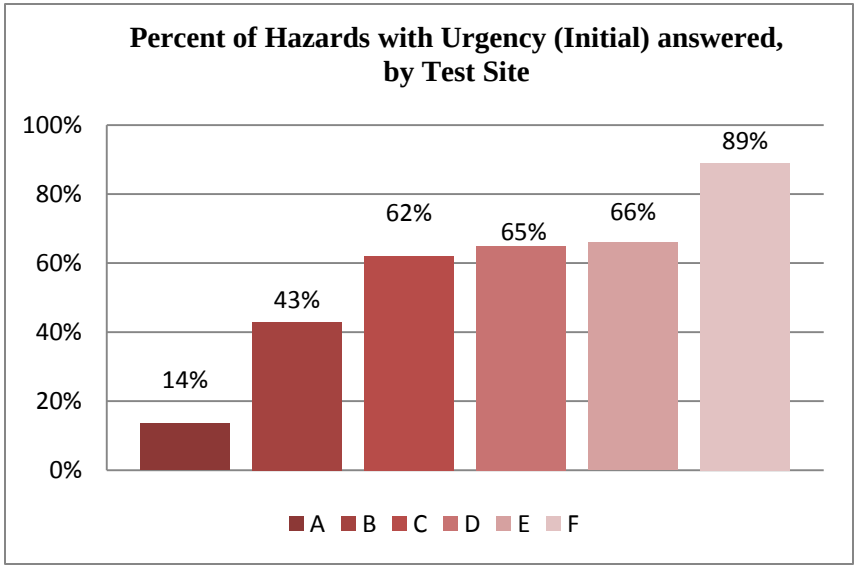
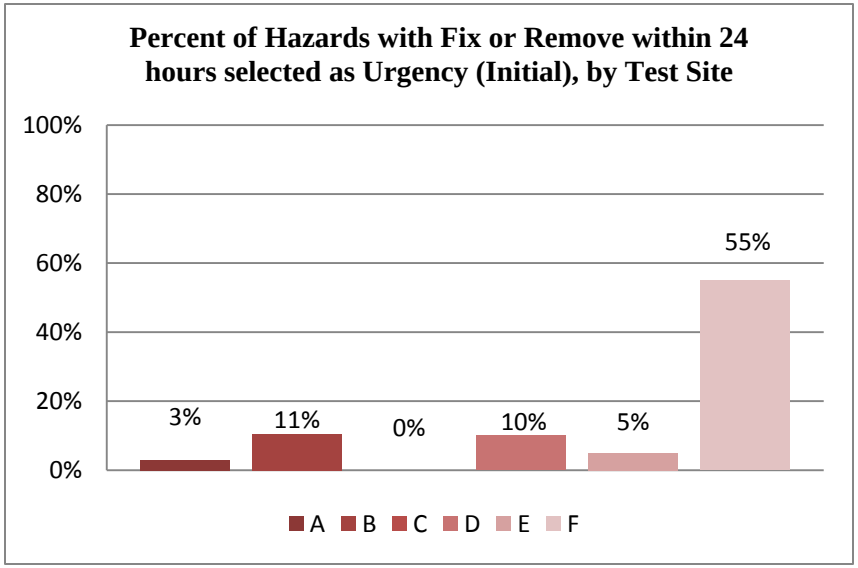


