



Final Report for HSR&D QUERI Project PLY 05-184-1

Project Title: Location of and Potential Gaps in Rehabilitation Services for OEF/OIF Veterans:
FY03-FY06

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Disclaimer: This report presents the findings and conclusions of the investigative team and does not necessarily represent those of the Department of Veterans Affairs, Veterans Health Administration, Office of Research and Development, Health Services Research and Development Service or the Polytrauma and Blast-Related Injury QUERI.

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ABSTRACT

Project Title: Location of and Potential Gaps in Rehabilitation Services for OEF/OIF Veterans: FY03-FY06

Project Description/Background: Rehabilitation services are especially important in the VA today given that OEF/OIF veterans are returning with service-connected traumatic brain dysfunction, traumatic spinal cord dysfunction, traumatic amputation, vision impairment, orthopedic disorders, burns and/or polytrauma injury. Despite this importance, access to specialized rehabilitation services in the VA has been shrinking. Given the value of these services and the dramatic reduction in the number of specialized rehabilitation units in the VA, it becomes critically important that the remaining VA rehabilitation resources are located where there is the greatest need for such services. If new resources are added for rehabilitation services, it is equally important to locate them where they will provide the largest impact in terms of filling service gaps and unmet need.

Objectives: This study replicated two objectives from a recently completed investigator initiated research project on OEF/OIF veterans (IIR #DHI 06-010-1) by adding two fiscal years to the location and gap analysis. We followed the same methodology from the larger study to replicate the location and gap analysis for those returning veterans who used VA health care services in FY05 and FY06. These additional cohorts enhance the utility of the information for rehabilitation service planning. Specific objectives are to (1) identify a cohort of OEF and OIF combat veterans who accessed the VHA for conditions and injuries sustained while on active duty, merge the identified cohort with VHA workload data sets to obtain medical diagnoses and VA utilization patterns on these individuals, and to identify a subgroup of veterans who are potential candidates for physical medicine and rehabilitation services; and (2) ascertain veterans' access to differing levels of VHA rehabilitation and medical services offered to veterans with potential need for rehabilitation services; specifically: distance and travel time to Level I – Level IV polytrauma facilities.

Methods: The design is a retrospective, observational, cross-sectional study of a subgroup of OEF/OIF veterans who accessed the VA health care system during FY03 through FY06 and who are identified, based on their ICD-9 codes, as potential candidates for rehabilitation. Geographic Information System (GIS) tools were used to map the location of returning war fighters (patient's zip code) in relation to where VHA rehabilitation services are available (facility latitude/longitude) and identify potential gaps in services. This study relies on existing administrative data collected by the VHA on patients receiving care in the VA system.

Results: Location and gaps analyses were updated to FY06. The number of new inpatients in our traumatic injury groups was largest in FY04; however, the number of new outpatients continues to grow each fiscal year. Findings from the FY03-FY04 study regarding potential gaps in rehabilitation services found additional support by inclusion of two additional years of information. Clark County, Nevada was again found to have the largest number of patients outside of reasonable drive time and many counties identified in our earlier work continued to rank in the upper 25% of patients outside of these travel bands.

Impact/Intended Outcome: Major products from this project include a series of maps that depict the geographic access of returning OEF/OIF veterans FY03 – FY06 to differing levels of rehabilitation services. These maps in themselves are powerful vehicles to demonstrate where gaps in services are geographically located. Our results will be submitted to the Polytrauma and Blast-Related Injury QUERI and the Physical Medicine and Rehabilitation Program Office.

Project Highlights

(a) Background and Objectives

With the change in modern warfare and military operations, the injuries sustained by today's soldiers are different from past military engagements. Injuries that probably would have resulted in death in earlier combat engagements are today not as lethal due to advances in military protective gear worn by the troops. As a result of greater survival, however, the returning OEF/OIF veterans may have a greater need for rehabilitation due to residual deficits from traumatic injury, or polytrauma injury, than veterans from any other preceding period of service. Unfortunately, very little is known about access to rehabilitation services for this cohort of veterans. The purpose of this study was to examine the location of returning OEF/OIF veterans with traumatic injury who used the VHA for health care from FY03 – FY06 in relation to the location of VHA rehabilitation services. Our objective was to identify, using Geographic Information System (GIS) tools, potential gaps in rehabilitation services and to make recommendations to the Polytrauma and Blast-Related Injury QUERI and VHA Physical Medicine and Rehabilitation Program Office regarding our findings.

(b) Design and/or Methods

The design of the study is a retrospective, observational, cross-sectional study of a subgroup of OEF/OIF veterans who accessed the VA health care system during FY03 through FY06. Patients are identified, based on their diagnostic codes, as potential candidates for rehabilitation. Unique individuals make up the cohorts. In other words, if a veteran was identified in FY03 and used care again in FY04, FY05, or FY06, he/she was counted only in the FY03 cohort not in subsequent years.

The specific groups of interest in this study are veterans who have diagnostic codes that are associated with traumatic brain dysfunction, traumatic spinal cord dysfunction, traumatic amputation, vision impairment, hearing impairment, orthopedic disorders, and burns. Only veterans who received services in VHA are included. We used VHA workload data sets to obtain socio-demographics and utilization information on these individuals. The analysis employs GIS tools to map the location of returning war fighters in relation to where VHA rehabilitation services are available and identifies potential gaps in services.

The VHA Polytrauma System of Care is comprised of four Levels. Our analyses were based on reasonable access to these varying facilities. Drive time travel bands were calculated around the facilities, based on their designation of Level I-IV. Reasonable drive times were designated as: 8 hours (Level I Polytrauma Rehabilitation Center); 4 hours (Level II Polytrauma Network Site); 1 hour (Level III Polytrauma Support Clinic Team); and 30 minutes (Level IV Polytrauma Point of Contact). Our analyses are based on the premise that San Juan, which is currently proposed to move to a Level II designation, will indeed have that designation in the near future.

For the total FY03-FY06 combined inpatient and outpatient cohorts and for each impairment group, we calculated the percentage of VHA users inside and outside the drive time bands. Potential gaps in rehabilitation services are identified by summing patients located outside of the drive time bands to the county level. If the county contained more than 10 individuals, it was flagged as a potentially underserved county.

(c) Findings

1. Number of OEF/OIF Patients by Traumatic Injury Impairment Group, FY03 – FY06

Table 1 provides the number of veterans by inpatient/outpatient status for each impairment group under investigation from FY03 through FY06.

Inpatients. The inpatient trend over this time period shows a low of 134 veterans in FY03, followed by a high of 410 veterans in FY04, an annual increase of over 300%. In the two later years, VHA treated 295 and 285 new individuals in our defined patient population for FY05 and FY06 respectively.

The three largest impairment groups seeking VHA inpatient services throughout this time frame were: Traumatic Brain Dysfunction, Visual Impairment, and Hearing Impairment, although the rank-order varied somewhat across years. Veterans with Burns and veterans with Traumatic Amputation represented relatively small numbers of patients at all four time points. An interesting note is that about one quarter of the traumatically injured veterans hospitalized each year in VHA facilities had more than one, or polytrauma, injuries.

