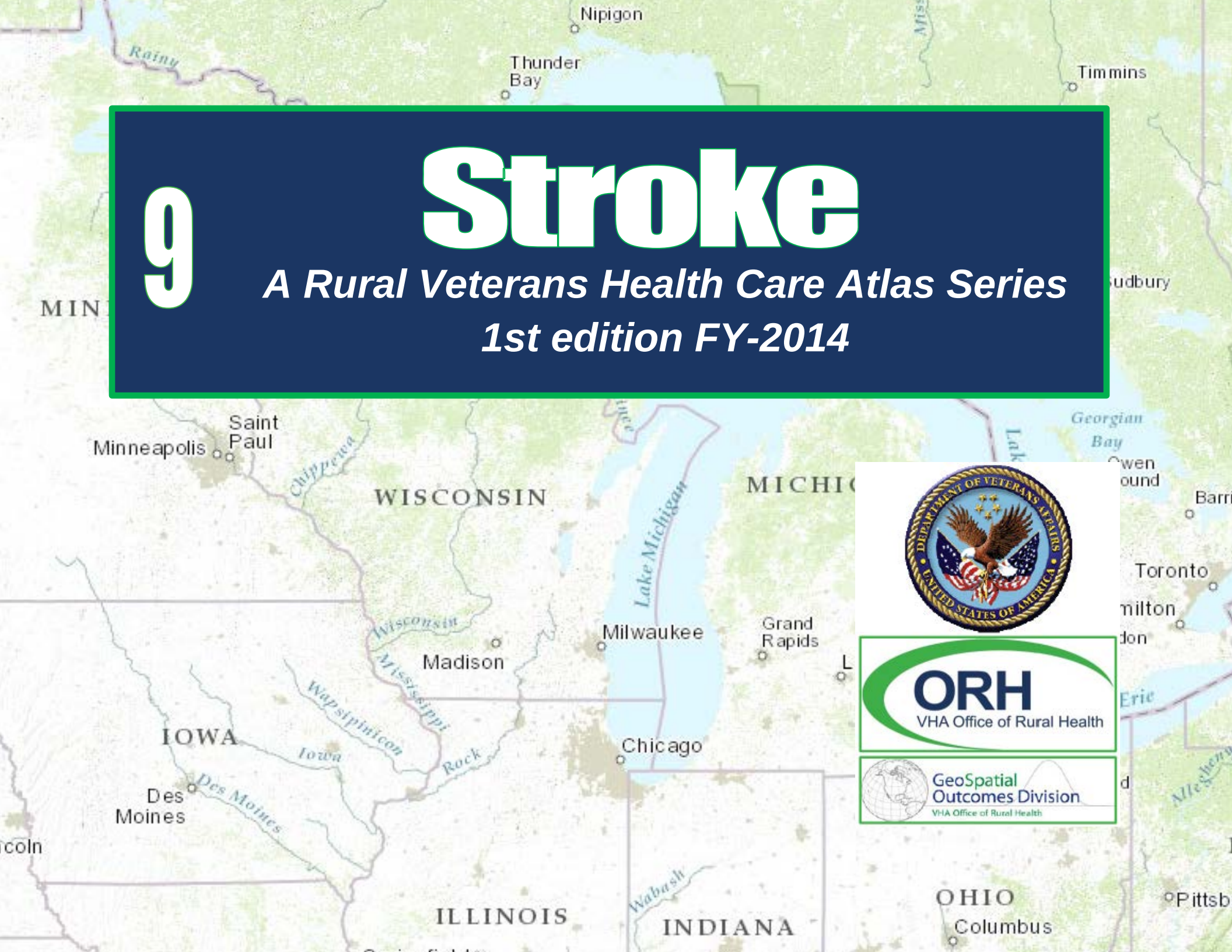
9 Stroke

A Rural Veterans Health Care Atlas Series

1st edition FY-2014



Contents

Table of Contents

Contents

GeoSpatial Outcomes Division
VHA Office of Rural Health

Stroke

OVERVIEW

The staff at the GeoSpatial Outcomes Division accessed data repositories available through the VHA Support Service Center (VSSC) http://vssc.med.va.gov/ to query and extract the data used to generate this chapter's tables, charts, and maps. The Diagnosis Cube, in particular, is a single repository cube with tools for diagnosis monitoring of the Veteran patient population. It was developed to provide a cube where diagnoses from all diagnosis positions from Outpatient, Inpatient, and Fee Sources are included[1]. The ICD-9-CM diagnostic codes used for Stroke is a modified version of the Stroke high sensitivity algorithm (Reker et al, 2001) and has been used extensively in studying Veterans with Stroke.*** The codes include hemiplegia and hemiparesis (342.xx), subarachnoid hemorrhage (430.xx), intra-cerebral hemorrhage (431.xx), other and unspecified intracranial hemorrhage (432.xx), occlusion and stenosis of pre-cerebral arteries (433.xx), occlusion of cerebral arteries (434.xx), transient cerebral ischemia (435.xx), and acute, but ill-defined cerebrovascular disease (436.xx). The team extracted the appropriate data based on a total of 45 ICD-9-CM codes.

Process of Data Compilation

Using the VSSC and Proclarity Desktop Professional Version 6.3.129.200, data were extracted from the Diagnosis Cube. **Prevalence and demographic data** were queried on a broad level and then drilled down to specific ruralities. The following parameters were entered in different combinations to present various scenarios:

- **Measures:** Unique Patients
- **DXDate Date:** FY-2014
- **Diagnosis ICD9 Desc:** All, 342.0, 342.00, 342.01, 342.02, 342.10, 342.11, 342.12, 342.80, 342.81, 342.82, 342.90, 342.91, 342.92, 430., 431., 432.0, 432.1, 432.9, 433.00, 433.01, 433.1, 433.10, 433.11, 433.20, 433.21, 433.30, 433.31, 433.80, 433.81, 433.90, 433.91, 434.00, 434.01, 434.10, 434.11, 434.9, 434.90, 434.91, 435.0, 435.1, 435.2, 435.3, 435.8, 435.9, 436
- **Home County VISN:** V01, V02, V03, V04, V05, V06, V07, V08, V09, V10, V11, V12, V15, V16, V17, V18, V19, V20, V21, V22, V23
- **DiagnosisPosition:** Primary Diagnosis, Secondary Diagnosis
- **Priority:** 1 Svc Con 50% +, 2 Svc Con 30%-40%, 3 Svc Con 20%/POW/Special, 5 Non Service Con Below Income
- **Rurality:** Highly Rural, Rural, Urban, Unknown
- **Gender:** Female, Male, Unknown

- **Age:** <25, 25-34, 35-44, 45-54, 55-64, 65-74, 75-84, 85+, Unknown

Then the following parameters were entered to extract **outpatient encounters** and were used in different combinations to present various scenarios:

- **Measures:** Frequency
- **DXDate Date:** FY 14
- **Diagnosis ICD9 Desc:** All, 342.0, 342.00, 342.01, 342.02, 342.10, 342.11, 342.12, 342.80, 342.81, 342.82, 342.90, 342.91, 342.92, 430., 431., 432.0, 432.1, 432.9, 433.00, 433.01, 433.1, 433.10, 433.11, 433.20, 433.21, 433.30, 433.31, 433.80, 433.81, 433.90, 433.91, 434.00, 434.01, 434.10, 434.11, 434.9, 434.90, 434.91, 435.0, 435.1, 435.2, 435.3, 435.8, 435.9, 436
- **Home County VISN:** V01, V02, V03, V04, V05, V06, V07, V08, V09, V10, V11, V12, V15, V16, V17, V18, V19, V20, V21, V22, V23
- **DiagnosisPosition:** Primary Diagnosis, Secondary Diagnosis
- **Rurality:** Highly Rural, Rural, Urban, Unknown
- **Source:** Outpatient Encounters

ESRI ArcGIS Desktop was used to import the tabular data and create custom maps at National and VISN scales. The tabular data is broken down by rows of FIPS codes (county level geographic units), State, VISN, and then by columns of the following:

- Number of users in the VA system (retreived from the Current Enrollment Cube in the VSSC)
- Counts and percentages of total Stroke patients versus all patients (uniques) broken down by rurality (HR/R/U/total), with HR/R combined into RHR for the purposes of patient confidentiality
- Counts and percentages of Stroke patients versus all patients (uniques) *by gender* broken down by rurality (HR/R/U/total), with HR/R combined into RHR for the purposes of patient confidentiality
- Counts and percentages of Stroke patients versus all patients (uniques) *by age group (<65, 65+)* broken down by rurality (HR/R/U/total), with HR/R combined into RHR for the purposes of patient confidentiality
- Counts and percentages of Stroke patients versus all patients (uniques) *by enrollment priority (groups 1, 2 and 3)* broken down by rurality (HR/R/U/total), with HR/R combined into RHR for the purposes of patient confidentiality

- Counts and percentages of Stroke patients versus all patients (uniques) *by enrollment priority (group 5)* broken down by rurality (HR/R/U/total), with HR/R combined into RHR for the purposes of patient confidentiality
- Counts and percentages of outpatient encounters of patients with Stroke in rural and highly rural areas versus outpatient encounters of patients with Stroke in all rural categories, with HR/R combined into RHR for the purposes of patient confidentiality.

*** GSOD would like to acknowledge and thank Dr. Margaret Stineman, Professor Emeritus, University of Pennsylvania and her staff Jibby Kurichi, Pui Kwong, and Dawei Xie, as well as Dr. Barbara Bates, Chief of Physical Medicine and Rehabilitation at the VA Medical Center in Albany, New York for their assistance in finalizing the ICD-9-CM codes used to identify Veterans with Stroke.

