

VA Traumatic Brain Injury Veterans Health Registry Report

*Cumulative from 1st Qtr FY 2002 through 4th Qtr FY 2013
(October 2001 through September 2013)*

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Authors:

Gale G Whiteneck, PhD¹; Jeffrey P Cuthbert, PhD, MPH, MS¹; David C Mellick, MA¹



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Executive Summary

At the direction of Congress, the Department of Veterans Affairs (VA) maintains the VA Traumatic Brain Injury (TBI) Veterans Health Registry that includes information about Veterans who served in Operation Enduring Freedom (OEF), Operation Iraqi Freedom (OIF), or Operation New Dawn (OND), who exhibit symptoms associated with TBI and seek care or benefits from the VA. From October 2001 through September 2013, a total of 221,895 Veterans have entered the VA TBI Veterans Health Registry.

Veterans in the VA TBI Veterans Health Registry are captured by any one or combination of three methods: 1) the VA TBI Screen, 2) diagnostic codes in electronic medical records (EMR), and 3) the disability benefit file. The majority of VA TBI Veterans Health Registry cases (84%) have been identified through the VA TBI Screen which is administered when OEF/OIF/OND Veterans seek VA health care: 143,913 (65%) answered four screening questions affirmatively, indicating they were exposed to a traumatic event and experienced a loss or alteration of consciousness as well as symptoms associated with TBI which remained present at the time of the screen; an additional 41,524 (19%) reported during the screen that they had already been diagnosed as having a TBI during OEF/OIF/OND deployment. EMR with TBI diagnoses identified 114,322 (52%) Veterans. This group was hospitalized 11,208 times and was seen 600,019 times as outpatients where a TBI diagnosis appeared in the visit record. The disability claim files identified 77,665 (35%) Veterans. Of these cases filing TBI related claims, 44% (33,949) were determined to be non-service connected, 51% (39,392) were adjudicated to receive less than a 50% benefit, and 6% (4,324) receive a benefit of 50% or more. About half of Registry cases are identified by multiple methods.

A total of 727,731 Veterans have taken the VA TBI screen and 25% have qualified for the VA TBI Veterans Health Registry. Compared to those taking the screen who did not qualify for the VA TBI Veterans Health Registry, those included in the Registry were more likely to be male, younger, white or Hispanic, in the Marines or Army, active duty, and enlisted.

Those with four positive responses to the TBI Screen are offered a comprehensive clinical evaluation to diagnose their symptoms and to develop a plan of care. To date, 108,942 Veterans have a complete VA TBI Screen and Clinical Evaluation File (CEF). Of those, the CEF has confirmed TBI in 61% of the cases, ruled out TBI in 35%, and been inconclusive in 5%. Of those with a CEF confirming TBI, 77% report blast injuries, 52% report loss of consciousness, and 40% report posttraumatic amnesia. Based on these indicators, 81% are classified as having mild TBI, 9% moderate TBI, and 6% severe TBI.

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Background of the TBI Veterans Health Registry: Considered for inclusion in the registry are Veterans who

- Served as a member of the Armed Forces in Operation Enduring Freedom (OEF), Operation Iraqi Freedom (OIF), or Operation New Dawn (OND) since the beginning of OEF on October 7, 2001; and,
- Exhibit symptoms associated with TBI, as determined by the Secretary of the VA; and
- Apply for care and services furnished by the VA under chapter 17 of title 38, United States Code; or,
- File a claim for compensation under chapter 11 of such title on the basis of any disability which may be associated with TBI as a result of such service.

Veterans fitting this definition are considered registry cases, which include cases identified through the VA TBI Screen, disability claims data processed by the Veterans Benefits Administration, or electronic medical record review. Cases designated as TBI within the VA TBI Registry must have at least one of the following: (1a.) a complete VA TBI Screen, in which the Veteran reports a history of TBI diagnosis during OEF/OIF/OND deployment or (1b.) a complete VA TBI Screen in which the Veteran responds positively to all four VA TBI Screen questions; (2) a VBA disability claim that includes a claim code for TBI; and/or (3) an electronic medical record that includes an ICD-9-CM diagnosis code of TBI (as defined by VA TBI Case finding procedures).