Outpatients. The number and trend for our impairment groups in using VHA outpatient services saw a similar tripling in numbers between FY03 (N=1,919) and FY04 (N=5,908) but unlike the inpatient trend, new VHA outpatients in FY05 and FY06 continued to increase. In FY05, 6,992 traumatically injured veterans began using outpatient services and in FY06, an additional 8,254 veterans in these seven impairment groups entered the VHA health care system via outpatient clinics.

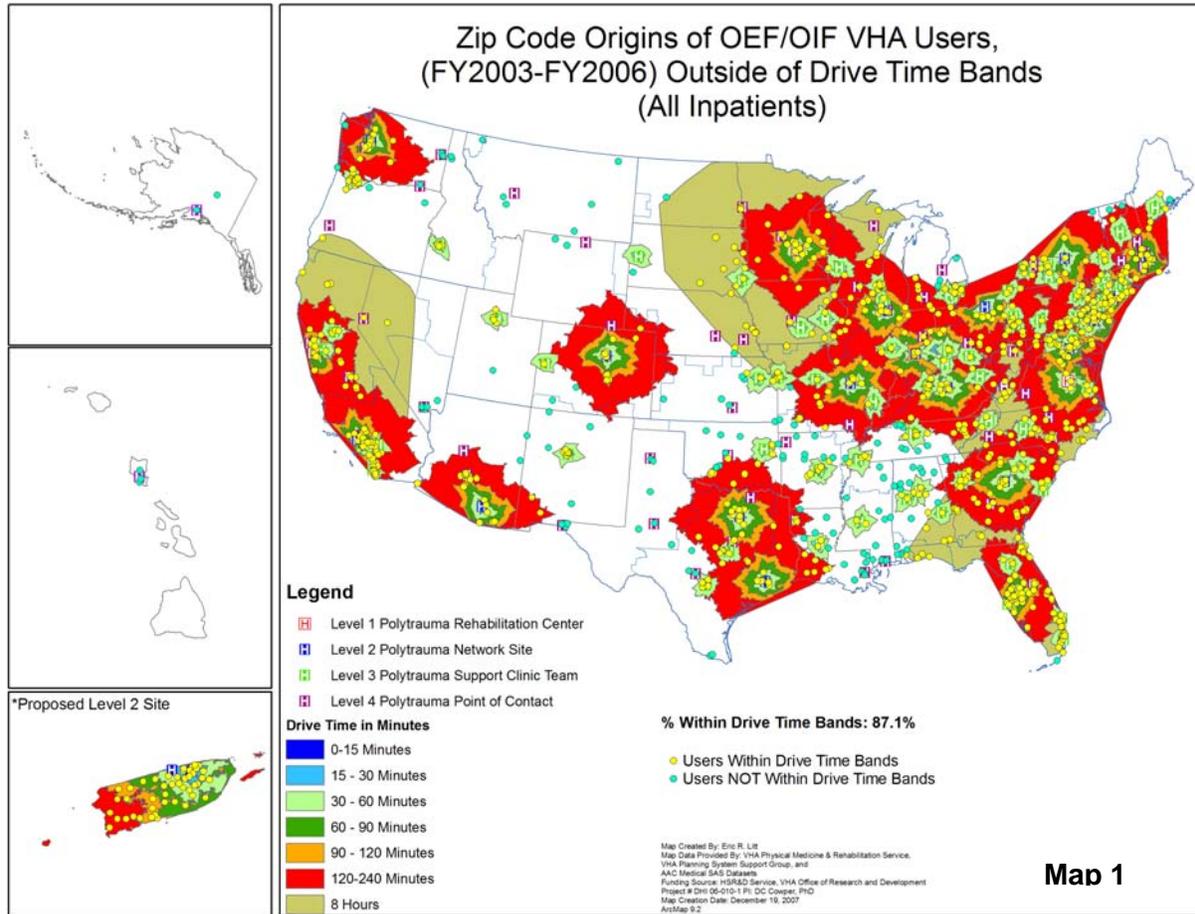
The vast majority of veterans using VHA outpatient services had one traumatic injury (95%). The most common traumatic injury for outpatient users for all years under investigation was Hearing Impairment (rank order one at all time periods), followed by Visual Impairment (rank order two at all time periods). Unlike inpatient users, Traumatic Brain Dysfunction was a less frequent impairment for outpatient users.

In summary, the OEF/OIF patients in our targeted traumatic injury subgroups are accessing the VHA primarily for outpatient services. In particular, these veterans are using VHA for the outpatient treatment of hearing and sight related injuries.

**Table 1:
Numbers of OEF/OIF Patients by Traumatic Injury Impairment Group, FY03 – FY06**

INPATIENT	FY03 N=134	FY04 N=410	FY05 N=295	FY06 N=285
<i>Impairment Group (N, %)*</i>				
Traumatic Brain Dysfunction	39 (29.1)	115 (28.1)	113 (38.3)	106 (37.2)
Open	10 (7.5)	46 (11.2)	50 (17.0)	17 (6.0)
Closed	39 (29.1)	112 (27.3)	111 (37.6)	106 (37.2)
Traumatic Spinal Cord Dysfunction	32 (23.9)	44 (10.7)	35 (11.9)	28 (9.8)
Traumatic Amputation	9 (6.7)	16 (3.9)	7 (2.4)	5 (1.8)
Burns	3 (2.2)	16 (3.9)	3 (1.0)	10 (3.5)
Visual Impairment	39 (29.1)	99 (24.2)	60 (20.3)	44 (15.4)
Orthopedic	10 (7.5)	63 (15.4)	39 (13.2)	42 (14.7)
Hearing Impairment	33 (24.6)	142 (34.6)	93 (31.5)	104 (36.5)
Number of Polytrauma Injuries				
1	101 (75.4)	319 (77.8)	220 (74.6)	220 (77.2)
2	28 (20.9)	63 (15.4)	52 (18.0)	59 (20.7)
3	2 (1.5)	20 (4.9)	17 (5.8)	6 (2.1)
4	3 (2.2)	7 (1.7)	4 (1.4)	0
5	0	1 (.24)	1 (.34)	0
OUTPATIENT	FY03 N=1,919	FY04 N=5,908	FY05 N=6,992	FY06 N=8,254
<i>Impairment Group (N, %)*</i>				
Traumatic Brain Dysfunction	84 (4.4)	234 (4.0)	292 (4.2)	336 (4.1)
Open	13 (.68)	45 (.76)	50 (.72)	26 (.3)
Closed	83 (4.3)	232 (3.9)	290 (4.2)	334 (4.1)
Traumatic Spinal Cord Dysfunction	48 (2.5)	77 (1.3)	63 (.9)	64 (.8)
Traumatic Amputation	24 (1.3)	78 (1.3)	99 (1.4)	94 (1.1)
Burns	58 (3.0)	110 (1.9)	114 (1.6)	109 (1.3)
Visual Impairment	587 (30.6)	1,600 (27.1)	1,396 (20.0)	1,620 (19.6)
Orthopedic	100 (5.3)	305 (5.2)	271 (3.9)	307 (3.7)
Hearing Impairment	1,115 (58.1)	3,865 (65.4)	5,051 (72.2)	6,091 (73.8)
Number of Polytrauma Injuries				
1	1,820 (94.8)	5,553 (94.0)	6,681 (95.6)	7,882 (95.5)
2	92 (4.8)	317 (5.4)	286 (4.1)	353 (4.3)
3	4 (.21)	28 (.47)	20 (.3)	19 (.23)
4	3 (.16)	9 (.15)	4 (.06)	0
5	0	1 (.02)	1 (.01)	0