Table: Corrective Action Page – Results of Descriptive Analysis









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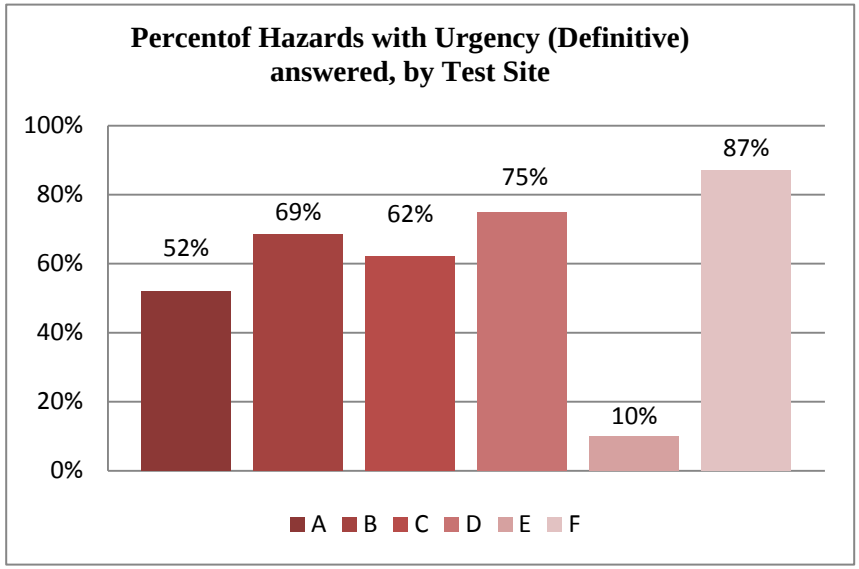