Diagnostic Codes Used to Define Cohort (Stroke)

ICD-9 CM code	Description
342.0	FLACCID HEMIPLEGIA
342.00	FLACCID HEMIPLEGIA AND HEMIPARESIS AFFECTING UNSPECIFIED SIDE
342.01	FLACCID HEMIPLEGIA AND HEMIPARESIS AFFECTING DOMINANT SIDE
342.02	FLACCID HEMIPLEGIA AND HEMIPARESIS AFFECTING NONDOMINANT SIDE
342.10	SPASTIC HEMIPLEGIA AND HEMIPARESIS AFFECTING UNSPECIFIED SIDE
342.11	SPASTIC HEMIPLEGIA AND HEMIPARESIS AFFECTING DOMINANT SIDE
342.12	SPASTIC HEMIPLEGIA AND HEMIPARESIS AFFECTING NONDOMINANT SIDE
342.80	OTHER SPECIFIED HEMIPLEGIA AND HEMIPARESIS AFFECTING UNSPECIFIED SIDE
342.81	OTHER SPECIFIED HEMIPLEGIA AND HEMIPARESIS AFFECTING DOMINANT SIDE
342.82	OTHER SPECIFIED HEMIPLEGIA AND HEMIPARESIS AFFECTING NONDOMINANT SIDE
342.90	HEMIPLEGIA, UNSPECIFIED, AFFECTING UNSPECIFIED SIDE
342.91	HEMIPLEGIA, UNSPECIFIED, AFFECTING DOMINANT SIDE
342.92	HEMIPLEGIA, UNSPECIFIED, AFFECTING NONDOMINANT SIDE
430.	SUBARACHNOID HEMORRHAGE
431.	INTRACEREBRAL HEMORRHAGE
432.0	NONTRAUMATIC EXTRADURAL HEMORRHAGE
432.1	SUBDURAL HEMORRHAGE
432.9	UNSPECIFIED INTRACRANIAL HEMORRHAGE
433.00	OCCLUSION AND STENOSIS OF BASILAR ARTERY WITHOUT MENTION OF CEREBRAL INFARCTION
433.01	OCCLUSION AND STENOSIS OF BASILAR ARTERY WITH CEREBRAL INFARCTION
433.1	OCCLUSION AND STENOSIS OF CAROTID ARTERY
433.10	OCCLUSION AND STENOSIS OF CAROTID ARTERY WITHOUT MENTION OF CEREBRAL INFARCTION
433.11	OCCLUSION AND STENOSIS OF CAROTID ARTERY WITH CEREBRAL INFARCTION
433.20	OCCLUSION AND STENOSIS OF VERTEBRAL ARTERY WITHOUT MENTION OF CEREBRAL INFARCTION

Stroke

ICD-9 CM code	Description
433.21	OCCLUSION AND STENOSIS OF VERTEBRAL ARTERY WITH CEREBRAL INFARCTION
433.30	OCCLUSION AND STENOSIS OF MULTIPLE AND BILATERAL PRECEREBRAL ARTERIES WITHOUT MENTION OF CEREBRAL INFARCTION
433.31	OCCLUSION AND STENOSIS OF MULTIPLE AND BILATERAL PRECEREBRAL ARTERIES WITH CEREBRAL INFARCTION
433.80	OCCLUSION AND STENOSIS OF OTHER SPECIFIED PRECEREBRAL ARTERY WITHOUT MENTION OF CEREBRAL INFARCTION
433.81	OCCLUSION AND STENOSIS OF OTHER SPECIFIED PRECEREBRAL ARTERY WITH CEREBRAL INFARCTION
433.90	OCCLUSION AND STENOSIS OF UNSPECIFIED PRECEREBRAL ARTERY WITHOUT MENTION OF CEREBRAL INFARCTION
433.91	OCCLUSION AND STENOSIS OF UNSPECIFIED PRECEREBRAL ARTERY WITH CEREBRAL INFARCTION
434.00	CEREBRAL THROMBOSIS WITHOUT MENTION OF CEREBRAL INFARCTION
434.01	CEREBRAL THROMBOSIS WITH CEREBRAL INFARCTION
434.10	CEREBRAL EMBOLISM WITHOUT MENTION OF CEREBRAL INFARCTION
434.11	CEREBRAL EMBOLISM WITH CEREBRAL INFARCTION
434.9	CEREBRAL ARTERY OCCLUSION UNSPECIFIED
434.90	CEREBRAL ARTERY OCCLUSION, UNSPECIFIED WITHOUT MENTION OF CEREBRAL INFARCTION
434.91	CEREBRAL ARTERY OCCLUSION, UNSPECIFIED WITH CEREBRAL INFARCTION
435.0	BASILAR ARTERY SYNDROME
435.1	VERTEBRAL ARTERY SYNDROME
435.2	SUBCLAVIAN STEAL SYNDROME
435.3	VERTEBROBASILAR ARTERY SYNDROME
435.8	OTHER SPECIFIED TRANSIENT CEREBRAL ISCHEMIAS
435.9	UNSPECIFIED TRANSIENT CEREBRAL ISCHEMIA
436	ACUTE, BUT ILL-DEFINED, CEREBROVASCULAR DISEASE

Organization of Data Tables and Maps

The data tables and maps for Veterans with Stroke are organized into four sections. The first section (Section I) focuses on the total numbers of VHA patients with Stroke. We first present an overview of the data at the National, Veterans Integrated Service Network (VISN), State, and county levels. In addition to the overall number of patients with Stroke, data are presented by gender, age group, and enrollment status. Table 1 contains the data used in the narrative summary. Following the table, there are a series of maps that visually illustrate the data.

- Map 1: Number of Patients with Stroke by VISN, FY-2014
- Map 2: Number of Patients with Stroke by State, FY-2014
- Map 3: Number of Patients with Stroke by County, FY-2014
- Map 4 - 7: Number of Patients with Stroke by County, FY-2014 – Zoomed VISN views

Section II of the chapter focuses on the overall prevalence of Stroke by the following rurality categories*: highly rural, rural, urban, and unknown*. Since the *rural and highly rural* categories are of particular interest in this volume, numbers and percentages are distinctively highlighted in shades of blue in Table 2. National, VISN, State, and county overview are presented focusing on the rural and highly rural Veterans with Stroke. Because the numbers of highly rural Veterans is so small, we combined the data for mapping purposes. For the maps, urban areas are shaded and urban patients are removed from the numerator and denominator. The following maps illustrate graphically the data on rural and highly rural VHA patients with Stroke:

- Map 8: Number of Rural and Highly Rural Patients with Stroke by VISN, FY-2014
- Map 9: Percent of Rural and Highly Rural Patients with Stroke of Total Rural and Highly Rural Patients by VISN, FY-2014
- Map 10: Number of Rural and Highly Rural Patients with Stroke by State, FY-2014
- Map 11: Percent of Rural and Highly Rural Patients with Stroke of Total Rural and Highly Rural Patients by State, FY-2014
- Map 12: Number of Rural and Highly Rural Patients with Stroke by County, FY-2014
- Map 13: Percent of Rural and Highly Rural Patients with Stroke of Total Rural and Highly Rural Patients by County, FY-2014
- Maps 14, 16, 18, 20: Number of Rural and Highly Rural Patients with Stroke by County, FY-2014 – Zoomed VISN views

- Map 15, 17, 19, 21: Percent of Rural and Highly Rural Patients with Stroke by County, FY-2014 – Zoomed VISN views

Section III provides more detail on subgroups of rural and highly rural patients. Table 3 contains data broken down by gender and rurality, with accompanying maps of rural and highly rural female VHA patients:

- Map 22: Number of Rural and Highly Rural Female Patients with Stroke by VISN, FY-2014
- Map 23: Percent of Rural and Highly Rural Female Patients with Stroke of Total Rural and Highly Rural Female Patients by VISN, FY-2014
- Map 24: Number of Rural and Highly Rural Female Patients with Stroke by State, FY-2014
- Map 25: Percent of Rural and Highly Rural Female Patients with Stroke of Total Rural and Highly Rural Female Patients by State, FY-2014 ***** Note:** County level maps are not presented for this disease condition, as the number of female VHA patients with Stroke is very small.

Table 4 contains data broken down by age group and rurality, with accompanying maps of rural and highly rural VHA patients by 65 years of age and older:

- Map 26: Number of Rural and Highly Rural Patients Aged 65+ with Stroke by VISN, FY-2014
- Map 27: Percent of Rural and Highly Rural Patients with Stroke Aged 65+ of Total Rural and Highly Rural Patients Aged 65+ by VISN, FY-2014
- Map 28: Number of Rural and Highly Rural Patients Aged 65+ with Stroke by State, FY-2014
- Map 29: Percent of Rural and Highly Rural Patients Aged 65+ with Stroke of Total Rural and Highly Rural Patients Aged 65+ by State, FY-2014
- Map 30: Number of Rural and Highly Rural Patients Aged 65+ with Stroke by County, FY-2014
- Map 31: Percent of Rural and Highly Rural Patients Aged 65+ with Stroke of Total Rural and Highly Rural Patients Aged 65+ by County, FY-2014

Table 5 contains data broken down by enrollment priority and rurality, with accompanying maps of rural and highly rural VHA patients by Service Connection (Enrollment Priority Groups 1-3) and Low Income (Enrollment Priority Group 5):

- Map 32: Number of Rural and Highly Rural Patients in Priority Group 1-3 with Stroke by VISN, FY-2014

- Map 33: Percent of Rural and Highly Rural Patients with Stroke in Priority Group 1-3 of Total Rural and Highly Rural Patients in Priority Group 1-3 by VISN, FY-2014
- Map 34: Number of Rural and Highly Rural Patients in Priority Group 1-3 with Stroke by State, FY-2014
- Map 35: Percent of Rural and Highly Rural Patients in Priority Group 1-3 with Stroke of Total Rural and Highly Rural Patients in Priority Group 1-3 by State, FY-2014
- Map 36: Number of Rural and Highly Rural Patients in Priority Group 1-3 with Stroke by County, FY-2014
- Map 37: Percent of Rural and Highly Rural Patients in Priority Group 1-3 with Stroke of Total Rural and Highly Rural Patients in Priority Group 1-3 by County, FY-2014
- Map 38: Number of Rural and Highly Rural Patients in Priority Group 5 with Stroke by VISN, FY-2014
- Map 39: Percent of Rural and Highly Rural Patients with Stroke in Priority Group 5 of Total Rural and Highly Rural Patients in Priority Group 5 by VISN, FY-2014
- Map 40: Number of Rural and Highly Rural Patients in Priority Group 5 with Stroke by State, FY-2014
- Map 41: Percent of Rural and Highly Rural Veterans in Priority Group 5 with Stroke of Total Rural and Highly Rural Patients in Priority Group 5 by State, FY-2014
- Map 42: Number of Rural and Highly Rural Patients in Priority Group 5 with Stroke by County, FY-2014
- Map 43: Percent of Rural and Highly Rural Patients in Priority Group 5 with Stroke of Total Rural and Highly Rural Patients in Priority Group 5 by County, FY-2014

The final section of the chapter (Section IV) provides information on the outpatient encounters of VHA patients with Stroke. Table 6 examines the outpatient encounters of patients with a **primary** diagnosis of Stroke and breaks the encounter information by rurality and Table 8 provides information on the number of outpatient encounters of patients with a **secondary** diagnosis of Stroke, also categorized by rurality. Table 7 and Table 9 provide information on the numbers and percentage of rural and highly rural Stroke encounters of total Stroke encounters for patients with a primary diagnosis of Stroke (Table 7) and secondary diagnosis of Stroke (Table 9). The accompanying maps display the total numbers and percentages of rural and highly rural patients with **either** a primary or secondary diagnosis of Stroke to capture the total workload (outpatient encounters) of this disease in rural and highly rural areas:

- Map 44: Number of Rural and Highly Rural Stroke Patient Encounters by VISN, FY-2014
- Map 45: Percent of Rural and Highly Rural Stroke Patient Encounters of VHA Stroke Patient Encounters by VISN,

FY-2014

- Map 46: Number of Rural and Highly Rural Stroke Patient Encounters by State, FY-2014
- Map 47: Percent of Rural and Highly Rural Stroke Patient Encounters of VHA Stroke Patient Encounters by State, FY-2014
- Map 48: Number of Rural and Highly Rural Stroke Patient Encounters by County, FY-2014
- Map 49: Percent of Rural and Highly Rural Stroke Patient Encounters of VHA Stroke Patient Encounters by County, FY-2014

Note: An asterisk (*) that appears in the tables signifies a low number or proportion of unique patients.