Table 1. Case Composition of the VA TBI Health Registry, October 2001-September 2013¹

	Method of Determination			
	Total Unique Registry Cases (May Meet Multiple Inclusion Criteria)	Registry Cases Identified by VA TBI Screen ²	VBA Disability Claim File with a TBI Claim Code ³	VA Medical Record with an ICD-9-CM VA/DOD Case Finding Code of TBI ⁴
VA TBI Registry Cases	221,895	185,437	77,665	114,322

¹Results of VA TBI Screens and VBA disability claims available since April 2007 and January 2007, respectively.

²Includes Veterans with a complete VA TBI Screen, in which the Veteran reports that they have already been diagnosed as having TBI during OEF/OIF/OND deployment or in which the person responds positively to all four VA TBI Screen questions.

³Includes individuals with a VBA disability claim that includes a claim code for TBI (8045).

⁴A medical record that includes at least one ICD-9-CM code of TBI; including 800 – 801.99 (skull fractures, vault and base), 803 – 804.99 (other skull fractures), 850 – 854.19 (concussion/intracranial injury), 950.1 – 950.3 (optic nerve injuries), 959.01 (unspecified head injury), 310.2 (post-concussion syndrome), 905.0 (late effects of fracture of skull and face bones), and 907.0 (late effects of intracranial injury without mention of skull fracture). ICD-9 codes 959.9 (brain injury traumatic NEC) and V15.52 (personal history of TBI) are also included after 10/1/2009.

Table 2. Veterans Completing VA TBI Screen and Screen Results, April 2007- September 2013

	Total Veterans with a Complete VA TBI Screen	Registry Cases Identified by VA TBI Screen ¹	Report of a Prior Diagnosis of TBI during OEF/OIF/OND Deployment on VA TBI Screen ²	Four Positive Responses to VA TBI Screen ²
Number of Individuals with a VA TBI Screen	727,731	185,437	41,524	143,913

¹Includes Veterans with a report of previous TBI during OEF/OIF/OND or four positive responses to VA TBI Screen

²Veterans with multiple VA TBI Screens are categorized by their first identification of TBI