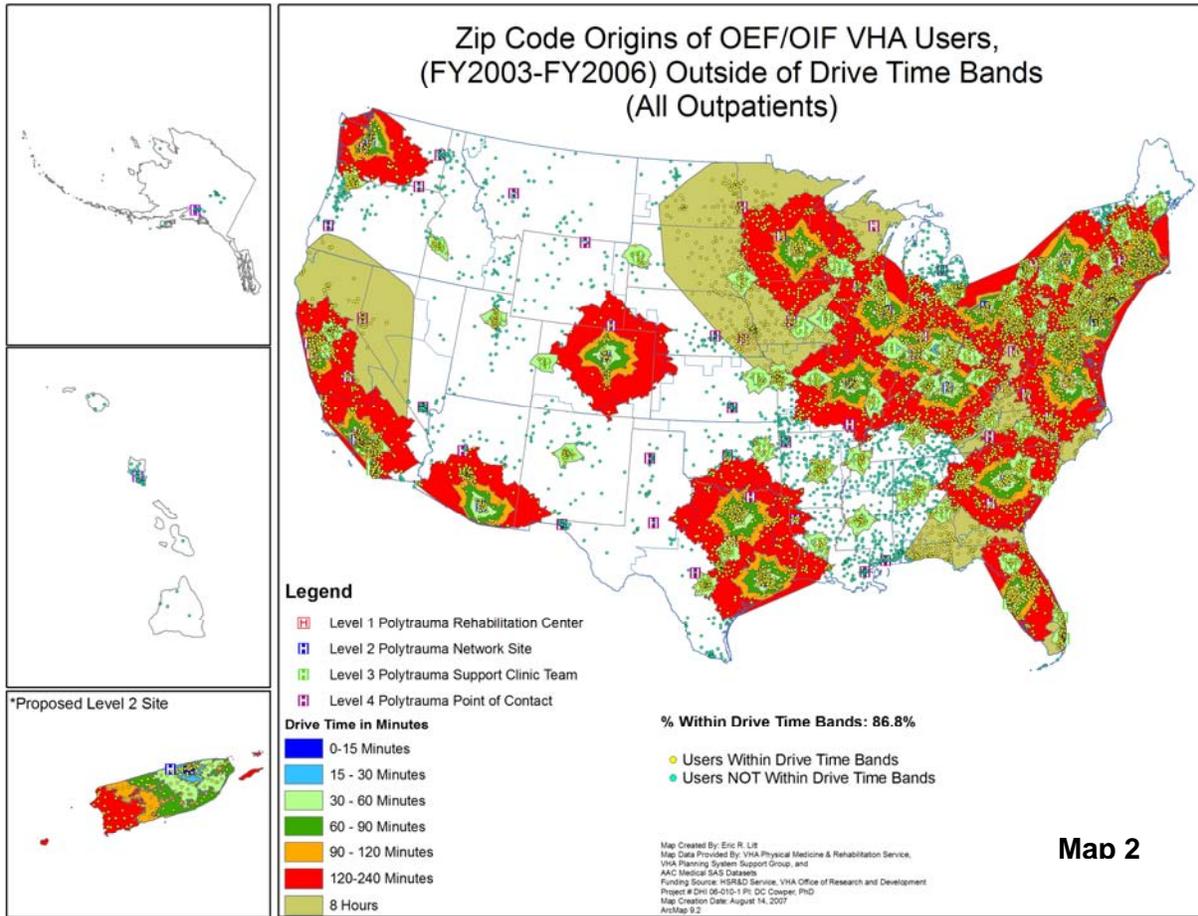
2. Location of All Inpatients, FY03-FY06



Map 1 shows the ZIP code locations of OEF/OIF inpatient users of VHA facilities from FY03-FY06 in relation to the location of the VHA Polytrauma System of Care. Drive time bands around the facilities represent reasonable drive times to rehabilitation services. ZIP codes in yellow represent areas within reasonable drive time; ZIP codes in turquoise represent areas of potential access gaps.

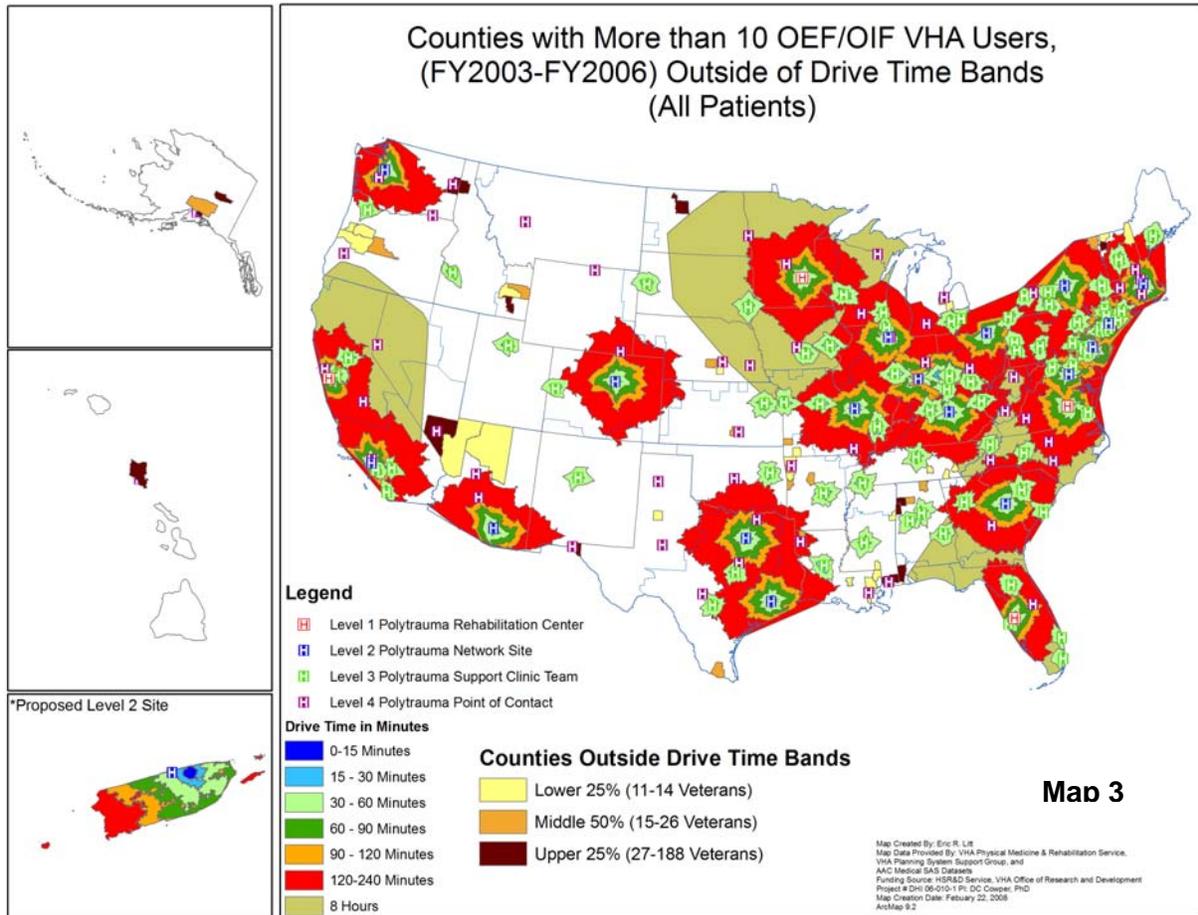
Overall, almost ninety percent (87.1%) of our traumatic injury subgroup inpatients resided in areas within reasonable drive time to rehabilitation services.