Section I Highlights: VHA Patients with Stroke

National Overview

As of 2010, Stroke was the fourth leading cause of death, responsible for 5.2% of all deaths in the United States (US).[2] The death rate increases exponentially with age. The Stroke mortality rate per 100,000 by age group in 2010 was 29.3 for people ages 55-64, 81.7 for ages 65-74, 288.3 for ages 75-84, and 993.8 for individuals over the age of 85.[2] Stroke is also a major cause of long-term disability in the US.[3] The prevalence rates, coupled with the neurological and physical deficits often resulting from Stroke, impose a large burden on patients, their families, and the overall health care system. This burden is especially true among the elderly population, where cerebrovascular diseases are responsible for over half a million discharges for individuals 65 years of age and older.[4] In Fiscal Year 2014, the Veterans Health Administration had more than two hundred thousand (257,448) patients with one or more of the 45 diagnostic codes indicating a primary or secondary diagnosis of Stroke. This number represented approximately 4% (4.14%) of the total patient population during the fiscal year. As with most patients seen in the VHA, the majority of Stroke patients were male (96.86%); females represented just over three percent (3.14%).

The age distribution of Stroke patients showed that 1.21% were under the age of 45, 4.11% were ages 45-54, 19.19% were ages 55-64, 37.37% were ages 65-74, and 38.12% were ages 75 or older.

We examined two groups of Veterans by their Enrollment Priority. Enrollment Priority Groups 1-3 were combined into one group, which includes Service-Connected Veterans rated by the VA from 10-100%. A second group, Enrollment Priority Group 5, was selected to represent non Service-Connected and noncompensable Service-Connected Veterans rated 0% disabled by VA with annual income and/or net worth below the VA National income threshold and geographically-adjusted income threshold for their resident location.[5] The table shows that about forty percent (42.91%) were Service-Connected injured Veterans enrolled in Priority Groups 1 – 3 and more than a quarter (27.58%) were Priority 5 (low income).

VISN Overview

At the time of this edition, the Veterans Health Administration (VHA) consisted of 21 networks. Examining data at the network level, the volume of patients with Stroke ranged from a high of 27,140 individuals in the Sunshine Network (VISN 8, which serves Veterans in most of Florida, Puerto Rico, U.S. Virgin Islands, and a portion of Georgia) to a low of 5,500 individuals in the Capitol Network (VISN 5, which includes all of Washington D.C. and portions of Pennsylvania, Maryland, Virginia, and West Virginia). When examining the number of Stroke patients proportionally to all patients, Ohio Network (VISN 10) had the highest proportion at 5.37% and Rocky Mountain Network (VISN 19) had the lowest proportion at 3.07%. The network with the highest ratio of females to males was in the Heart of Texas Network (VISN 17), where 4.17% of the Stroke patients were female. At the National level, the 75 years of age and older age group had the highest prevalence of Stroke patients to all VHA patients (38.12%); however, nine networks had Stroke patients in the 65-74 age group with the highest percentage (VISNs 6, 7, 9, 10, 11, 15, 16, 17, 20, and 22). Roughly one-third to one-half of Stroke patients in the VHA were Service-Connected (Priority Groups 1-3), with two networks at more than half – Heart of Texas Network (VISN 17) at 51.68% followed by Midwest Network (VISN 23) at 50.06%. Roughly one-fifth to one-third of Stroke patients in the VHA were Low Income (Priority Group 5), with four networks above 30%, the top being the Ohio Network (VISN 10) at 32.19%.

State Overview

Map 2 shows the number of VHA patients with Stroke by State (by quartiles). The top 10 States with the highest number of patients with Stroke by rank order were: Florida (N=24,417), Texas (N=18,733), California (N=16,615), Ohio (N=13,066), Pennsylvania (N=12,735), New York (N=11,471), North Carolina (N=9,213), Illinois (8,521), Georgia (N=7,325), and Missouri (N=7,127). The States with the highest percentages of patients with Stroke were Mississippi and Ohio (both at 5.78%), followed by (in rank order): District of Columbia (5.59%), Pennsylvania (5.57%), Puerto Rico (5.56%), West Virginia (5.37%), Louisiana (5.33), Kentucky (5.22%), Indiana (5.21%) and Missouri (5.19%).

County Overview

The number of patients with Stroke by county is displayed by quartiles in Map 3. The highest 25% in terms of volume is designated by the darkest color. In addition to the National map, four additional maps are provided that zoom to the VISN

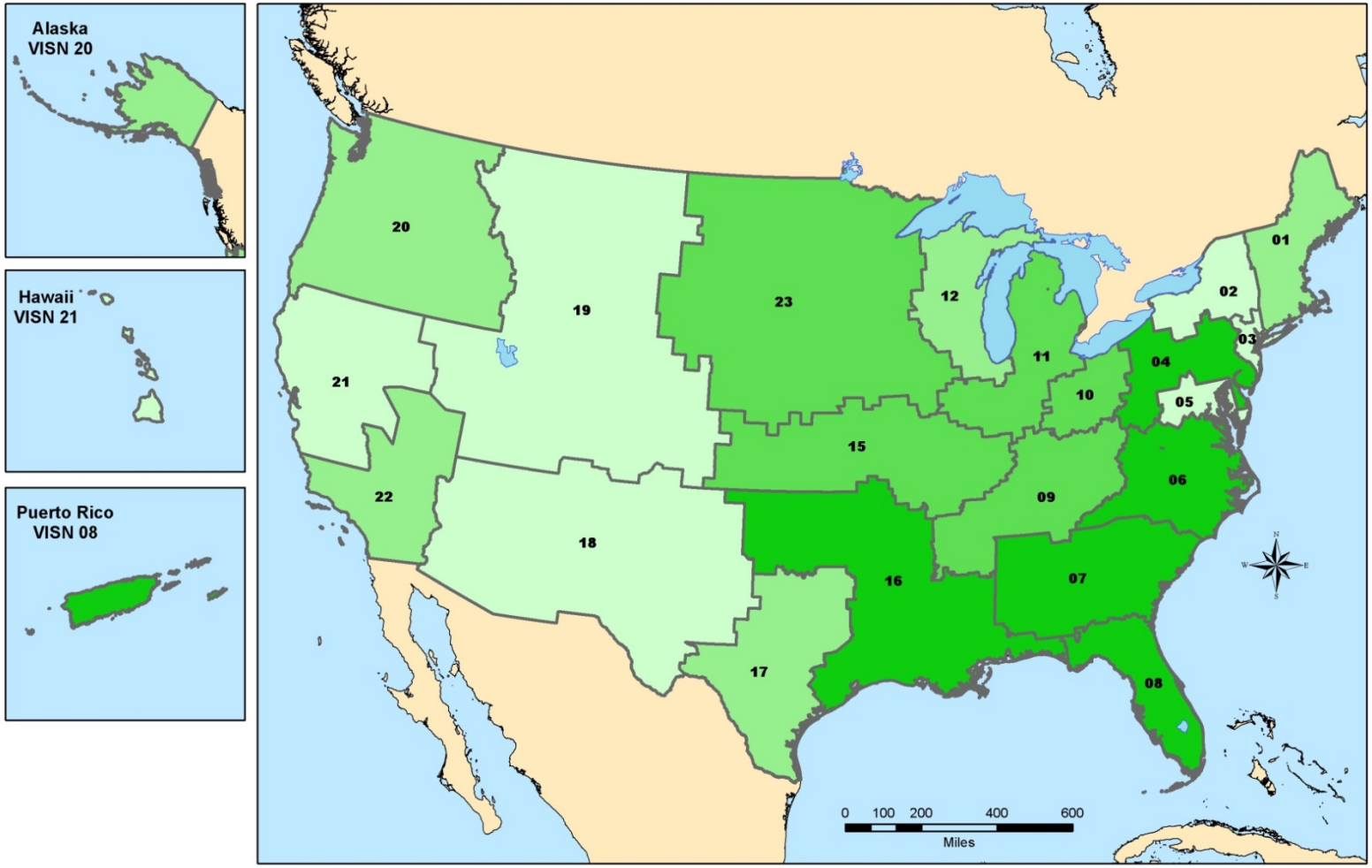
level (Maps 4-7) to give a clearer picture of the number of patients with Stroke and the geographic patterns within each VISN. The top 10 counties with the largest number of VHA patients with Stroke across the US were in the States of Arizona (1 county), California (1 county), Florida (3 counties), Illinois (1 county), Nevada (1 county), Ohio (1 county) and Texas (2 counties). Los Angeles County, California had the largest number of patients with Stroke (N=2,992), followed by, in rank order: Cook County, Illinois (N=2,788), Maricopa County, Arizona (N=2,710), Harris County, Texas (N=2,512), Pinellas County, Florida (2,446), Hillsborough County, Florida (N=1,782), Palm Beach County, Florida (1,696), Cuyahoga County, Ohio (N=1,671), Clark County, Nevada (N=1,616) and Bexar County, Texas (N=1,584).