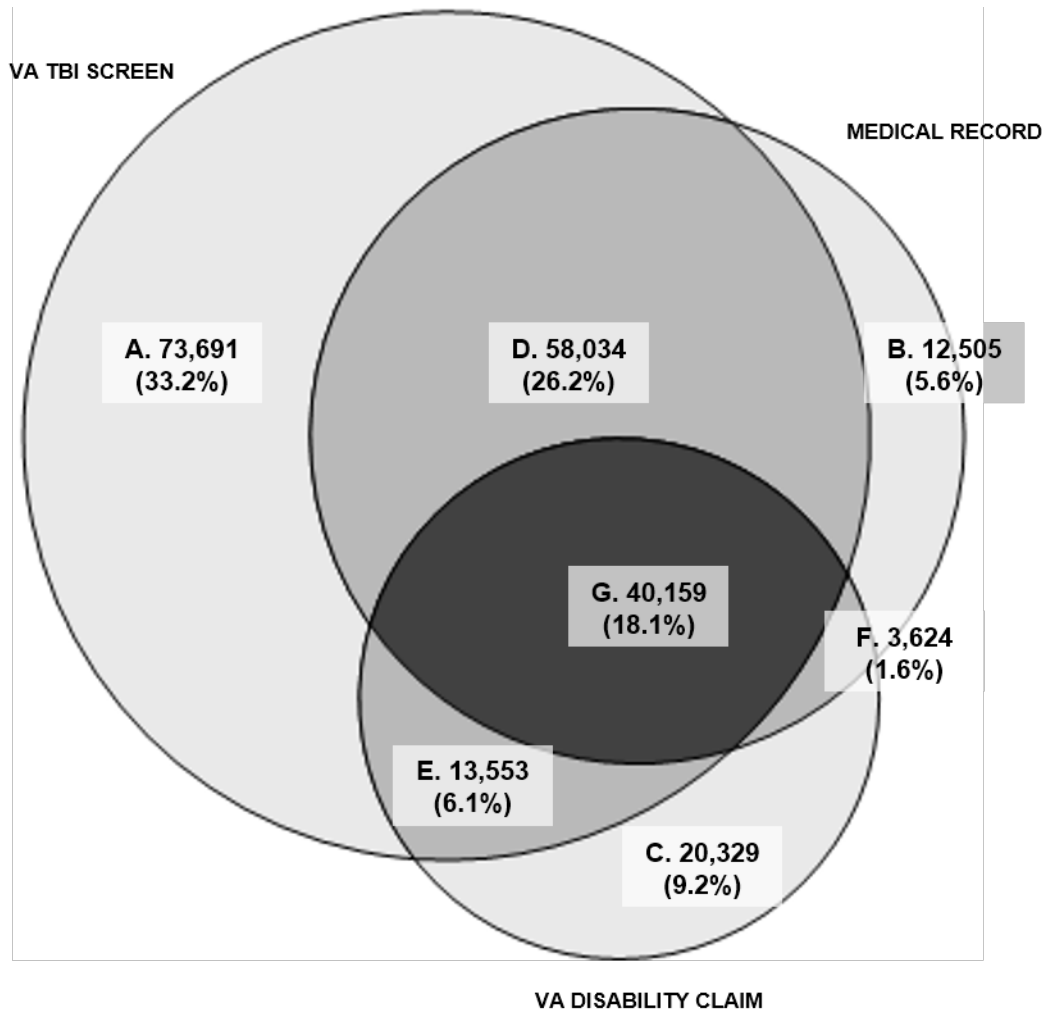
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Case Composition of the VA TBI Registry by Method(s) of Entry, October 2001- September 2013

Total N =221,895

LEGEND

- A:** Cases identified only by the VA TBI screen
(n =73,691; 33.2%)
- B:** Cases identified only by TBI ICD-9-CM Code within Electronic Medical Record (EMR)
(n = 12,505; 5.6%)
- C:** Cases identified only by inclusion of a TBI code in VBA disability claim
(n = 20,329; 9.2%)
- D:** Case Identified by the VA TBI screen and ICD-9-CM code in the EMR
(n =58,034; 26.2%)
- E:** Case Identified by the VA TBI screen and a TBI code in a VBA disability claim
(n = 13,553; 6.1%)
- F:** Case Identified by a TBI ICD-9-CM Code within the EMR and inclusion of a TBI code in a VBA disability claim (n = 3,624; 1.6%)
- G:** Case Identified by the VA TBI screen, a TBI ICD-9-CM Code within EMR and inclusion of a TBI code in a VBA disability claim
(n = 40,159; 18.1%)



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Table 3. Demographic & Military Characteristic Comparisons of Veterans completing the VA TBI Screen, April 2007- September 2013

		Total Number of Veterans Who Have Completed the VA TBI Screen	
		Total Sample ¹	
Total Cases		727,731	100.0%
Gender	Female	87,661	12.1%
	Male	640,006	87.9%
	Unknown	64	0.0%
Age	<25	146,200	20.1%
	26-30	262,330	36.0%
	31-40	165,161	22.7%
	>40	153,906	21.1%
	Unknown	134	0.0%
Race/Ethnicity	White	431,107	59.2%
	Black	98,271	13.5%
	Hispanic	79,057	10.9%
	Other	37,009	5.1%
	Unknown	82,287	11.3%
Service Branch	Army	459,276	63.1%
	Coast Guard	829	0.1%
	Air Force	71,026	9.8%
	Marines	107,101	14.7%
	Navy	89,499	12.3%
Component	Active	414,836	57.0%
	Reserve/Guard	312,895	43.0%
Rank	Enlisted	677,409	93.1%
	Officer ²	50,322	6.9%