3. Location of All Outpatients, FY03-FY06



Map 2 replicates the inpatient location and gap analyses for our traumatically injured subgroups that used VHA outpatient services. Similar to the results reported for inpatients, the VHA provided reasonable drive time access to approximately ninety percent (86.8%) of outpatients.

4. Potential Gaps in Rehabilitation Service



For the total FY03-FY06 combined inpatient and outpatient cohorts and for each impairment group, we calculated the percentage of VHA users inside and outside the drive time bands. Potential gaps in rehabilitation services are identified by summing patients located outside of the drive time bands to the county level. If the county contained more than 10 individuals, it was flagged as a potentially underserved county. Map 3 graphically displays the results of this county-level aggregation. For those counties meeting the “access gap” criterion, we identified the top ranked 25%, middle ranked 50%, and lower ranked 25% and assigned different colors to the counties to indicate which quantile they belonged. This information, along with the range of those quantiles, is displayed in Map 3.

Counties in the Upper 25% quantile of all counties with more than 10 veterans are, in rank order:

COUNTY NAME	VISN	STATE	Count
CLARK	22	Nevada	188
HONOLULU	21	Hawaii	93
ANCHORAGE	20	Alaska	86
EL PASO	18	Texas	73
HARRISON	16	Mississippi	65

MOBILE	16	Alabama	63
WARD	23	North Dakota	47
JACKSON	16	Mississippi	40
SPOKANE	20	Washington	35
KOOTENAI	20	Idaho	32
CHITTENDEN	1	Vermont	31
MARION	7	Alabama	30
FAIRBANKS NORTH STAR	20	Alaska	29
BANNOCK	19	Idaho	29
LAMAR	7	Alabama	27

(d) Discussion and Implications

Rehabilitation services are important in the VHA today for returning OEF/OIF service personnel with traumatic injury. Many of these veterans will be disabled throughout their lifetime and will rely on VHA to provide them care. Despite this importance, access to specialized rehabilitation services in the VHA has been shrinking. OEF/OIF veterans may face obstacles in obtaining access to rehabilitation services that could potentially affect their outcomes. For example, access to specialized care may be more difficult to obtain depending on the geographic distance of the patient to a treatment site. Given the value of these services and the dramatic reduction in the number of specialized rehabilitation units in the VHA, it becomes critically important that the rehabilitation resources are located where there is the greatest need for such services. If new resources are added for rehabilitation services, it is equally important to locate them where they will provide the largest impact in terms of filling service gaps and unmet need. Our research developed a methodology to assess geographic accessibility to rehabilitation services for OEF/OIF veterans with traumatic injury by employing Geographic Information System tools. By using our technique, planners and policy makers can easily discern where rehabilitation services may be needed. Obviously, there are myriad considerations in where to locate services including staffing and other capacity issues, but our work can provide a critical starting place for these decisions.

(e) Recommendations to Polytrauma and Blast-Related Injury QUERI.

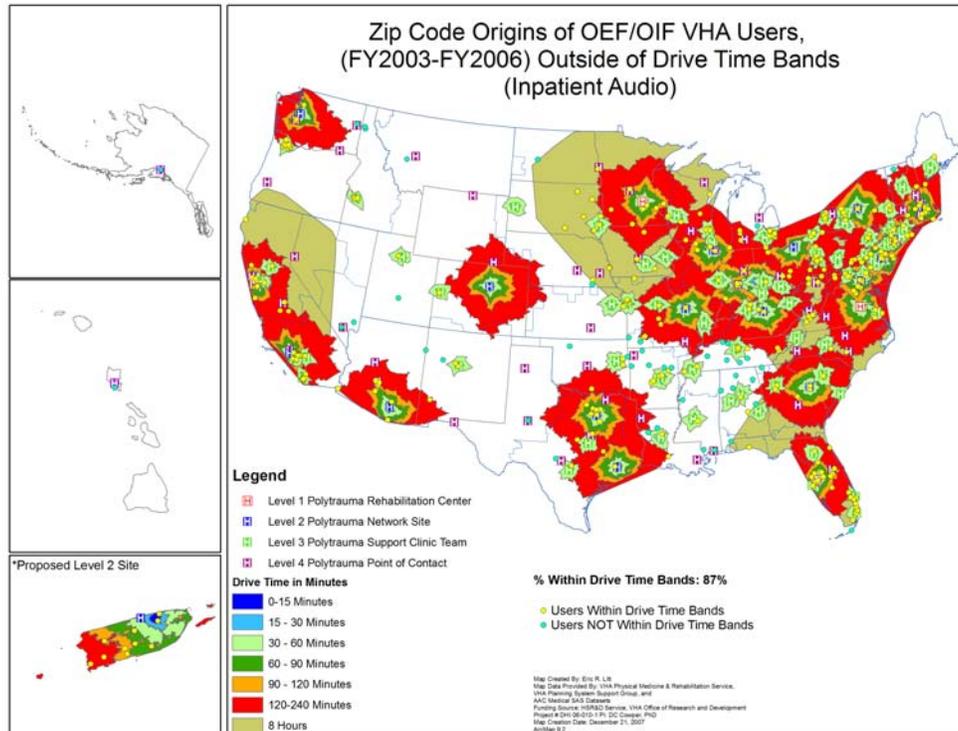
Based on the findings from this LIP, two specific recommendations are presented that may help decrease access barriers for traumatically injured OEF/OIF veterans in the future:

1. For counties with potential gaps, as evidenced by more than 10 individuals outside of reasonable drive times to rehabilitation services, an inventory of VHA facilities in or near the county should be created, along with the number and types of rehabilitation staff.
 - Based on the number of patients outside reasonable drive time, the rehabilitation capacity of VHA facilities in a county, and other community resources available, sites should be rank-ordered in terms of priority for rehabilitation level upgrades;
 - These priority ranked facilities should be forwarded to the Physical Medicine and Rehabilitation Program Office, Patient Care Services.
2. The residential location of traumatically injured OEF/OIF veterans should be monitored on at least an annual basis to identify additional areas with potential rehabilitation service gaps.