Table 1: National and VISN Numbers and Percentages of VHA Patients with Stroke, FY-2014

Overall Prevalence Statistics- Stroke, FY-2014												
Veterans Integrated Service Network	Total Number of Patients	Patients with Stroke		Gender (%)		Age Group (%)					Enrollment Priority Groups (%)	
		N	(%)	F	M	<45	45-54	55-64	65-74	75+	Service Connected (Priority 1-3)	Low Income (Priority 5)
New England (01)	253,326	9,962	3.93	2.53	97.47	0.73	2.44	13.55	35.16	48.12	43.23	23.79
Upstate NY (02)	136,497	6,735	4.93	2.76	97.24	0.91	3.43	16.08	34.23	45.35	36.07	30.83
NY/NJ (03)	174,457	6,431	3.69	2.47	97.53	0.87	3.08	14.09	32.65	49.31	36.91	28.24
Stars and Stripes (04)	310,940	16,225	5.22	2.64	97.36	0.81	3.09	15.25	35.13	45.72	34.71	27.14
Capitol (05)	150,012	5,500	3.67	3.87	96.13	1.60	5.69	20.44	34.29	37.98	38.74	31.83
Mid-Atlantic (06)	359,692	15,162	4.22	3.54	96.46	1.38	4.79	21.76	38.35	33.71	46.79	26.81
Southeast (07)	408,164	15,495	3.80	3.81	96.19	1.74	6.18	23.83	37.80	30.45	47.53	26.45
Sunshine (08)	576,411	27,140	4.71	3.36	96.64	1.08	3.98	17.27	35.47	42.21	40.90	27.79
Mid South (09)	298,396	13,993	4.69	2.65	97.35	1.12	4.18	21.50	38.91	34.28	44.27	29.51
Ohio (10)	231,319	12,429	5.37	2.83	97.17	1.09	4.25	20.46	39.11	35.09	36.57	32.19
Vets in Partnership (11)	282,135	12,436	4.41	2.77	97.23	1.19	4.54	22.07	39.90	32.30	41.53	30.94
Great Lakes (12)	266,879	10,987	4.12	2.82	97.18	0.86	3.67	16.85	36.57	42.05	33.75	28.09
Heartland (15)	245,357	11,672	4.76	2.90	97.10	1.11	4.23	20.54	38.33	35.79	42.70	29.48
South Central (16)	502,681	23,769	4.73	3.01	96.99	1.38	4.40	22.40	39.26	32.56	45.77	27.69
Heart of Texas (17)	306,581	11,169	3.64	4.17	95.83	1.88	5.12	22.45	38.75	31.79	51.68	24.19
Southwest (18)	271,557	9,556	3.52	3.79	96.21	1.29	3.83	17.97	38.30	38.61	44.91	27.72
Rocky Mtn. (19)	202,350	6,215	3.07	3.96	96.04	1.74	4.20	18.37	36.05	39.64	44.27	26.53
Northwest (20)	288,322	9,702	3.36	3.89	96.10	1.12	4.13	19.38	41.24	34.12	46.61	27.32
Sierra Pacific (21)	293,645	9,368	3.19	2.88	97.12	1.01	3.13	17.33	38.58	39.95	44.88	27.02
Desert Pacific (22)	328,951	10,821	3.29	3.53	96.47	1.73	4.53	19.57	37.79	36.39	43.30	29.38
Midwest (23)	324,728	12,681	3.91	2.12	97.88	0.93	2.59	15.23	34.61	46.65	50.06	19.29
Grand Total	6,212,400	257,448	4.14	3.14	96.86	1.21	4.11	19.19	37.37	38.12	42.91	27.58

Stroke

GeoSpatial Outcomes Division
VHA Office of Rural Health



Map 1:

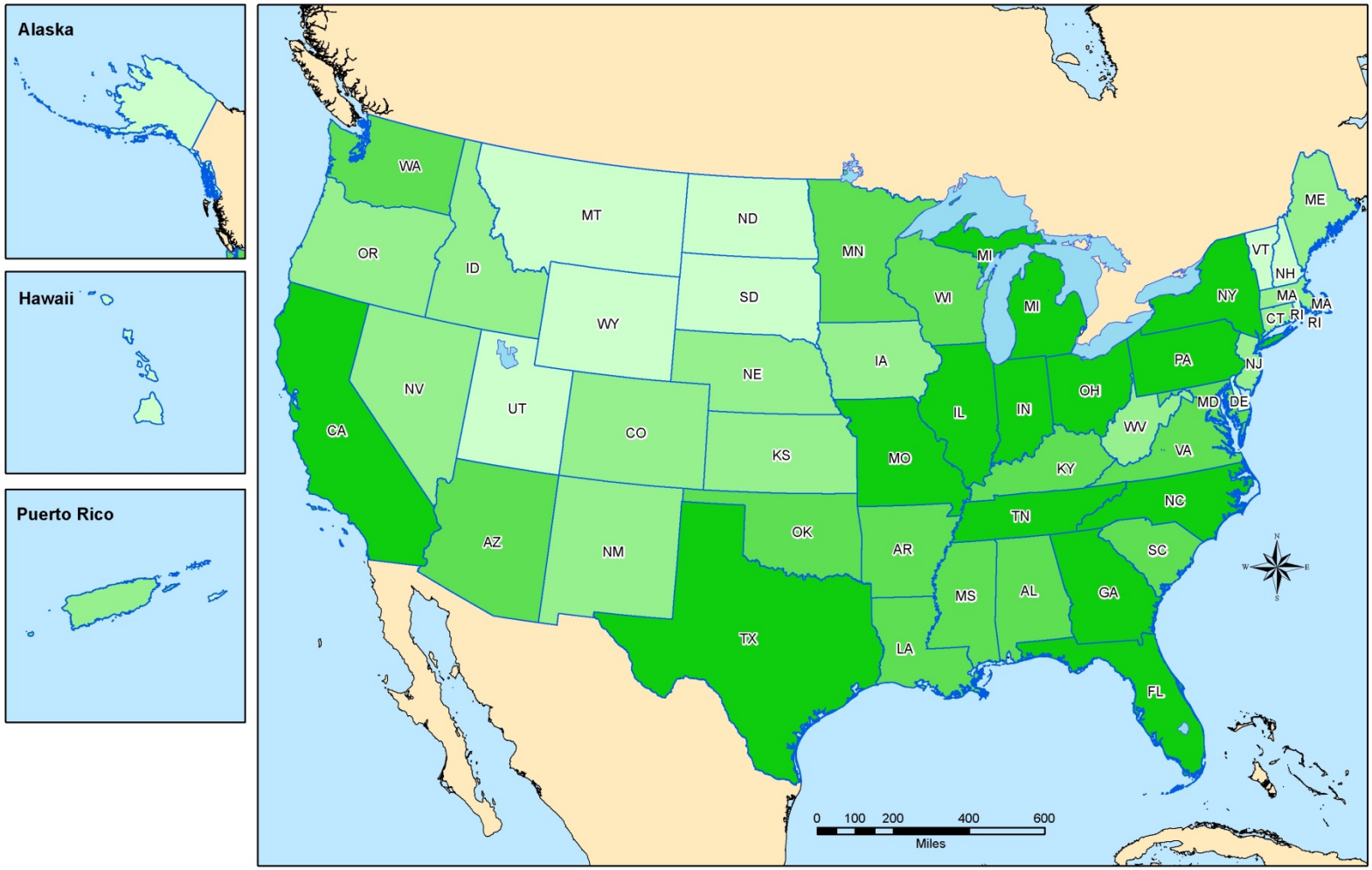
Number of VHA Patients with Stroke
By VISN FY - 2014

Patient Count
- 5,500 - 9,556 (Lower 25%)
- 9,557 - 11,169
- 11,170 - 13,993
- 13,994 - 27,140 (Upper 25%)

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 7/1/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Stroke



Patient Count

- 38 - 1,349 (Lower 25%)
- 1,350 - 3,649
- 3,650 - 6,090
- 6,091 - 24,417 (Upper 25%)

Map 2:

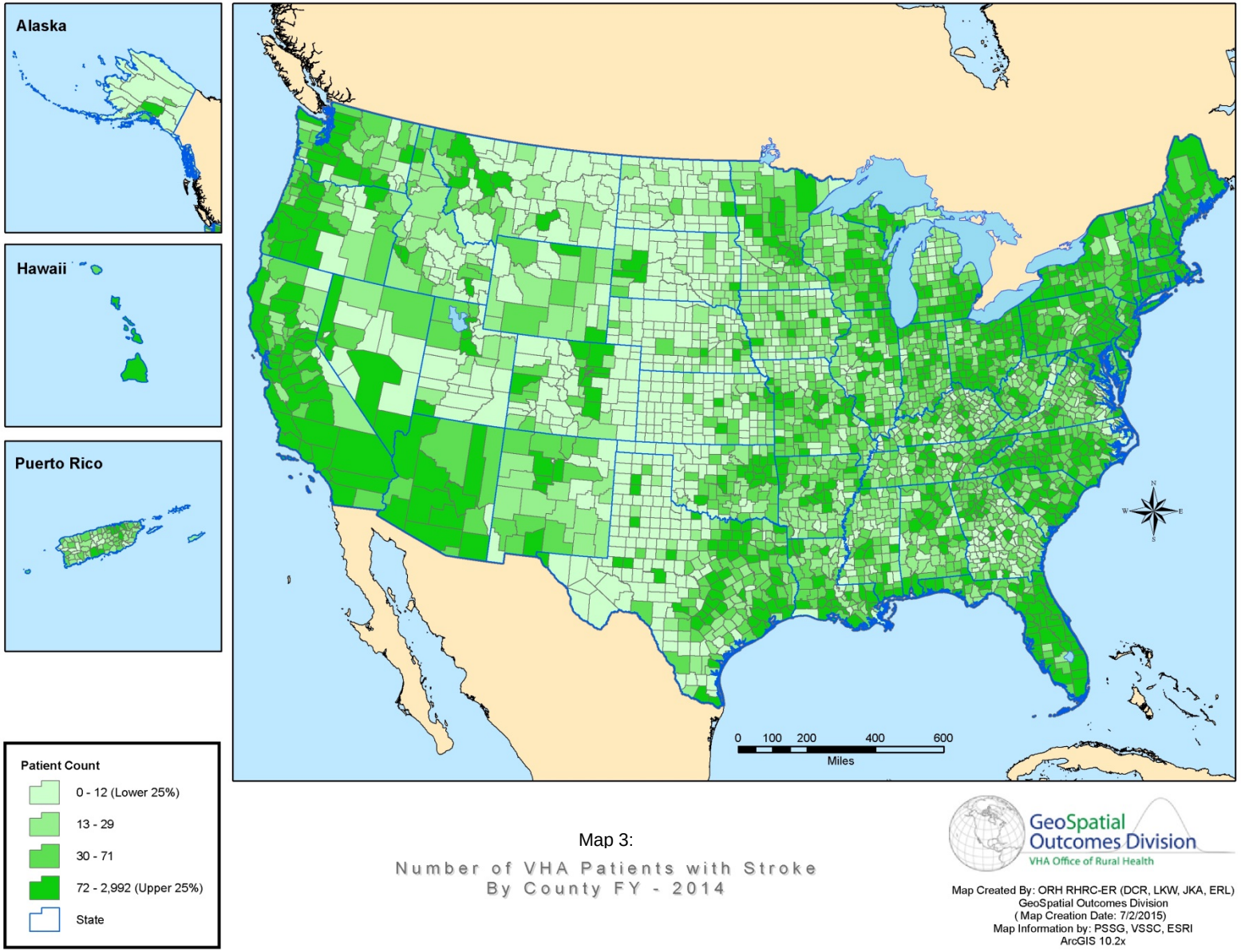
Number of VHA Patients with Stroke
By State FY - 2014