¹Percentages are column percentages

²Includes Commissioned and Warrant Officers

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Table 4. Demographic & Military Characteristic Comparisons of Veterans completing the VA TBI Screen by Result, April 2007-September 2013

	I. Veterans Excluded by Results of VA TBI Screen		II. VA TBI Registry Cases - Identified by VA TBI Screen ¹		III. VA TBI Registry Cases - Self Report Previous TBI Diagnosis		IV. VA TBI Registry Cases – Four positive Responses to TBI Screen	
	Subset of Table 3 ²		Subset of Table 3 ²		Subset of Column II ³		Subset of Column II ³	
Total Cases	542,294	74.5%	185,437	25.5%	41,524	22.4%	143,913	77.6%
Gender								
Female	76,065	86.8%	11,596	13.2%	2,593	22.4%	9,003	77.6%
Male	466,193	72.8%	173,813	27.2%	38,922	22.4%	134,891	77.6%
Unknown	36	56.3%	28	43.8%	9	32.1%	19	67.9%
Age								
<25	105,552	72.2%	40,648	27.8%	9,545	23.5%	31,103	76.5%
26-30	189,329	72.2%	73,001	27.8%	15,717	21.5%	57,284	78.5%
31-40	122,787	74.3%	42,374	25.7%	9,742	23.0%	32,632	77.0%
>40	124,539	80.9%	29,367	19.1%	6,505	22.2%	22,862	77.8%
Unknown	87	64.9%	47	35.1%	15	31.9%	32	68.1%
Race/Ethnicity								
White	318,843	74.0%	112,264	26.0%	26,662	23.7%	85,602	76.3%
Black	77,360	78.7%	20,911	21.3%	3,941	18.8%	16,970	81.2%
Hispanic	58,013	73.4%	21,044	26.6%	4,344	20.6%	16,700	79.4%
Other	29,903	80.8%	7,106	19.2%	1,475	20.8%	5,631	79.2%
Unknown	58,175	70.7%	24,112	29.3%	5,102	21.2%	19,010	78.8%
Service Branch								
Army	325,833	70.9%	133,443	29.1%	30,665	23.0%	102,778	77.0%
Coast Guard	738	89.0%	91	11.0%	24	26.4%	67	73.6%
Air Force	64,132	90.3%	6,894	9.7%	1,431	20.8%	5,463	79.2%
Marines	73,289	68.4%	33,812	31.6%	7,371	21.8%	26,441	78.2%
Navy	78,302	87.5%	11,197	12.5%	2,033	18.2%	9,164	81.8%
Component								
Active	296,054	71.4%	118,782	28.6%	28,268	23.8%	90,514	76.2%
Reserve/Guard	246,240	78.7%	66,655	21.3%	13,256	19.9%	53,399	80.1%
Rank								
Enlisted	498,516	73.6%	178,893	26.4%	39,764	22.2%	139,129	77.8%
Officer ⁴	43,778	87.0%	6,544	13.0%	1,760	26.9%	4,784	73.1%

¹For Veterans with multiple VA TBI Screens, the first screen resulting in inclusion as a VA TBI Health Registry case is used

²Percentages are row percentages of Table 3

³Percentages are row percentages of Column II

⁴Includes Commissioned and Warrant Officers

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Table 5. Summary of Subsequent Clinical Evaluation Results for VA TBI Screen Positive Cases, April 2007- September 2013

	Total Veterans with a Complete Screen & CEF ¹	Clinical Confirmation of OEF/OIF/OND Deployment Related TBI	Clinical Evaluation Ruled Out TBI (Signs and Symptoms Not Indicative of TBI)	Clinical Evaluation Results 'Unknown' (No Designation of Signs and Symptoms)
VA TBI Health Registry Cases Identified by the VA TBI Screen With A Follow-Up TBI Clinical Evaluation Form (CEF)	108,942	65,930 (60.5%)	37,764 (34.7%)	5,248 (4.8%)

¹Additional TBI-related clinical evaluation is offered to all Veterans who screen positive; however, not all people who screen positive undertake evaluation.