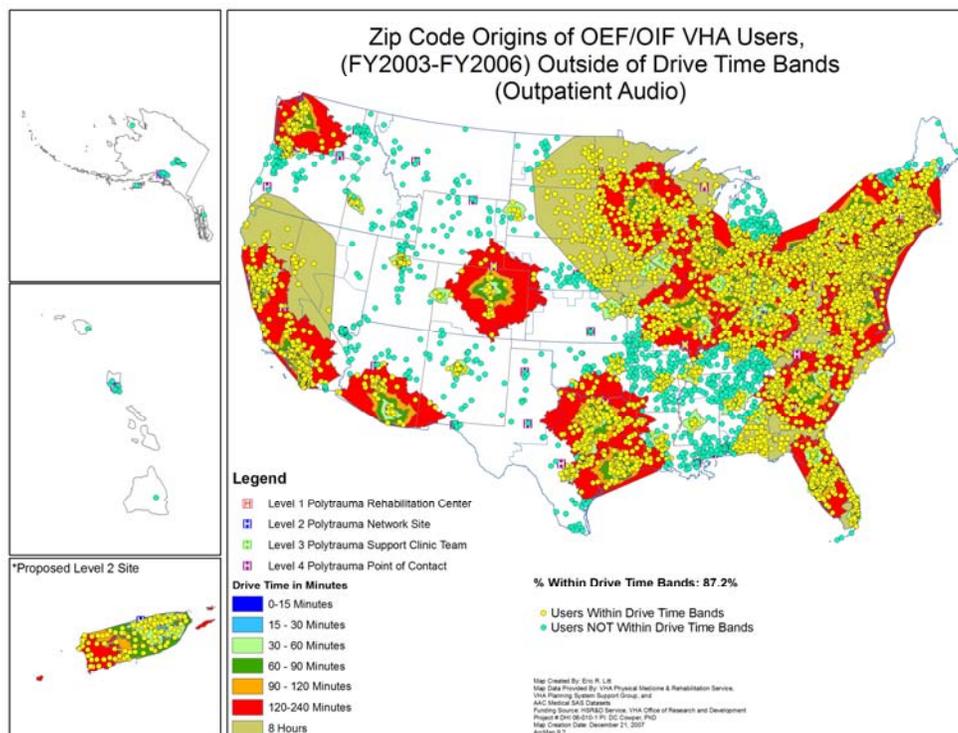
- With the methodology used in this study, the Polytrauma and Blast-Related Injury QUERI should request a regular data feed from the OEF/OIF roster that includes patient ZIP code;
- Merges with the Medical SAS inpatient, outpatient, and extended care files should be conducted on at least an annual basis to identify OEF/OIF traumatic injured veteran who may have rehabilitation needs;
- GIS should be employed to map patient location vis-à-vis VHA facilities, and to identify new potential gaps in rehabilitation services.

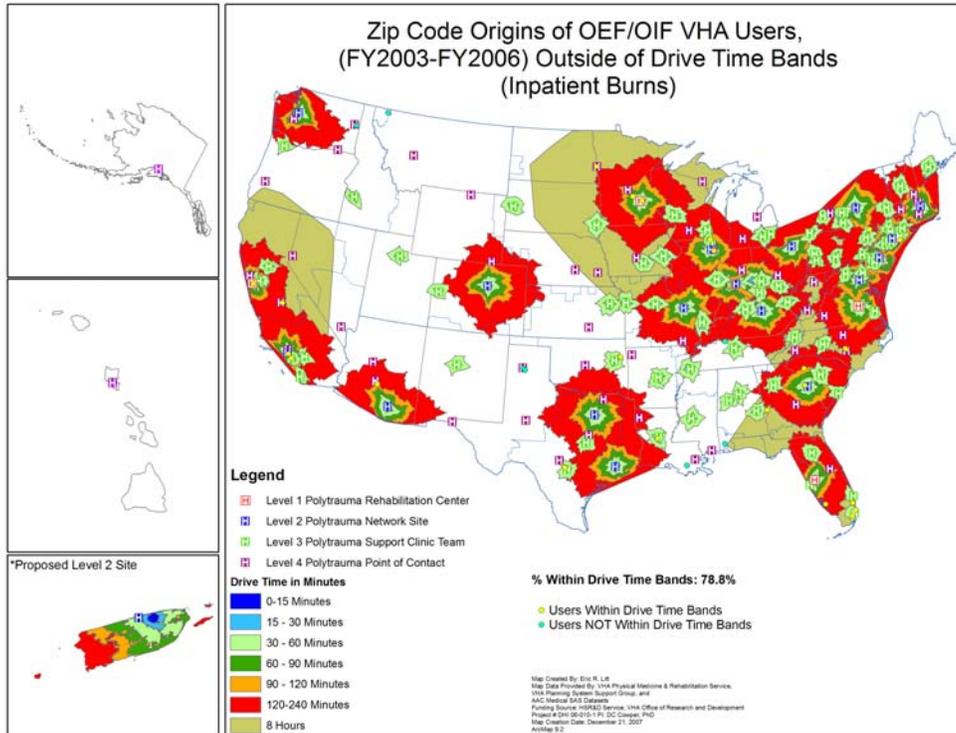
Appendix A:

Maps of OEF/OIF VHA Users by Inpatient/Outpatient Status and Traumatic Injury, FY03-FY06