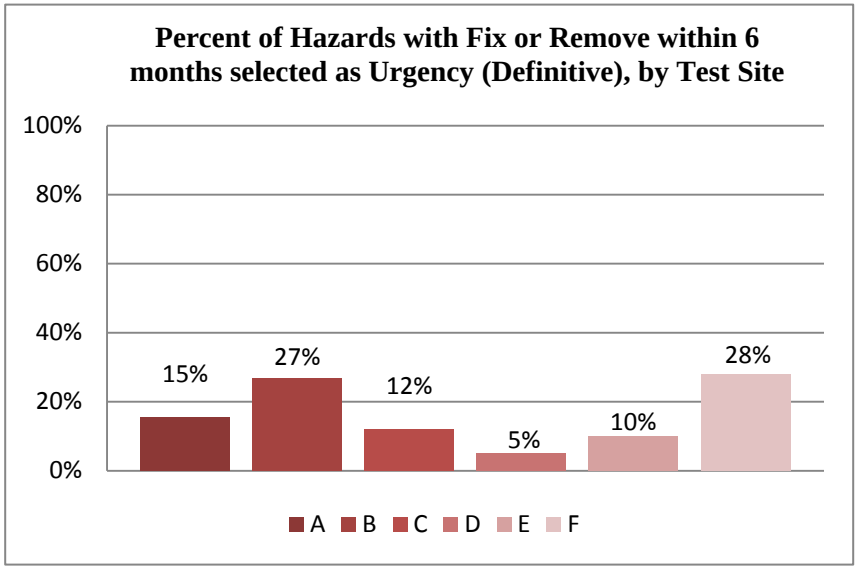

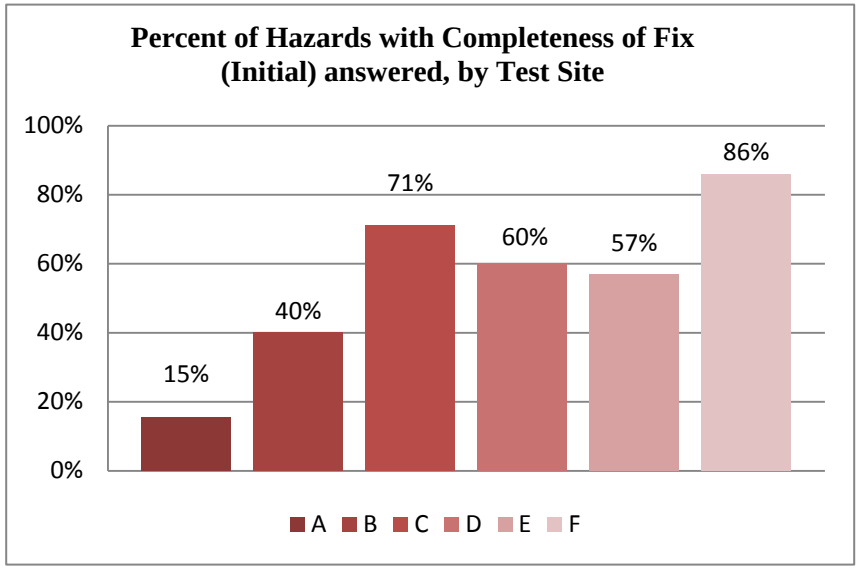

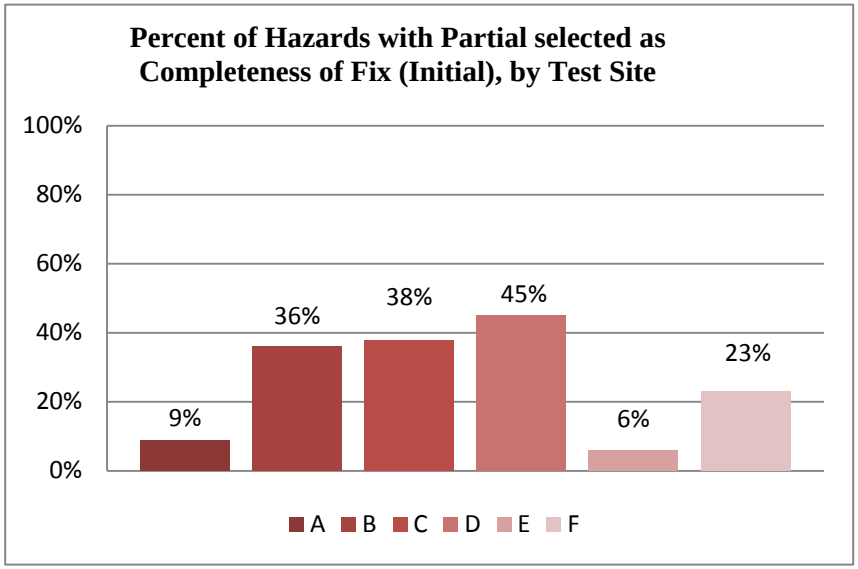