Table 6. Detailed Summary of Clinical Evaluation Results for Veterans Identified as having a TBI by the VA TBI Screen and a Confirmed TBI diagnosis by the VA Clinical Evaluation (N =62,713), April 2007- September 2013

Number of Specific Injury Events Reported¹										
Etiology of Injury	None		One		Two or More		Missing			
Bullet Injuries	63,458	96.3%	1,422	2.2%	967	1.5%	83	0.1%		
Fall Injuries	48,603	73.7%	10,998	16.6%	5,880	8.9%	489	0.8%		
Blast Injuries	13,403	20.3%	18,714	28.4%	32,088	48.7%	1,725	2.6%		
Vehicular Injuries	49,798	75.5%	10,008	15.2%	5,701	8.6%	423	0.6%		
Number of Etiologies Reported										
	None		One		Two or More		Missing			
Number of Injury Etiologies Reported	2,886	4.4%	37,357	56.7%	25,687	38.9%	0	0.0%		
Disrupted Brain Function Reported										
Type of Disrupted Brain Function	None		One		Two or More		Uncertain ²		Missing	
Loss of Consciousness	25,522	38.6%	26,713	40.6%	7,832	11.9%	5,023	8.0%	565	0.9%
Alteration of Consciousness	4,440	6.8%	34,526	52.1%	22,237	35.5%	2,502	4.0%	1,090	1.7%
Posttraumatic Amnesia	31,293	47.0%	19,811	30.2%	6,484	10.3%	6,732	10.7%	1,080	1.7%
Severity of TBI										
Most Severe Brain Injury Reported³	Mild		Moderate		Severe		Missing			
Severity	53,475	81.1%	5,618	8.5%	3,902	5.9%	2,935	4.5%		

¹Percentages presented are row percentages; categories in a row are mutually exclusive and sum to 100%

²'Uncertain' is a specific response category to questions regarding disrupted brain function, and indicates the possibility of the occurrence of these events. It does not indicate that the Veteran failed to respond to the question.

³Traumatic brain injury severity ratings are based on duration of loss of consciousness, alteration of conscious, and/or posttraumatic amnesia at the time of injury. The Clinical Evaluation relies on patient self-report obtained months to years from the date of injury, which may impact the accuracy of severity determination.

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An examination of cases identified using Veterans Benefits Administration (VBA) claim codes of TBI are provided in tables 7. The data examined for these comparisons included all cases with a VBA TBI claim code (n=77,665). This table indicates the Maximum TBI Disability Adjudication.

Table 7. Demographic and Military Characteristic Comparisons of Veterans with Claim Codes for TBI Identified in VBA Disability Claims, January 2007- September 2013