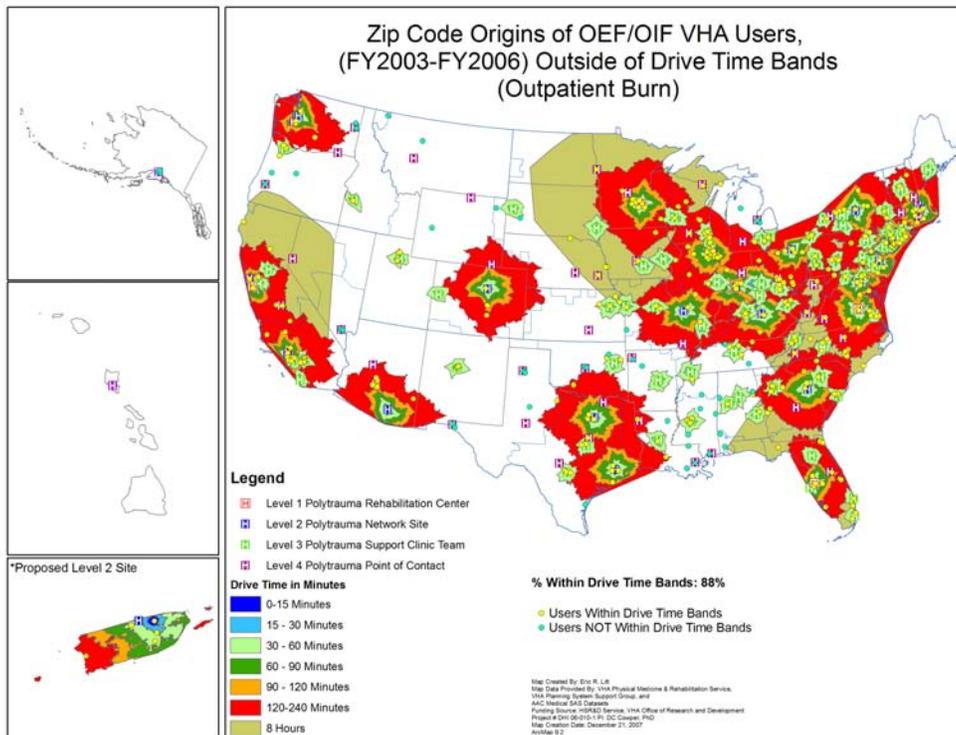


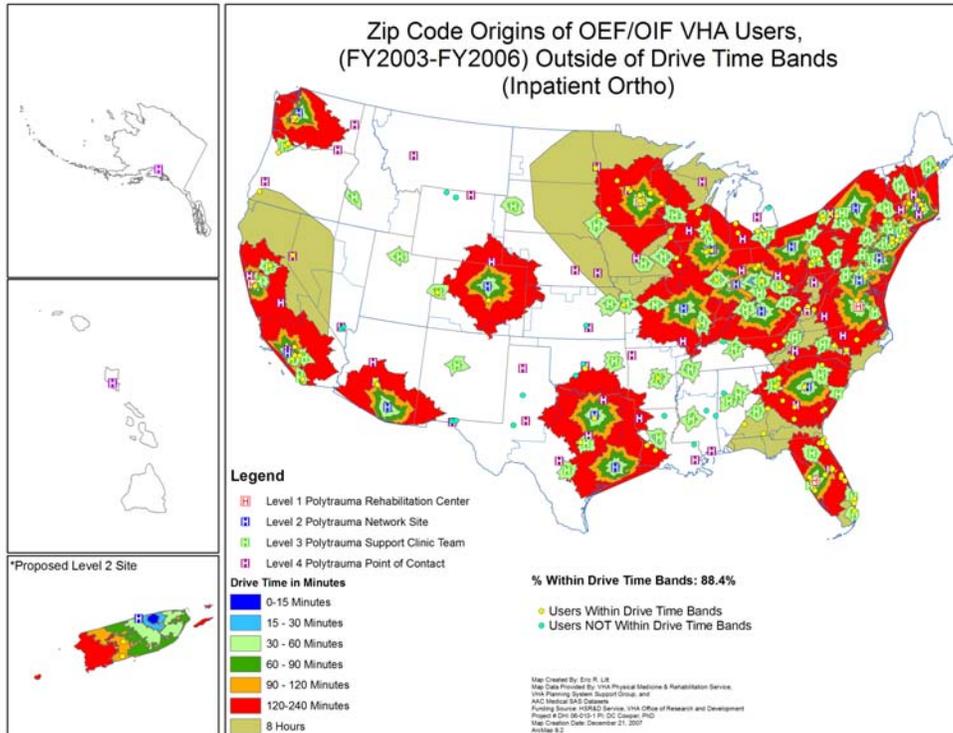
HEARING IMPAIRMENT



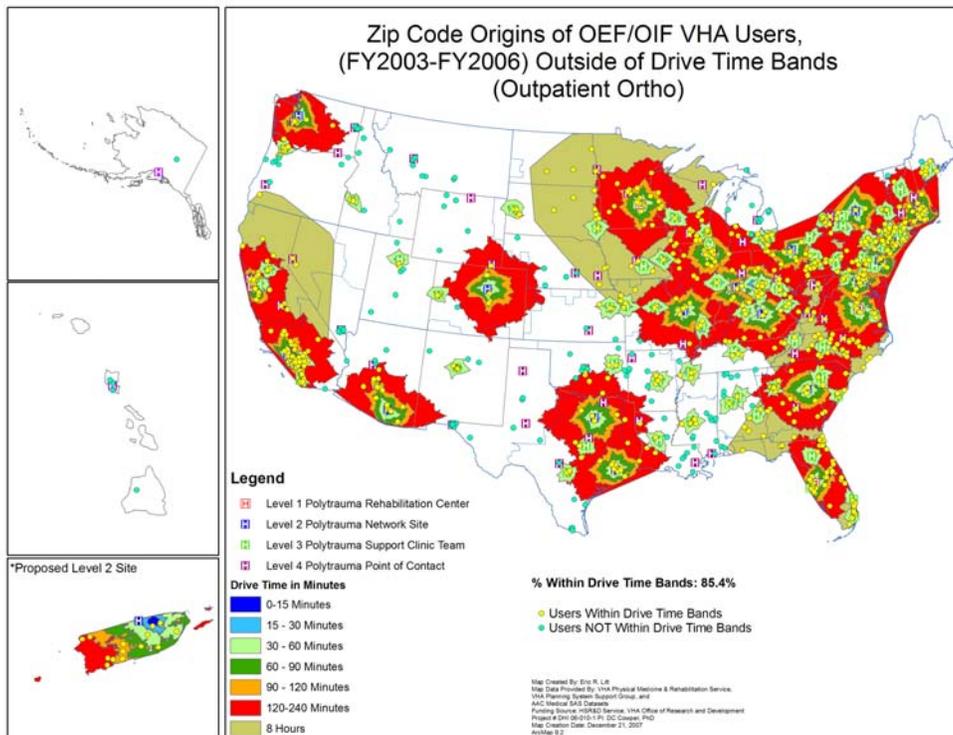


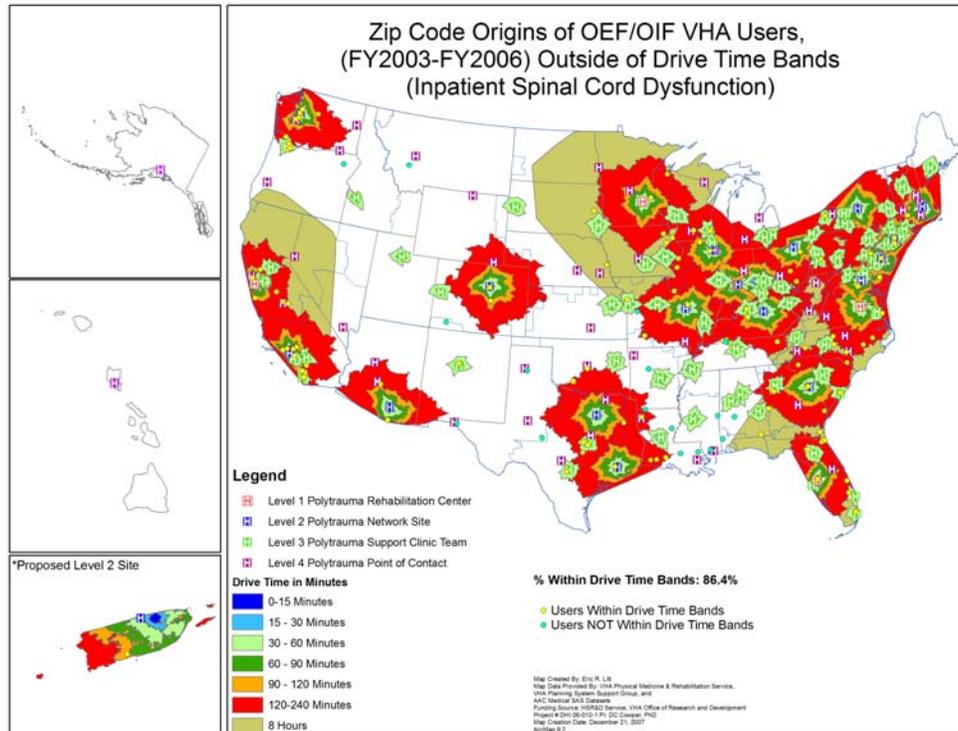