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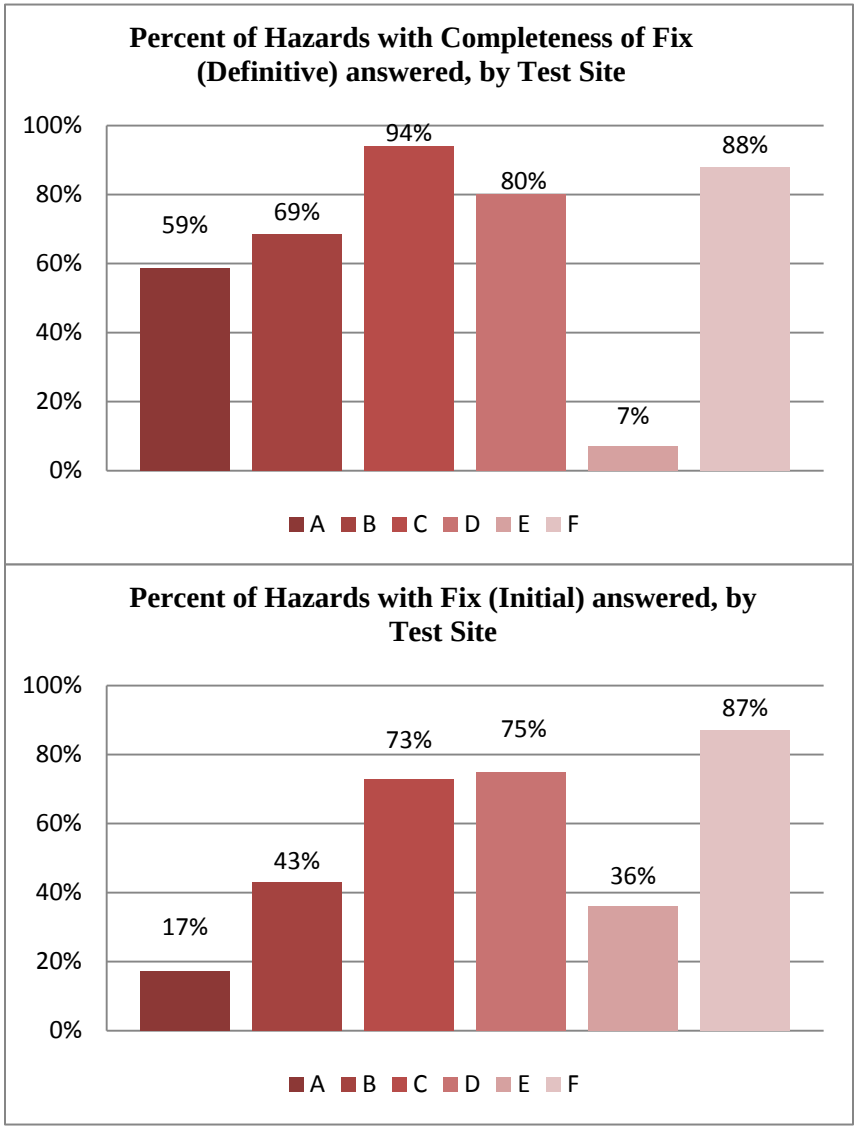