	Highest TBI Disability Adjudication ^{1,2,3}													
	Not Service Connected		0%		10%-20%		30%-40%		50%-60%		70%-90%		100%	
	Denied		Mild Disability		Definite Disability		Considerable Disability		Severe Disability		Total Disability			
Total	33,949	43.7%	9,396	12.1%	20,172	26.0%	9,824	12.6%	94	0.1%	3,619	4.7%	611	0.8%
Gender														
Female	2,197	53.1%	509	12.3%	874	21.1%	373	9.0%	8	0.2%	148	3.6%	30	0.7%
Male	31,745	43.2%	8,884	12.1%	19,294	26.2%	9,446	12.9%	86	0.1%	3,469	4.7%	581	0.8%
Unknown	7	33.3%	3	14.3%	4	19.0%	5	23.8%	0	0.0%	2	9.5%	0	0.0%
Age														
<25	8,562	53.7%	1,521	9.5%	3,570	22.4%	1,634	10.3%	15	0.1%	555	3.5%	74	0.5%
26-30	4,233	19.7%	3,671	17.1%	8,165	38.1%	3,823	17.8%	36	0.2%	1,313	6.1%	204	1.0%
31-40	5,413	33.5%	2,329	14.4%	4,759	29.5%	2,431	15.1%	22	0.1%	997	6.2%	189	1.2%
>40	1,283	13.3%	1,867	19.3%	3,667	38.0%	1,928	20.0%	21	0.2%	752	7.8%	144	1.5%
Unknown	14,458	99.8%	8	0.1%	11	0.1%	8	0.1%	0	0.0%	2	0.0%	0	0.0%
Race/Ethnicity														
White	20,857	42.5%	6,133	12.5%	13,147	26.8%	6,254	12.7%	60	0.1%	2,268	4.6%	347	0.7%
Black	3,665	50.3%	801	11.0%	1,592	21.9%	837	11.5%	9	0.1%	324	4.4%	58	0.8%
Hispanic	3,477	41.9%	981	11.8%	2,178	26.3%	1,108	13.4%	16	0.2%	448	5.4%	87	1.0%
Other	1,279	44.0%	342	11.8%	737	25.3%	371	12.8%	4	0.1%	145	5.0%	31	1.1%
Unknown	4,671	46.2%	1,139	11.3%	2,518	24.9%	1,254	12.4%	5	0.0%	434	4.3%	88	0.9%
Service Branch														
Army	23,521	43.9%	6,440	12.0%	13,955	26.1%	6,670	12.5%	64	0.1%	2,441	4.6%	433	0.8%
Coast Guard	16	42.1%	3	7.9%	12	31.6%	5	13.2%	0	0.0%	2	5.3%	0	0.0%
Air Force	2,010	55.6%	488	13.5%	684	18.9%	296	8.2%	7	0.2%	105	2.9%	27	0.7%
Marines	6,073	38.6%	1,841	11.7%	4,394	27.9%	2,389	15.2%	19	0.1%	910	5.8%	114	0.7%
Navy	2,329	49.1%	624	13.1%	1,127	23.7%	464	9.8%	4	0.1%	161	3.4%	37	0.8%
Component														
Active	22,785	41.5%	7,216	13.2%	14,531	26.5%	7,187	13.1%	66	0.1%	2,667	4.9%	410	0.7%
Reserve/Guard	11,164	49.0%	2,180	9.6%	5,641	24.7%	2,637	11.6%	28	0.1%	952	4.2%	201	0.9%
Rank														
Enlisted	31,964	43.5%	8,802	12.0%	19,156	26.1%	9,360	12.8%	91	0.1%	3,452	4.7%	578	0.8%
Officer ⁴	1,985	46.6%	594	13.9%	1,016	23.8%	464	10.9%	3	0.1%	167	3.9%	33	0.8%

¹If multiple adjudications occur, the adjudication with the highest percentage of TBI disability is reported

²Adjudication percentages fall between 0 and 100 and are only assigned in multiples of 10

³Percentages presented are row percentages

⁴Includes Commissioned and Warrant Officers

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Table 8. VA TBI Health Registry Cases Identified by Electronic Medical Record Review by Veterans Integrated Service Network (VISN), October 2001- September 2013