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 6/30/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Stroke

GeoSpatial Outcomes Division
VHA Office of Rural Health



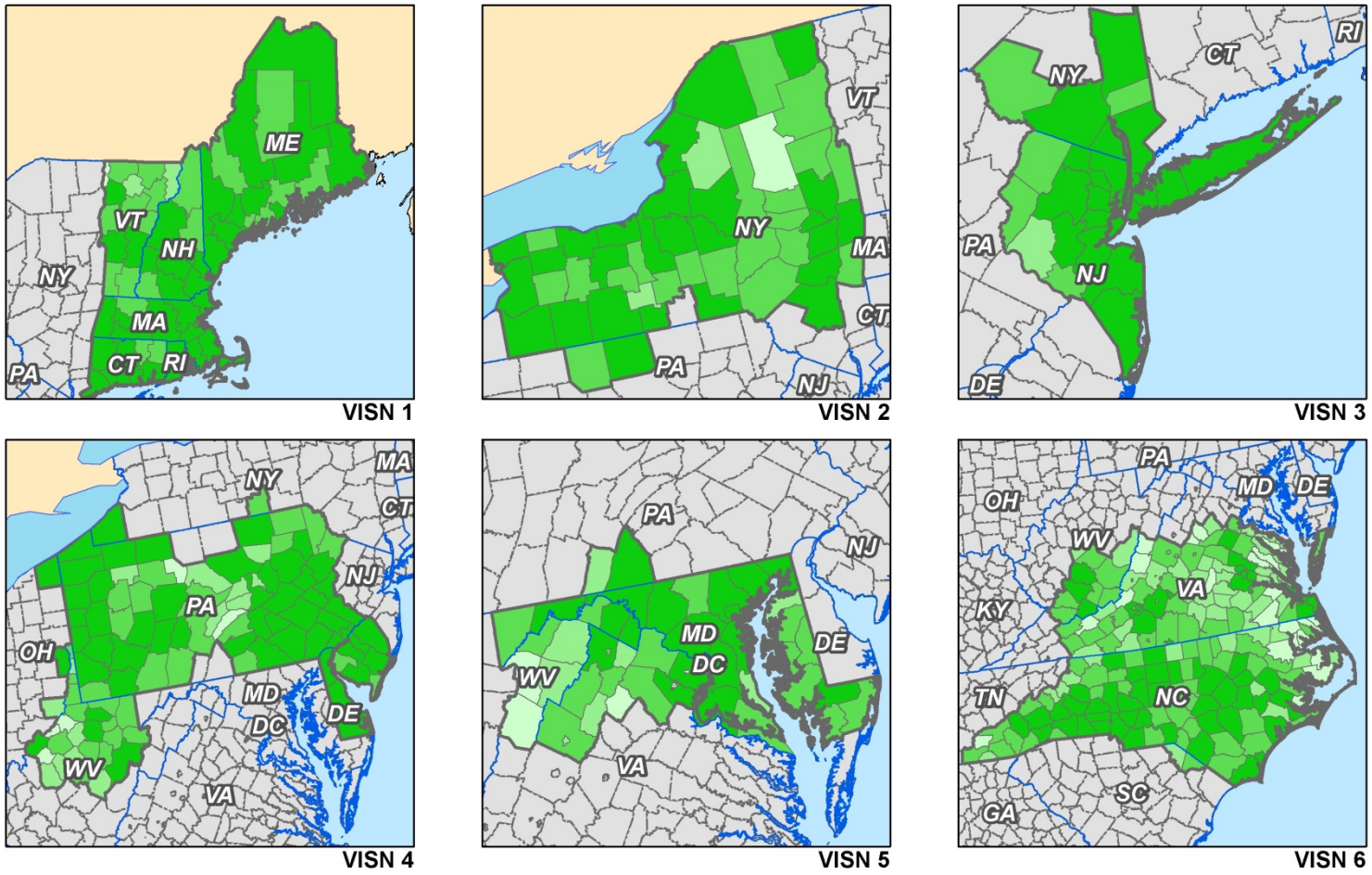
Map 3:

Number of VHA Patients with Stroke
By County FY - 2014

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 7/2/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Stroke



Map 4:

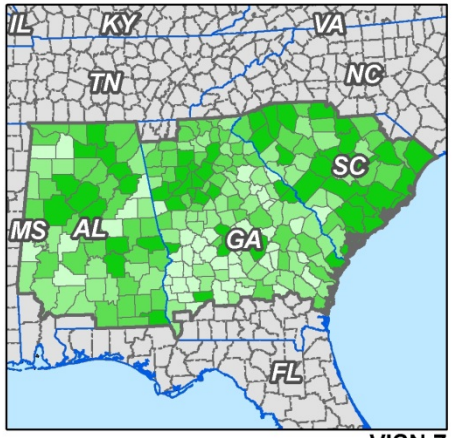
Number of VHA Patients with Stroke by County, FY - 2014

GeoSpatial Outcomes Division
VHA Office of Rural Health

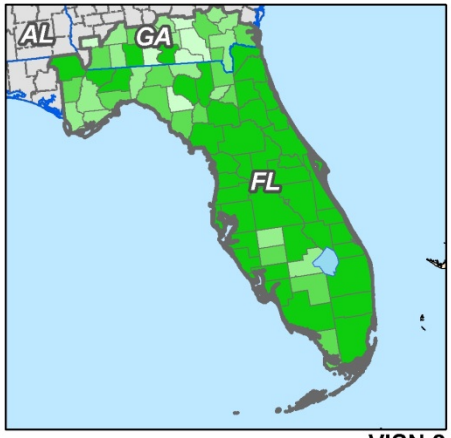
Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 7/2/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Stroke

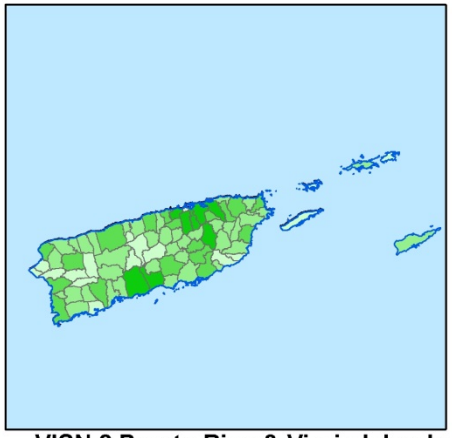
GeoSpatial Outcomes Division
VHA Office of Rural Health

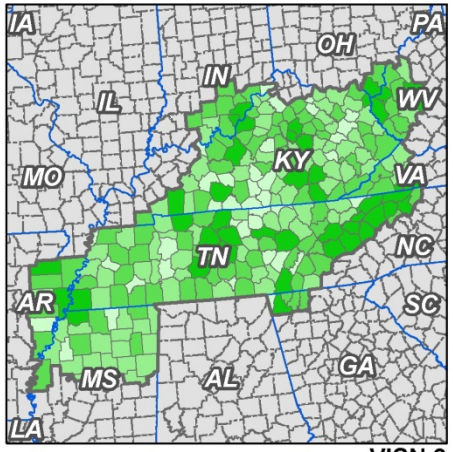


VISN 7

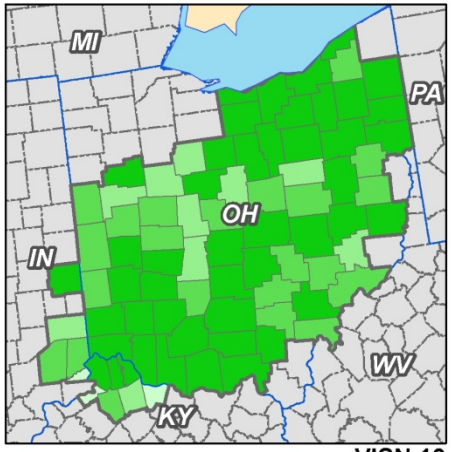


VISN 8

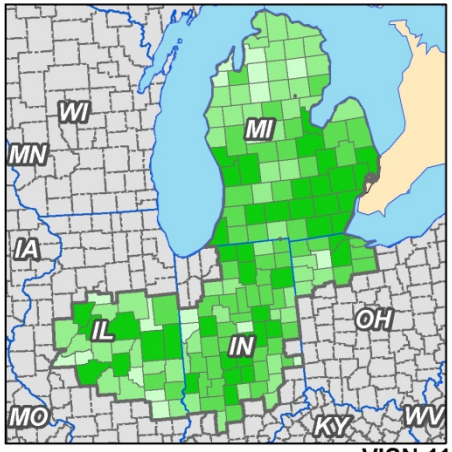

VISN 8 Puerto Rico & Virgin Islands



VISN 9



VISN 10



VISN 11

Patient Count
- 0 - 12 (Lower 25%)
- 13 - 29
- 30 - 71
- 72 - 2,992 (Upper 25%)
- VISN
- State

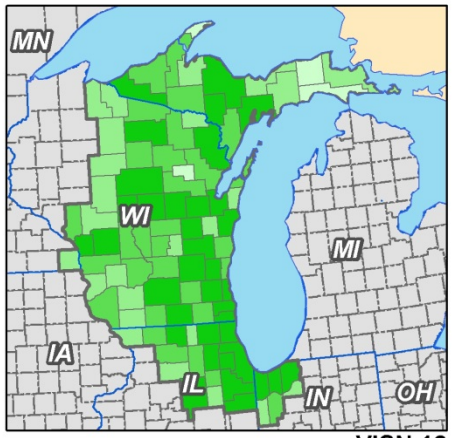
Map 5:

Number of VHA Patients with Stroke
By County FY - 2014

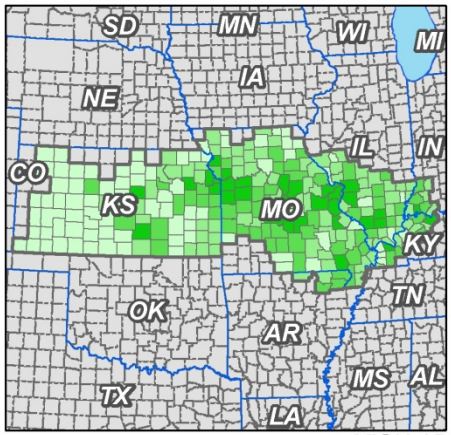
GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 7/2/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