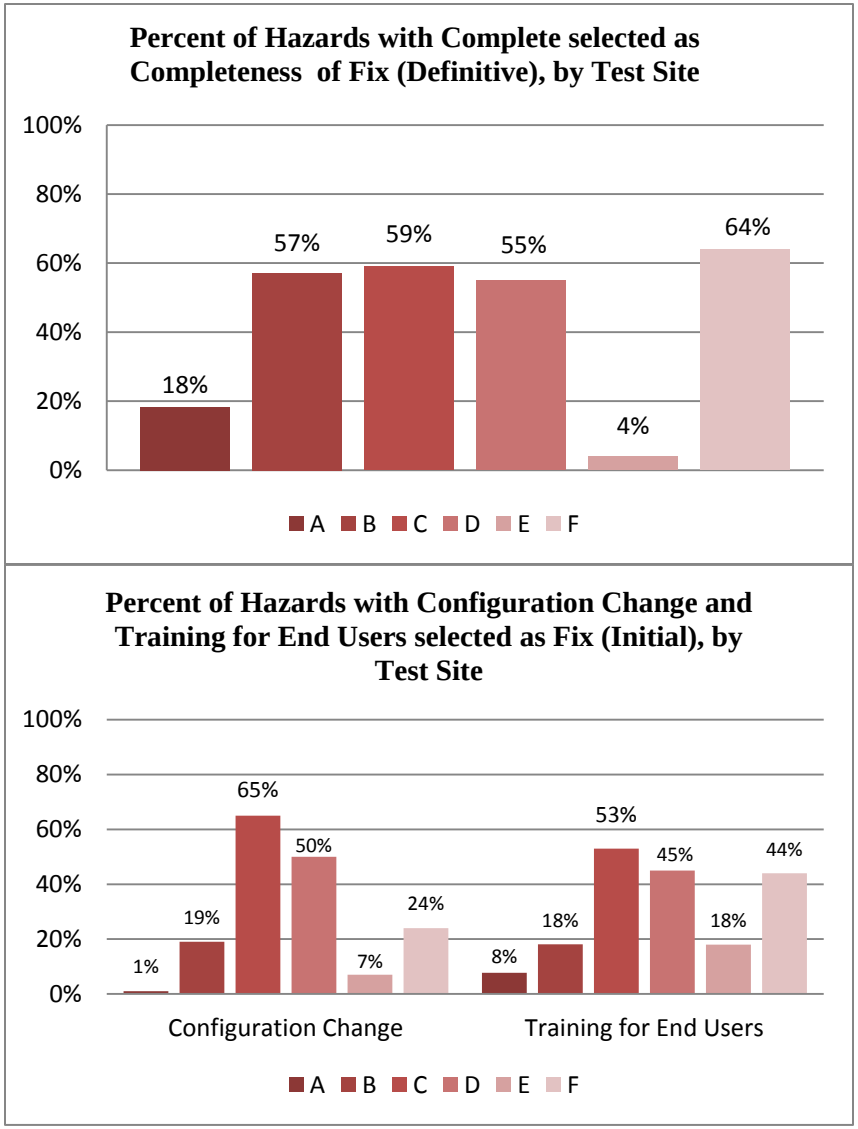

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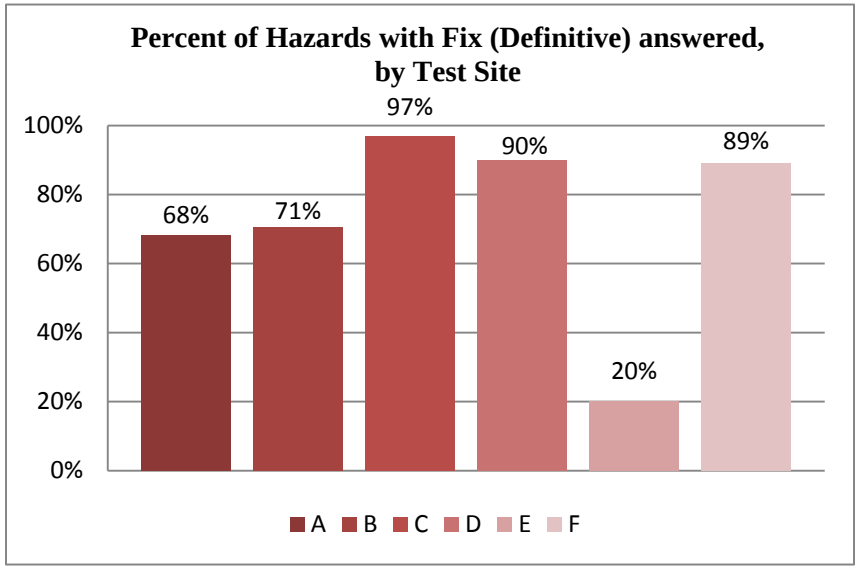


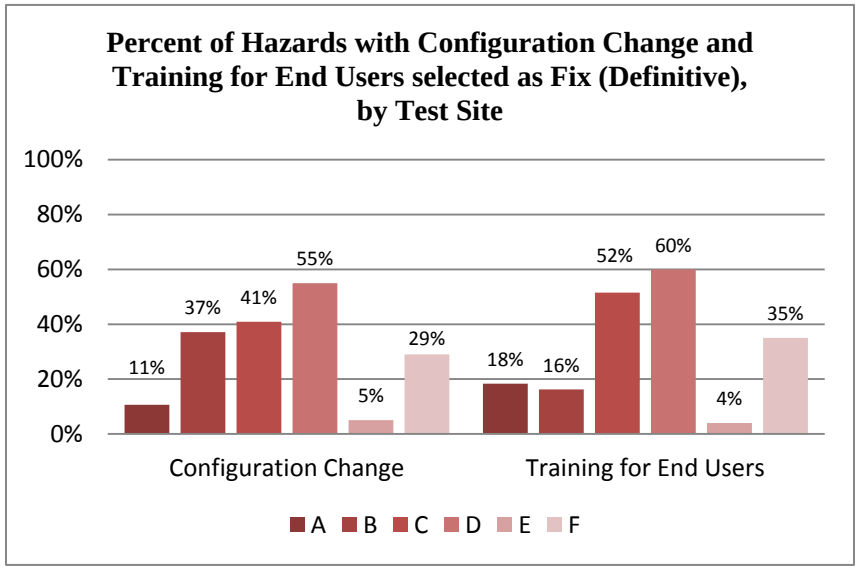


Table: Vetting and Resolution Page – Results of Descriptive Analysis

Vetting/Resolution Lists	Department Options	Selected
Responsible for Vetting: Selected: 83.8% (n=415) User Skipped: 16.2% (n=80) System Skipped: n/a	**Out of 415 hazards with "Responsible for Vetting" answered, the following options were selected:** ***(Multiple selections possible)***	
	Pharmacy	14.7% (n=61)
	Medical Records	10.8% (n=45)
	Informatics/Human Factors	11.1% (n=46)
	Engineering	1.0% (n=4)
	Quality/Safety	12.8% (n=53)
	Clinical Leadership	34% (n=141)
	Local IT	84.6% (n=351)
	HIT Vendor	35.2% (n=146)
	Risk Management	5.8% (n=24)
	Legal Department	3.1% (n=13)
	Laboratory	2.2% (n=9)
	Radiology	1.7% (n=7)
	Regulatory Agency	0.7% (n=3)
	Reimbursement Agency	0.2% (n=1)