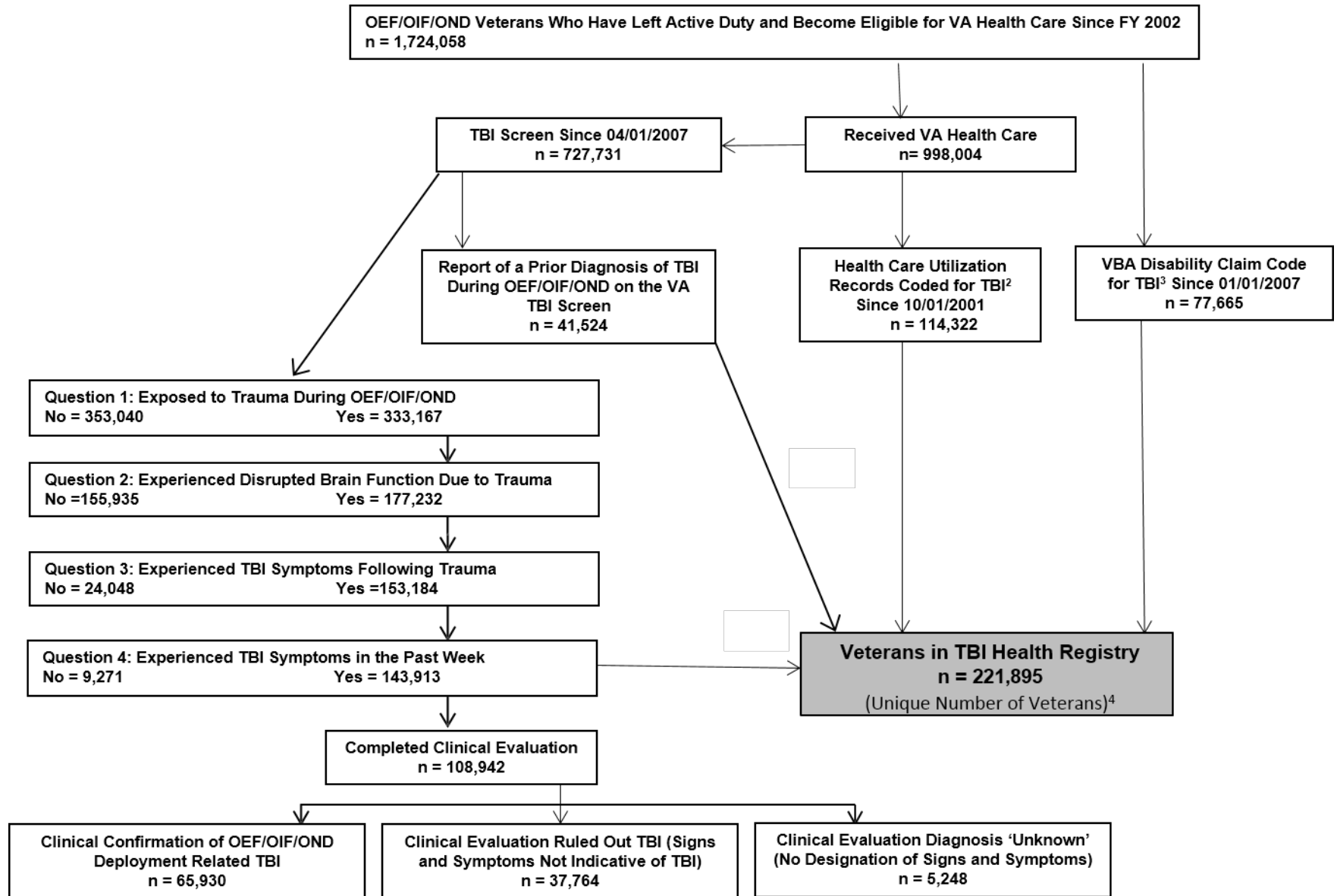
	Number of Veterans ¹				Number of Visits ¹			
	Any Diagnosis of TBI ² Inpatient Visits		Any Diagnosis of TBI ² Outpatient Visits		Any Diagnosis of TBI ² Inpatient Visits		Any Diagnosis of TBI ² Outpatient Visits	
Total Veterans/Visits per VISN	7,610	100.0%	112,963	100.0%	11,208	100.0%	600,019	100.0%
VISN 1. VA New England Healthcare System	459	6.0%	4,751	4.2%	806	7.2%	27,940	4.7%
VISN 2. VA Healthcare Network Upstate New York	124	1.6%	2,300	2.0%	187	1.7%	9,861	1.6%
VISN 3. VA New York/New Jersey Healthcare System	157	2.1%	2,812	2.5%	240	2.1%	15,444	2.6%
VISN 4. VA Stars & Stripes Healthcare System	260	3.4%	5,400	4.8%	368	3.3%	30,101	5.0%
VISN 5. VA Capitol Health Care System	82	1.1%	2,085	1.8%	151	1.3%	17,914	3.0%
VISN 6. VA Mid-Atlantic Healthcare System	745	9.8%	6,415	5.7%	1,022	9.1%	33,064	5.5%
VISN 7. VA Southeast Network	405	5.3%	6,290	5.6%	584	5.2%	33,894	5.6%
VISN 8. VA Sunshine Healthcare Network	890	11.7%	8,311	7.4%	1,293	11.5%	53,104	8.9%
VISN 9. VA Mid-South Healthcare Network	290	3.8%	5,756	5.1%	389	3.5%	37,079	6.2%
VISN 10. VA Healthcare System of Ohio	243	3.2%	4,015	3.6%	388	3.5%	26,471	4.4%
VISN 11. Veterans in Partnership Healthcare Network	189	2.5%	3,739	3.3%	276	2.5%	16,236	2.7%
VISN 12. VA Great Lakes Health Care System	366	4.8%	4,927	4.4%	594	5.3%	23,600	3.9%
VISN 15. VA Heartland Network	261	3.4%	4,025	3.6%	373	3.3%	24,685	4.1%
VISN 16. South Central VA Health Care Network	548	7.2%	9,649	8.5%	757	6.8%	36,350	6.1%
VISN 17. VA Heart of Texas Health Care Network	261	3.4%	6,847	6.1%	387	3.5%	25,666	4.3%
VISN 18. VA Southwest Healthcare Network	259	3.4%	5,756	5.1%	385	3.4%	27,171	4.5%