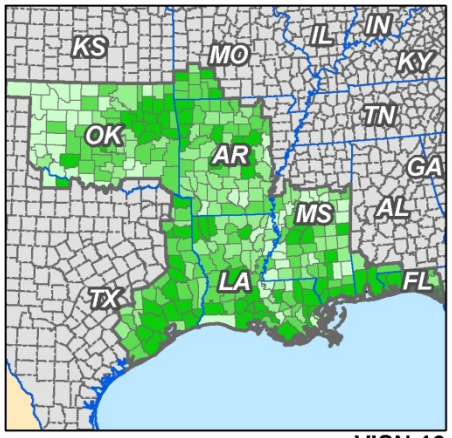
Stroke



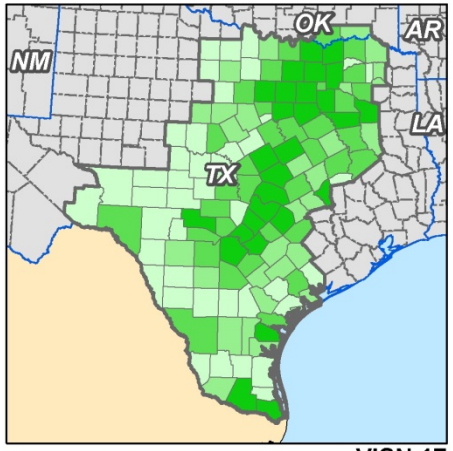
VISN 12



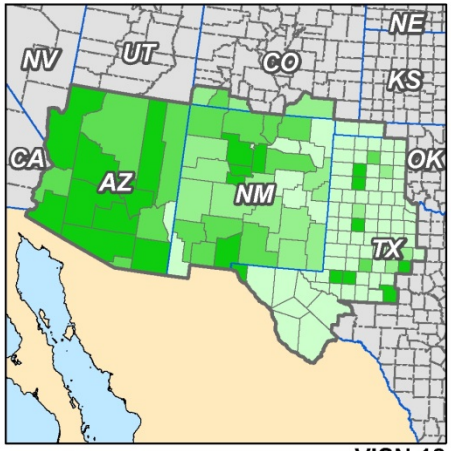
VISN 15



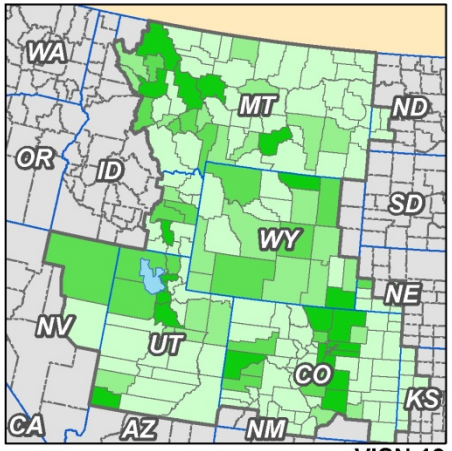
VISN 16



VISN 17



VISN 18



VISN 19

Patient Count

- 0 - 12 (Lower 25%)
- 13 - 29
- 30 - 71
- 72 - 2,992 (Upper 25%)
- VISN
- State

Map 6:

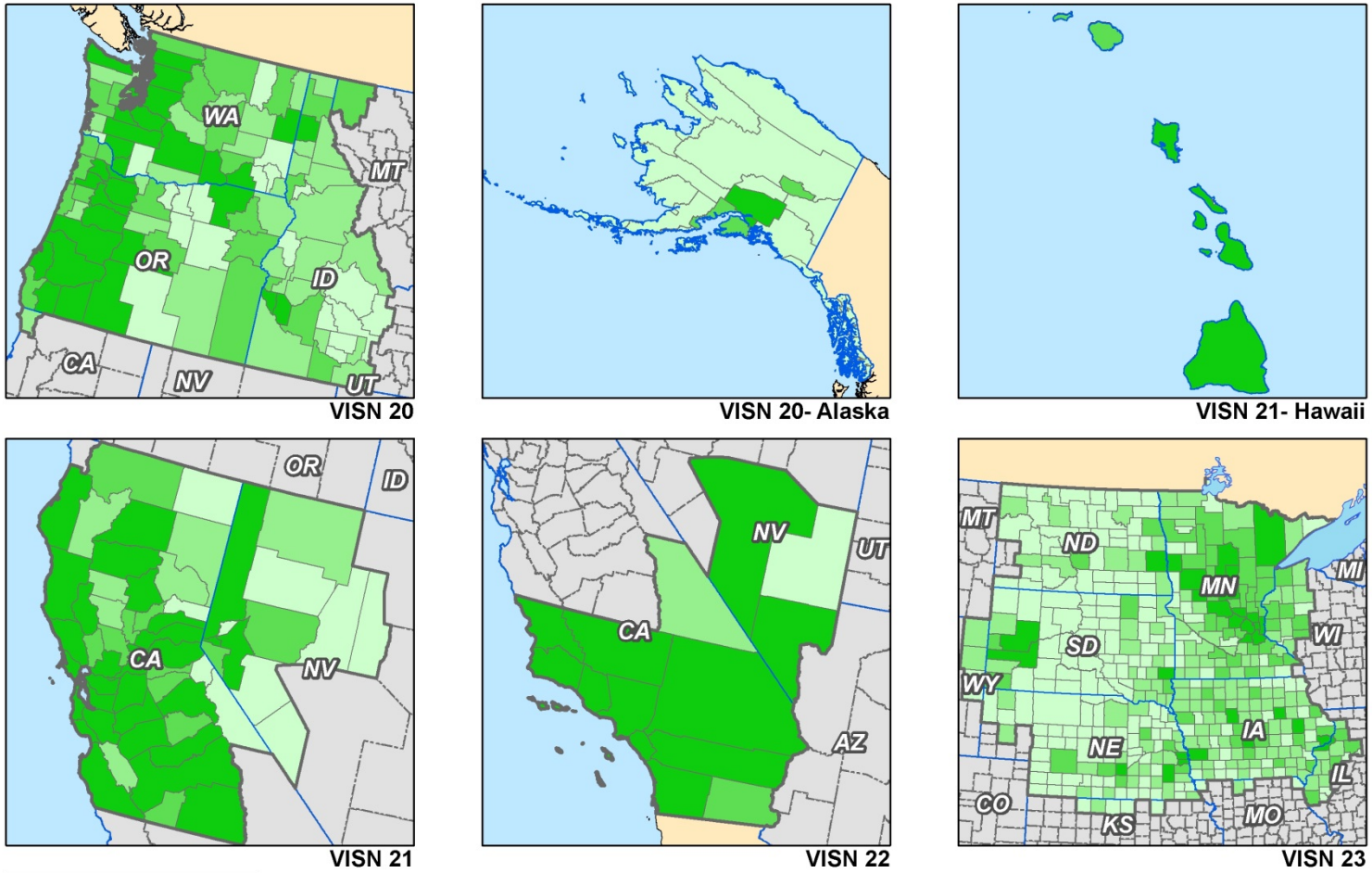
Number of VHA Patients with Stroke
By County, FY - 2014

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 7/2/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Stroke

GeoSpatial Outcomes Division
VHA Office of Rural Health



Map 7:

Number of VHA Patients with Stroke
By County, FY - 2014

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 7/2/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Section II Highlights: Rural and Highly Rural VHA Patients with Stroke

This section focuses on the overall prevalence of Stroke in each VISN, broken down by the following rurality categories*: highly rural, rural, urban, and unknown*. Beginning with Fiscal Year 2011, the repository from where these data were extracted obtained the rural designation data from the most recent geocoded rurality table provided by VHA's Planning System Support Group (PSSG). If not available from this source, the repository's algorithm then looks to the Office of Rural Health's (ORH) ZIP-based file located on the ORH website.[1] In FY-2014*, the VHA's definition of rurality was based on the U.S. Census definition for rural and urban, with an added category of Highly Rural. The definition of these categories is as follows:

- *urban* - areas defined by U.S. Census as an urbanized area.
- *rural* - all other areas excluded in U.S. Census defined urbanized areas
- *highly rural* - any rural area within a county with less than 7.0 civilians per square mile

Since the *rural and highly rural* categories are of particular interest in this volume, numbers and percentages are distinctively highlighted in shades of blue in Table 2. For the maps, urban areas are shaded and urban patients are removed from the numerator and denominator. The maps in this section illustrate graphically the data on rural and highly rural patients with Stroke. For this section, both the number and the percentages of rural and highly rural patients with Stroke at the VISN, State, and county levels are mapped.

*Note: Starting at the beginning of FY-2015, the VA changed its definitions based on Rural-Urban Commuting Area (RUCA) Codes. Future editions of the Rural Veterans Health Care Atlas will use the new definition of rurality: Urban Area: Census tracts with at least 30 percent of the population residing in an urbanized area as defined by the Census Bureau; Rural Area: Land areas not designed as urban or highly rural. Highly Rural Area: Sparsely populated areas — less than 10 percent of the working population commutes to any community larger than an urbanized cluster, which is typically a town of no more than 2,500 people.

National Overview

In FY-2014, 257,448 VHA patients had a primary or secondary diagnosis of Stroke. The majority of patients with Stroke lived in urban areas (60.90%). However, close to forty percent resided in either rural (N=97,555) or highly rural (N=2,957) areas (39.04% combined).

VISN Overview

The Rocky Mountain Network (VISN 19) had the highest number of patients with Stroke residing in a defined *highly rural* area at 824, which represented 13.26% of the total number of patients with Stroke in that network (Table 2). The South Central Network (VISN 16) had the highest number of patients with Stroke residing in a defined *rural* area at 12,036, which represented 50.64% of the total number of patients with Stroke in that network. Of note is that five of the 21 VISNs, almost one-quarter, had a higher proportion of *rural* patients with Stroke compared to *urban* patients with Stroke: VISN 6 (Mid-Atlantic), VISN 9 (Mid-South), VISN 15 (Heartland), VISN 16 (South Central), and VISN 23 (Midwest).

Map 8 and Map 9 show the number and percentages of rural and highly rural patient with Stroke by VISN. VISNs 9 and 16 show both a high volume of rural and highly rural patients with Stroke and a large proportion of their rural and highly rural patient population who had this disease. VISNs 7 and 23 had a relatively large number of patients with Stroke, but the proportion of rural and highly rural patients with Stroke represented a relatively low percentage of the total rural and highly rural patient population. Conversely, VISNs 4 and 10 had a moderate number of combined rural and highly rural patients with Stroke, but Stroke is quite prevalent in the rural and highly patient population (upper 25% quartile).