Table: Vetting and Resolution Page – Results of Descriptive Analysis

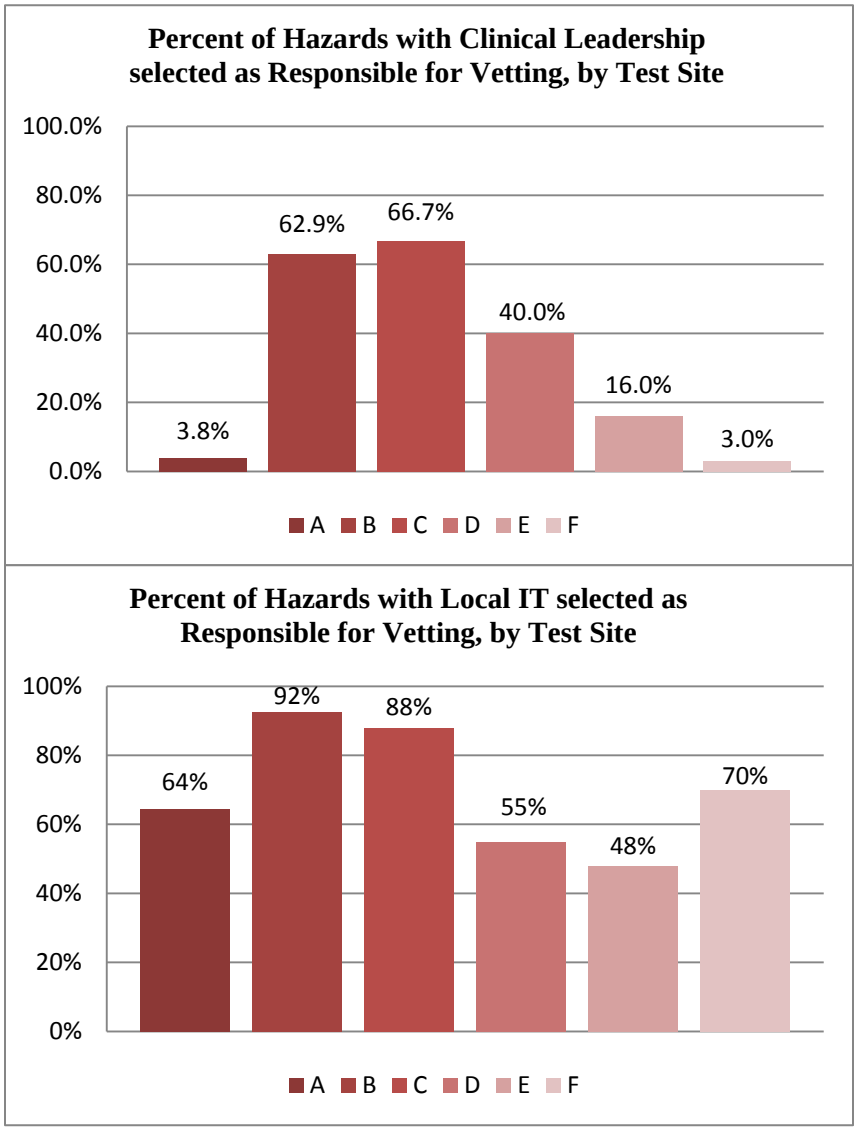
Vetting/Resolution Lists	Department Options	Selected
	End-User	23.4% (n=97)
	User Community	0.7% (n=3)
	Other	2.2% (n=9)
Responsible for Hazard Mitigation: Selected: 84.9% (n=420) User Skipped: 15.1% (n=75) System Skipped: n/a	**Out of 420 hazards with "Responsible for Hazard Mitigation" answered, the following options were selected:** ***(Multiple selections possible))***	
	Pharmacy	11.2% (n=47)
	Medical Records	9.3% (n=39)
	Informatics/Human Factors	10% (n=42)
	Engineering	0.7% (n=3)
	Quality/Safety	9.5% (n=40)
	Clinical Leadership	73.1% (n=307)
	Local IT	83.3% (n=350)
	HIT Vendor	35% (n=147)
	Risk Management	4.5% (n=19)
	Legal Department	2.1% (n=9)