VISN 19. VA Rocky Mountain Network	321	4.2%	4,870	4.3%	493	4.4%	26,998	4.5%
VISN 20. VA Northwest Network	431	5.7%	5,732	5.1%	647	5.8%	25,031	4.2%
VISN 21. VA Sierra Pacific Network	508	6.7%	4,794	4.2%	694	6.2%	22,636	3.8%
VISN 22. VA Desert Pacific Healthcare Network	358	4.7%	9,157	8.1%	538	4.8%	52,582	8.8%
VISN 23. VA Midwest Health Care Network	453	6.0%	5,332	4.7%	636	5.7%	34,192	5.7%

¹Percentages presented are column percentages

²The diagnosis of TBI was determined by review of all ICD-9-CM codes included within the record for each visit, as non-TBI diagnosis codes were frequently listed as the primary or principal diagnosis.

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APPENDIX: Flowchart of OEF/OIF/OND Veterans Entering the Veterans TBI Health Registry¹, October 2001- September 2013



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Footnotes for Flowchart on Previous Page (8)

¹Cumulative from 10/7/2001 - 9/30/2013.

²ICD-9-CM codes included 800 – 801.99 (skull fractures, vault and base), 803 – 804.99 (other skull fractures), 850 – 854.19 (concussion/intracranial injury), 950.1 – 950.3 (optic nerve injuries), 959.01 (unspecified head injury), 310.2 (post-concussion syndrome), 905.0 (late effects of fracture of skull and face bones), and 907.0 (late effects of intracranial injury without mention of skull fracture). ICD-9-CM codes 959.9 (brain injury traumatic NEC) and V15.52 (personal history of TBI) are also included after 10/1/2009.

³VBA diagnostic claim code 8045.

⁴As Veterans were able to enter the TBI Health Registry from numerous pathways, this total indicates the number of unique Veterans entering from any entry pathway or combination of pathways.