BURNS



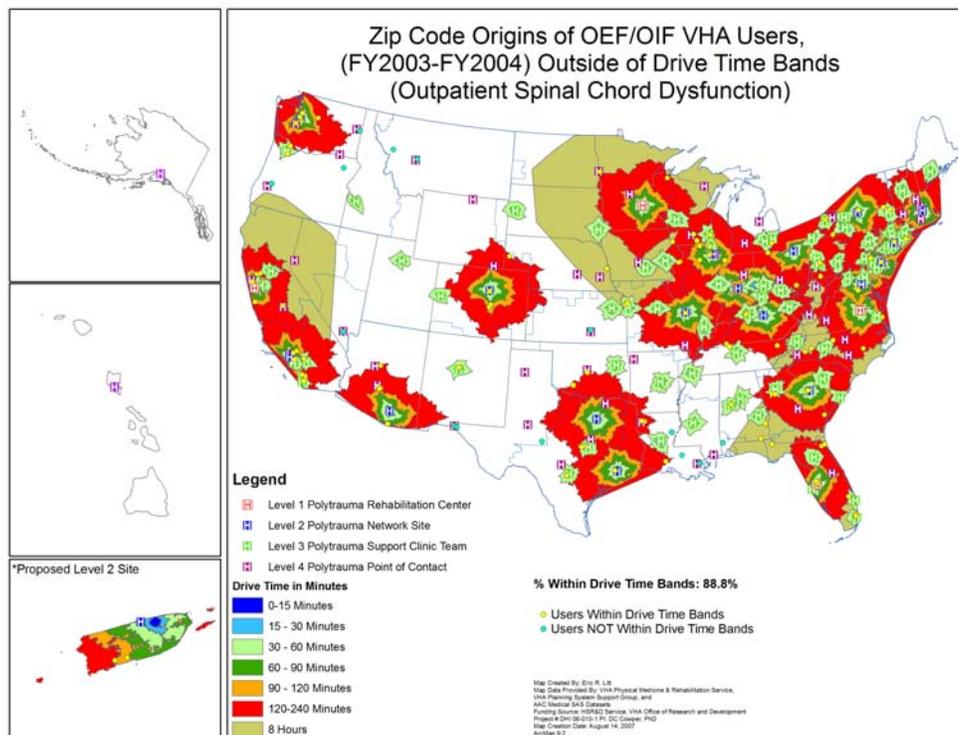


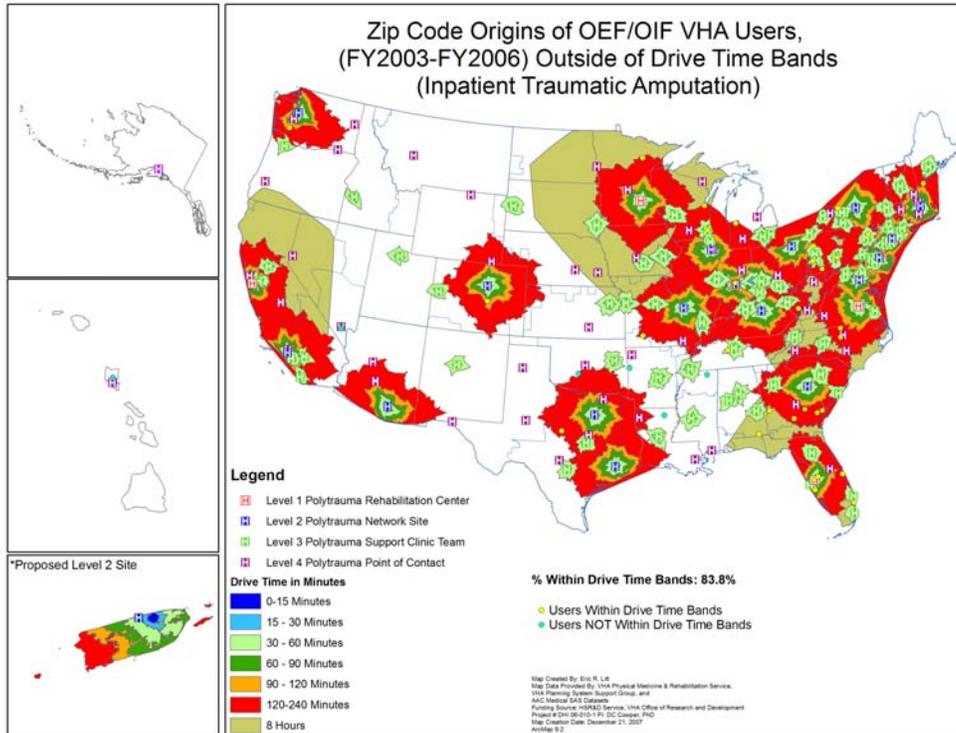
ORTHOPEDIC



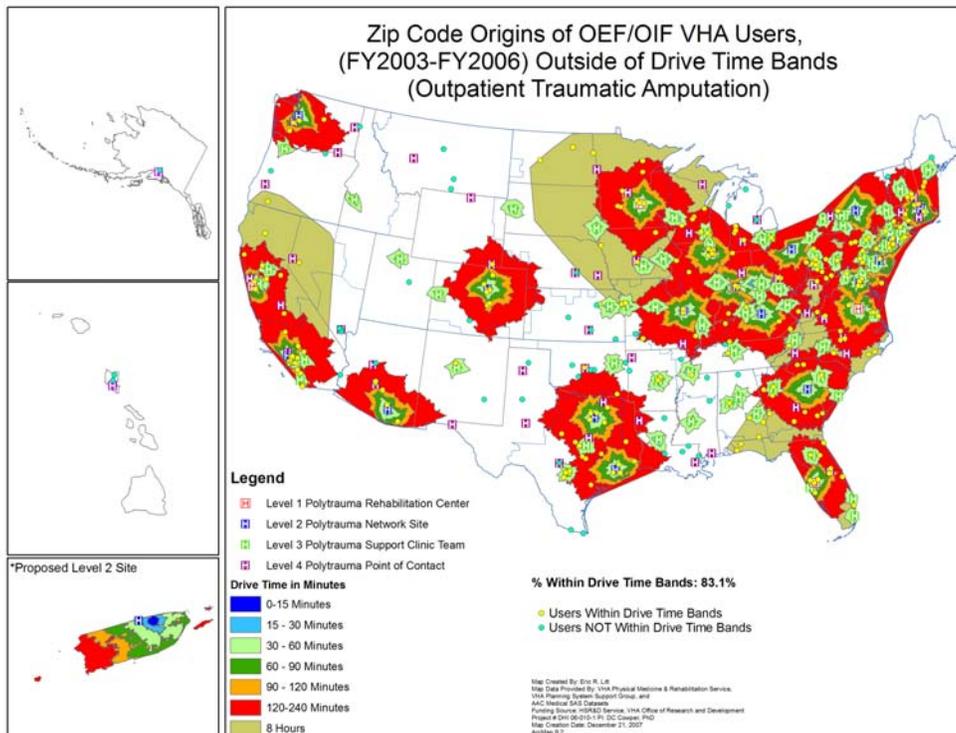


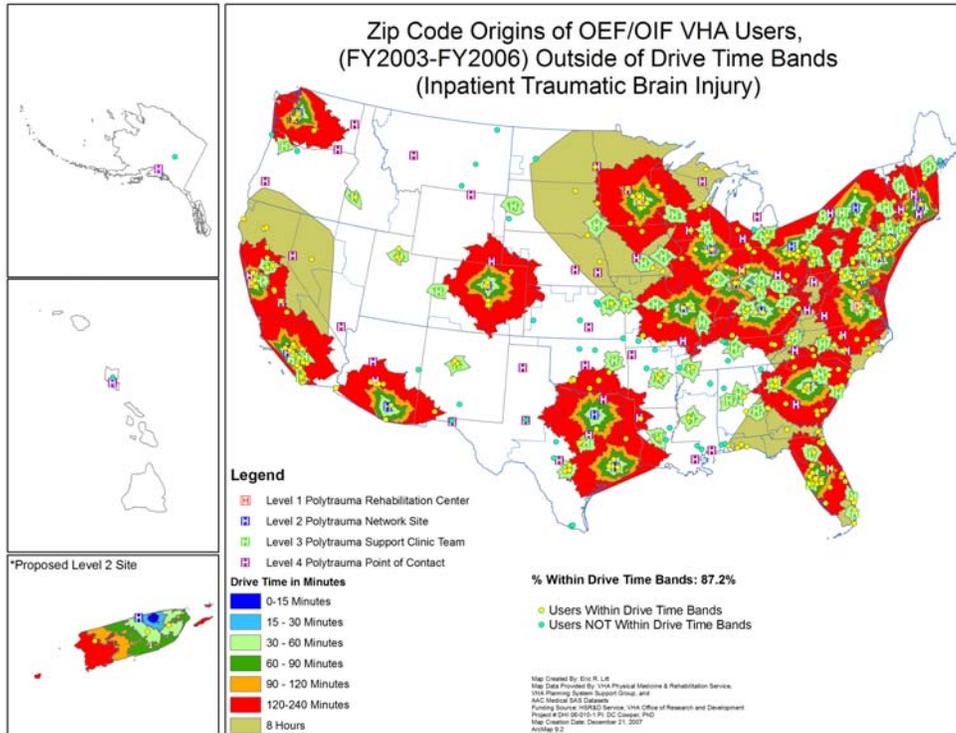