Table: Vetting and Resolution Page – Results of Descriptive Analysis

Vetting/Resolution Lists	Department Options	Selected
	Laboratory	1.7% (n=7)
	Radiology	1.7% (n=7)
	Regulatory Agency	0.5% (n=2)
	Reimbursement Agency	0.2% (n=1)
	End-User	22.9% (n=96)
	User Community	0
	Other	1.9% (n=8)

Table: Vetting and Resolution Page – Results of Descriptive Analysis

To understand whether variation existed between test sites in terms of selecting Vetting & Resolution options, Resolution & Vetting options most frequently selected in the Hazard Manager were graphed by test site using the total number of hazards within a site as the denominator.



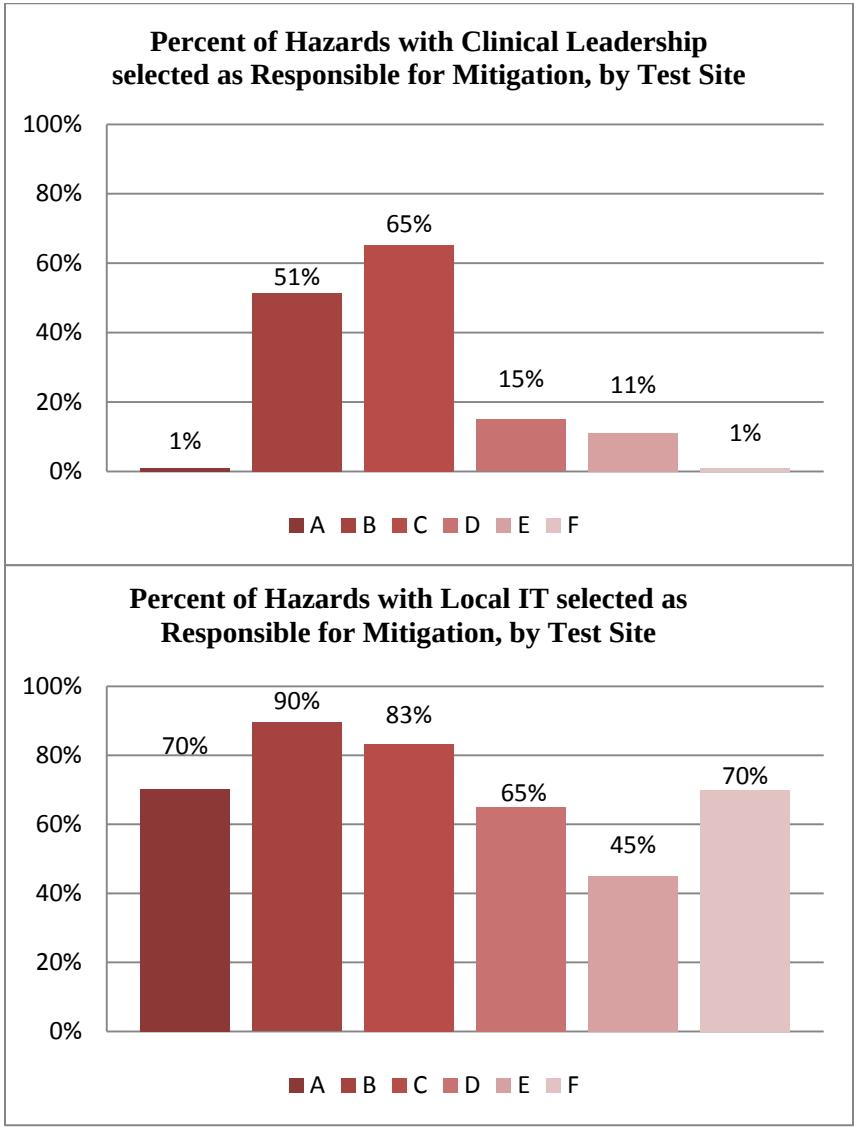


Table: Vetting and Resolution Page – Results of Descriptive Analysis