SPINAL CORD DYSFUNCTION



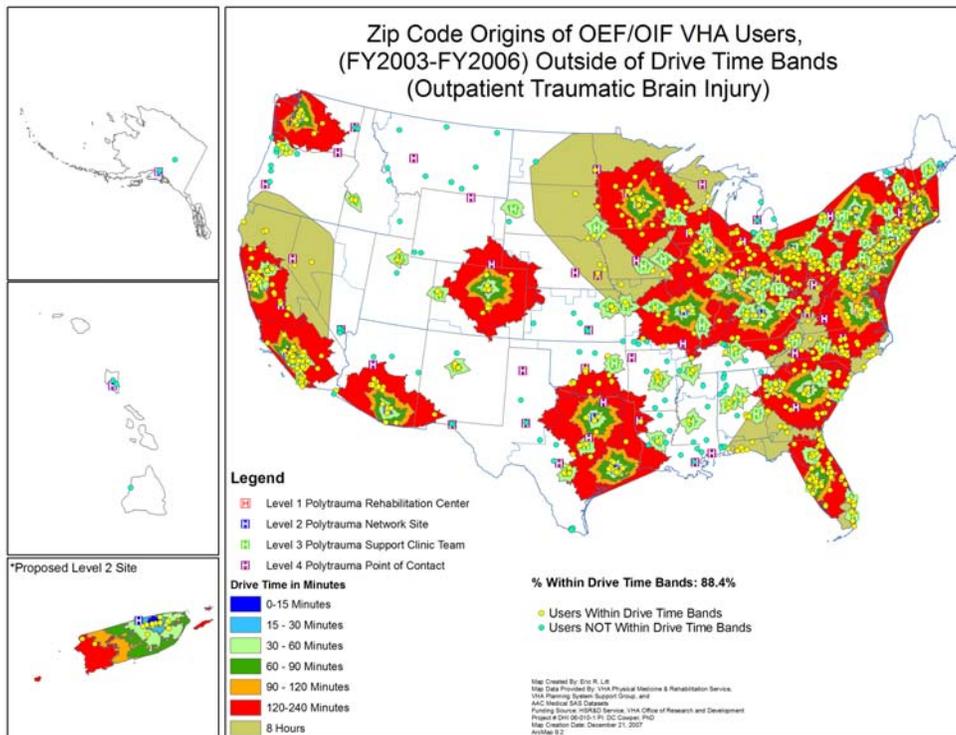


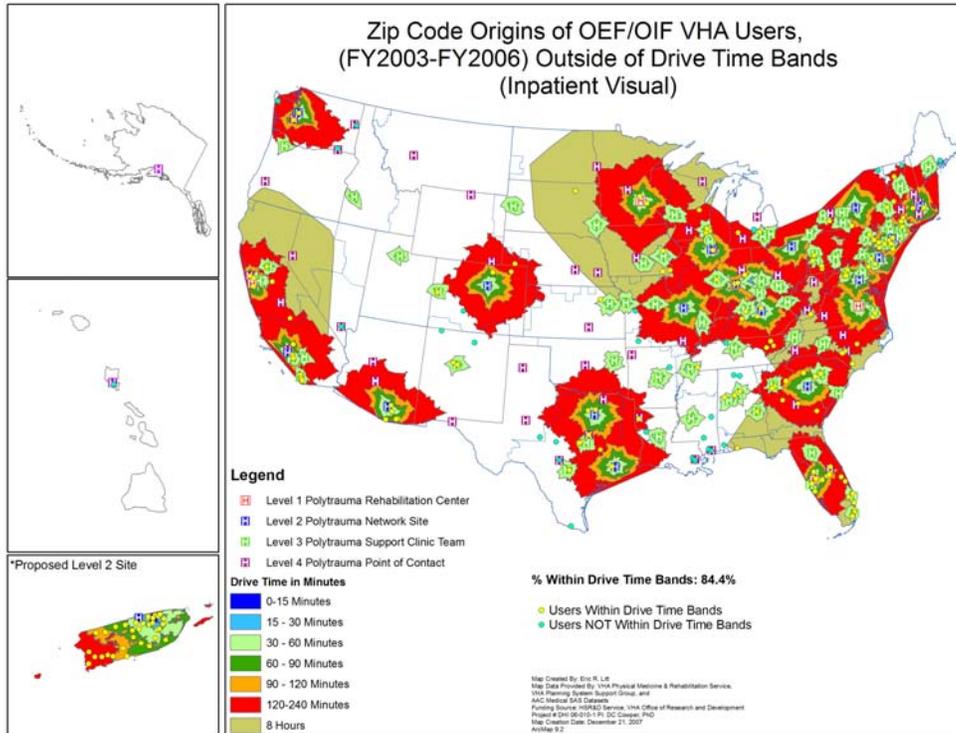
TRAUMATIC AMPUTATION





TRAUMATIC BRAIN INJURY





VISUAL IMPAIRMENT