State Overview

Map 10 shows the number of VHA rural and highly rural patients with Stroke by State (by quartile). The top 10 States with the highest number of rural and highly rural patients with Stroke by rank order were: Texas (N=6,916), Ohio (N=5,193), North Carolina (N=4,797), Florida (N=4,367), Pennsylvania (N=4,262), Missouri (N=3,842), New York (N=3,717), Kentucky (N=3,395), Georgia (N=3,280), and Tennessee (N=3,180). The proportion of rural and highly rural patients with Stroke to the total rural and highly rural patient population is displayed in Map 11. Four of the States (Ohio, Kentucky, Florida and New York) with the highest volume of rural and highly rural patients with Stroke also had the highest

proportions of Stroke in their rural and highly rural patient population. The States with the highest percentage of their rural and highly rural patients (and more than 10 patients classified as rural or highly rural) with Stroke were: Ohio (6.05%), Louisiana (5.79%), Mississippi (5.73), Kentucky (5.59%), West Virginia (5.53%), Indiana (5.35%), Florida (5.30%), Delaware (5.15%), Arkansas (5.13%), and New York (5.11%).

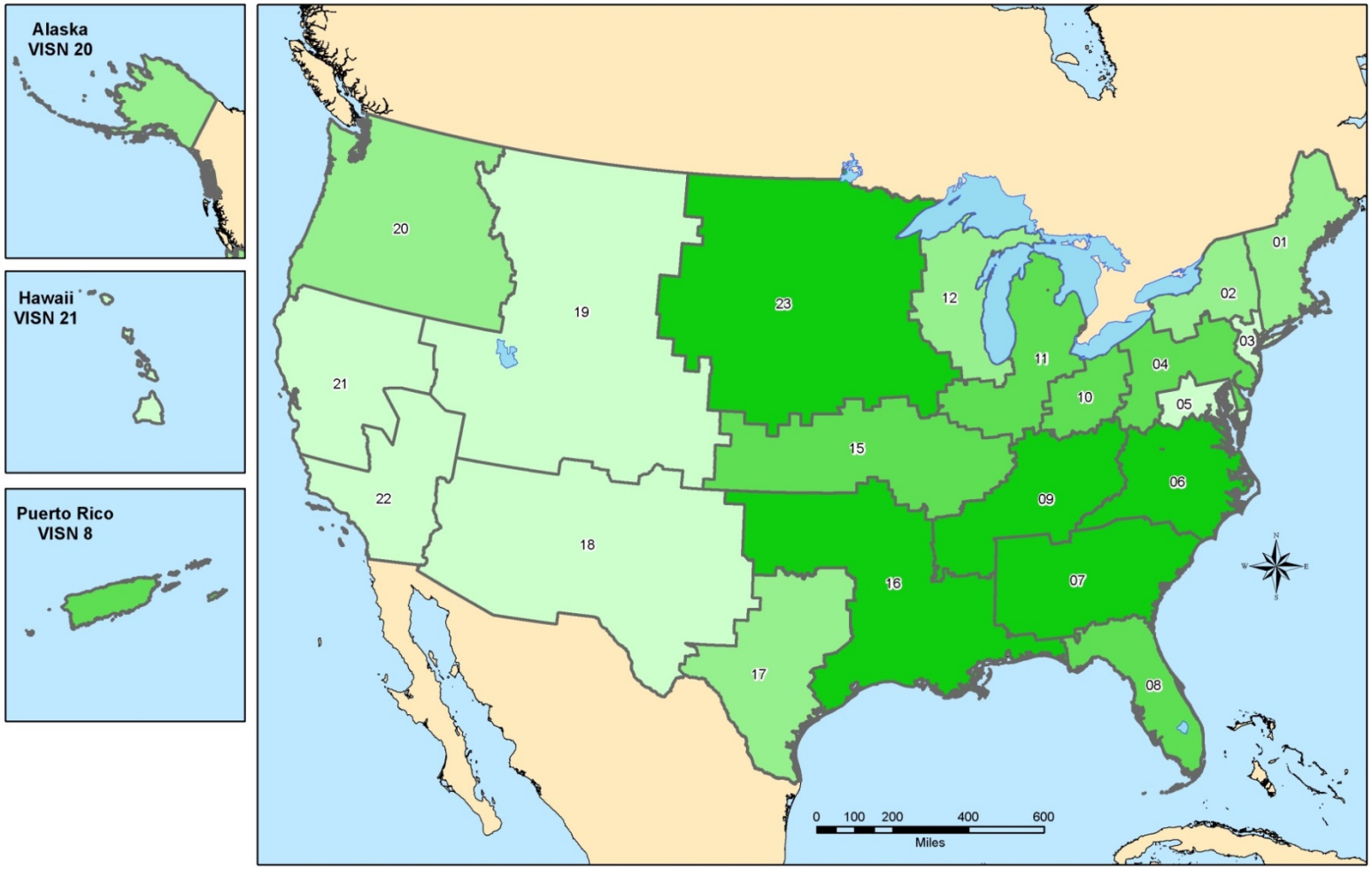
County Overview

The number of rural and highly rural patients with Stroke by county is displayed by quartiles in Map 12. The highest 25% in terms of volume is designated by the darkest shade. The proportion of rural and highly rural patients with Stroke of the total rural and highly rural patient population is portrayed in Map 13. In addition to the National map, eight additional maps are provided that zoom to the VISN level (Maps 14-21) to give a clearer picture of the number and percentages of rural and highly rural patients with Stroke and the geographic patterns by county within each VISN. The top 10 counties with the largest number of VHA rural and highly rural patients with Stroke across the US were in the States of Arizona (2 counties), California (1 county), Florida (1 county), Maine (1 county), New York (2 counties), Ohio (1 county), Oregon (1 county) and Pennsylvania (1 county). Yavapai County, Arizona had the largest number of rural and highly rural patients with Stroke (N=330) followed by, in rank order: Douglas County, Arizona (N=315), Marion County, Florida (N=300), Schuylkill County, Pennsylvania (N=295), Chautauqua County, New York (N=285), Pima County, Arizona (N=257), Oswego County, New York (N=247), San Bernardino County, California (N=245), Kennebec County, Maine (N=238), and Ross County, Ohio (N=238). The top 10 counties with the largest proportion of their rural and highly rural patients (and there were at least 10 rural and highly rural patients) with a Stroke diagnostic code were: Carolina Municipio, Puerto Rico (30.77%), Greeley County, Kansas (20.00%), Winchester City, Virginia (15.38%), Bristol City, Virginia (14.29%), Juana Diaz Municipio, Puerto Rico (13.04%), Charles City, Virginia (11.64%), Concho County, Texas (11.43%), Ellis County, Oklahoma (11.29%), Menard County, Texas (11.29%), and Colonial Heights City, Virginia (11.11%).

Table 2: National and VISN Numbers and Percentages of VHA Patients with Stroke by Rurality, FY-2014

Prevalence Statistics by Rurality- Stroke, FY-2014									
Veterans Integrated Service Network	Total Number of Stroke Patients	Highly Rural		Rural		Urban		Unknown	
		N	(%)	N	(%)	N	(%)	N	(%)
New England (01)	9,962	33	0.33	3,499	35.12	6,430	64.55	*	*
Upstate NY (02)	6,735	*	*	3,260	48.40	3,472	51.55	*	*
NY/NJ (03)	6,431	*	*	358	5.57	6,073	94.43	*	*
Stars and Stripes (04)	16,225	3	0.02	6,112	37.67	10,106	62.29	*	*
Capitol (05)	5,500	*	*	1,336	24.29	4,162	75.67	*	*
Mid-Atlantic (06)	15,162	3	0.02	7,602	50.14	7,555	49.83	*	*
Southeast (07)	15,495	*	*	7,250	46.79	8,243	53.20	*	*
Sunshine (08)	27,140	3	0.01	4,774	17.59	22,353	82.36	3	0.01
Mid South (09)	13,993	*	*	8,159	58.31	5,825	41.63	*	*
Ohio (10)	12,429	4	0.03	4,732	38.07	7,691	61.88	*	*
Vets in Partnership (11)	12,436	*	*	5,175	41.61	7,254	58.33	*	*
Great Lakes (12)	10,987	42	0.38	3,592	32.69	7,349	66.89	*	*
Heartland (15)	11,672	81	0.69	6,564	56.24	5,024	43.04	*	*
South Central (16)	23,769	28	0.12	12,036	50.64	11,701	49.23	3	0.01
Heart of Texas (17)	11,169	74	0.66	4,277	38.29	6,813	61.00	*	*
Southwest (18)	9,556	447	4.68	2,604	27.25	6,499	68.01	4	0.04
Rocky Mtn. (19)	6,215	824	13.26	1,776	28.58	3,613	58.13	*	*
Northwest (20)	9,702	543	5.60	3,537	36.46	5,618	57.91	4	0.04
Sierra Pacific (21)	9,368	133	1.42	2,609	27.85	6,532	69.73	93	0.99
Desert Pacific (22)	10,821	128	1.18	909	8.40	9,782	90.40	*	*
Midwest (23)	12,681	604	4.76	7,394	58.31	4,685	36.95	*	*
Grand Total	257,448	2,957	1.15	97,555	37.89	156,780	60.90	118	0.05

Stroke



Patient Count
- 358 - 3,051 (Lower 25%)
- 3,052 - 4,351
- 4,352 - 6,645
- 6,646 - 12,064 (Upper 25%)

Map 8:

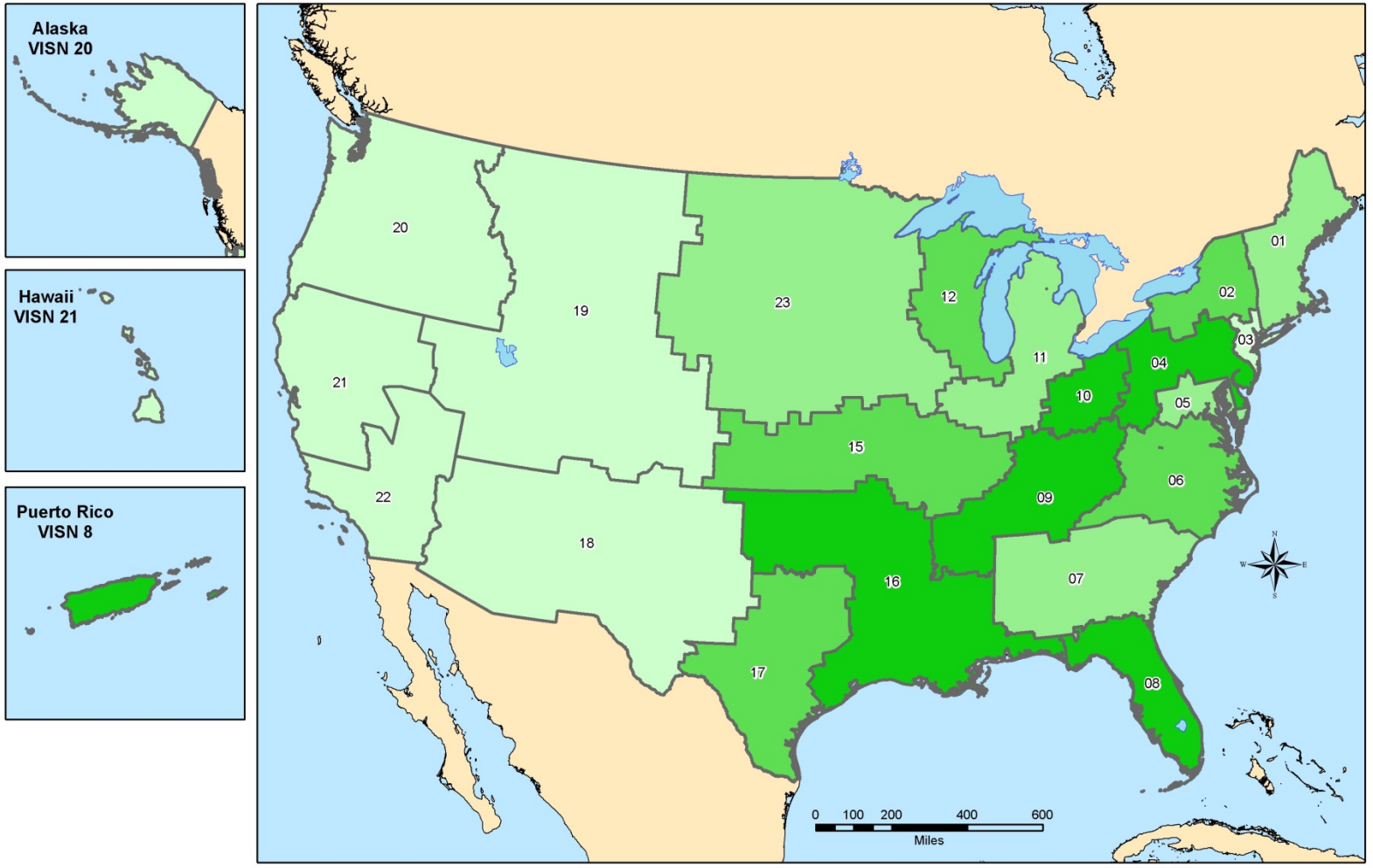
Number of Rural and Highly Rural VHA Patients with Stroke
By VISN FY - 2014

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 7/2/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Stroke

GeoSpatial Outcomes Division
VHA Office of Rural Health



Percent of Patients
- 3.5% - 4.1%
- 4.2% - 4.6%
- 4.7% - 5.2%
- 5.3% - 6.1%

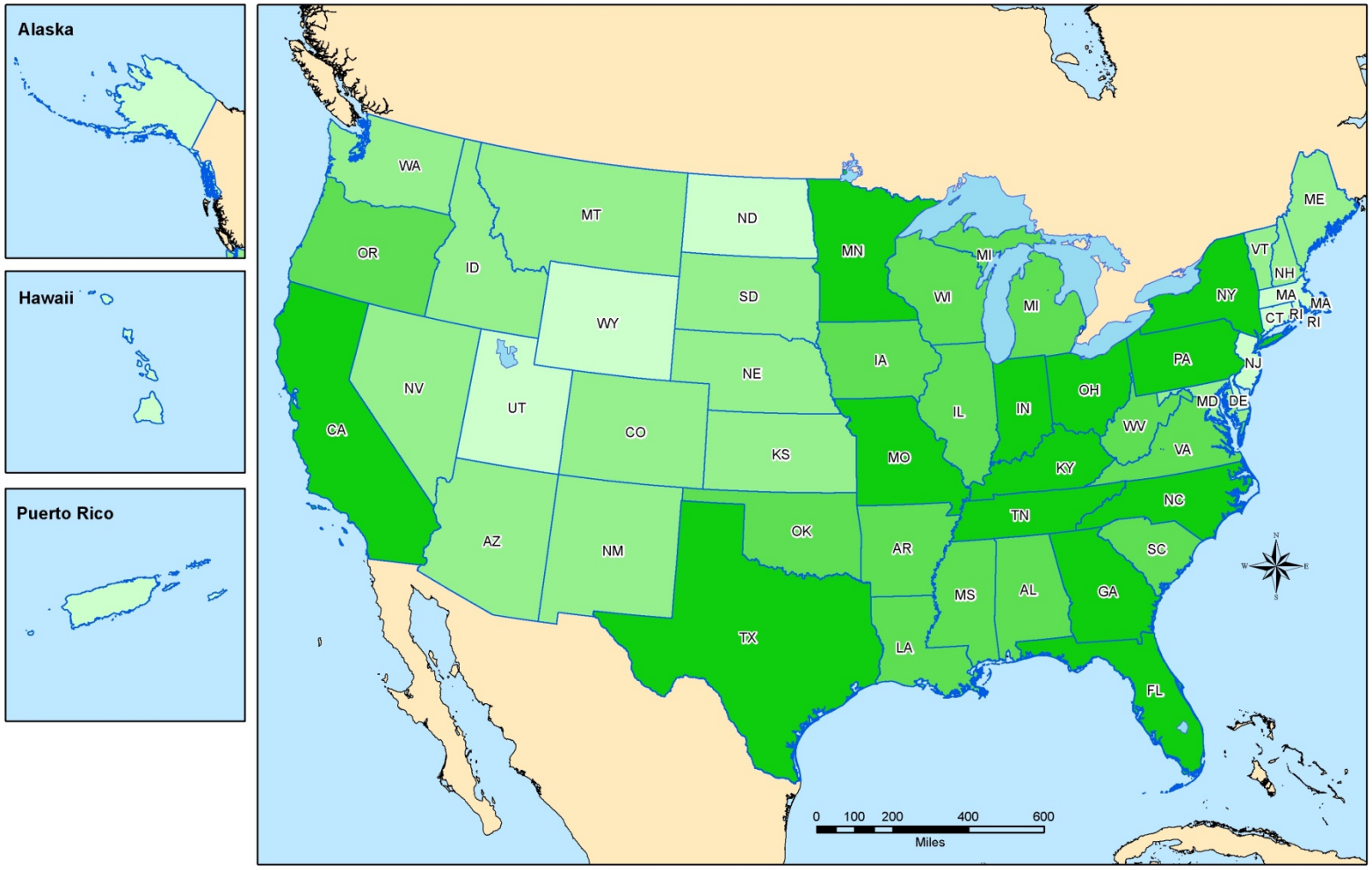
Map 9:

Percent of Rural and Highly Rural VHA Patients with Stroke
Of All Rural and Highly Rural VHA Patients
By VISN FY - 2014

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 7/2/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Stroke



Patient Count

- 0 - 457 (Lower 25%)
- 458 - 1,594
- 1,595 - 2,768
- 2,769 - 6,916 (Upper 25%)

Map 10:

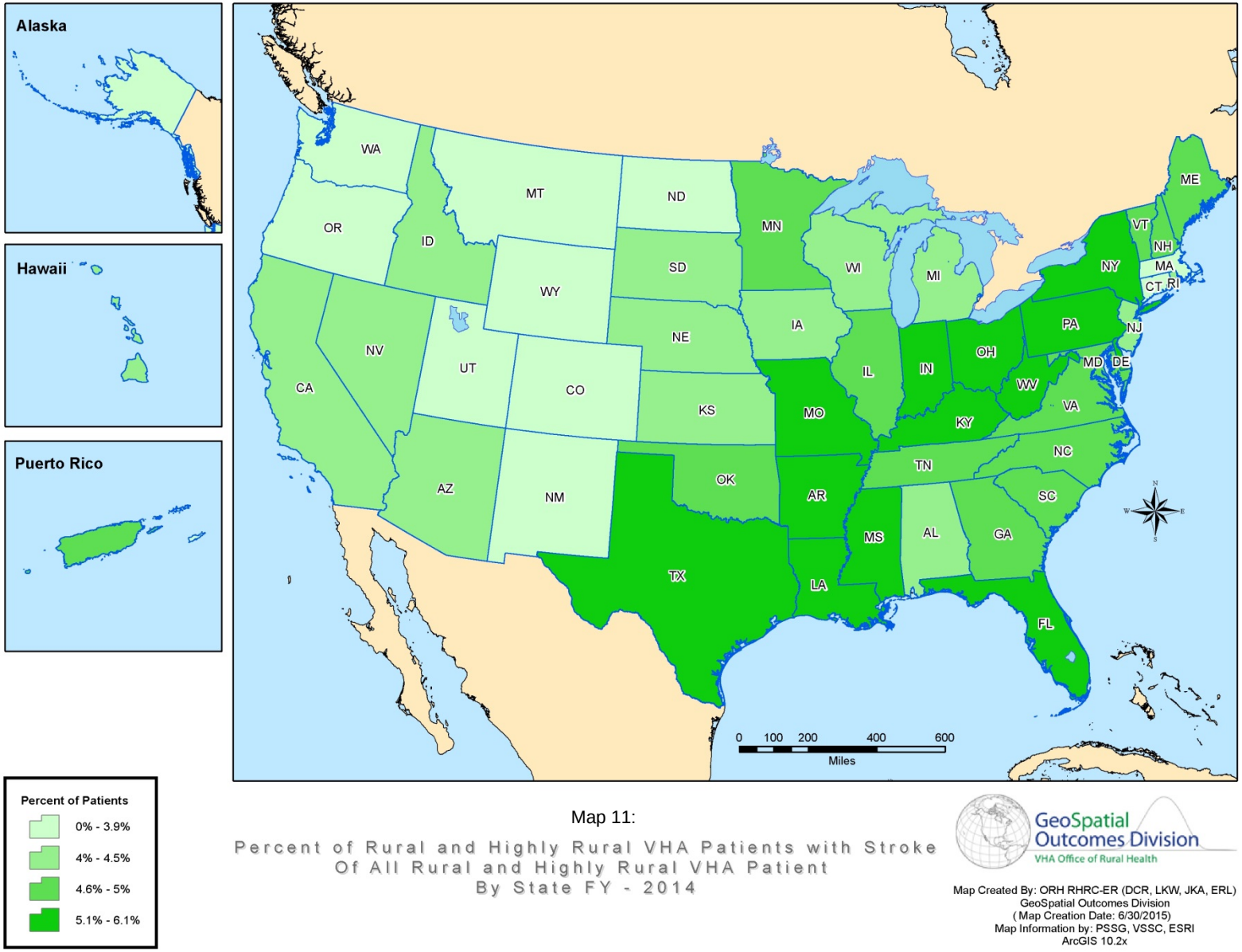
Number of Rural and Highly Rural VHA Patients with Stroke By State FY - 2014

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 6/30/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Stroke

GeoSpatial Outcomes Division
VHA Office of Rural Health



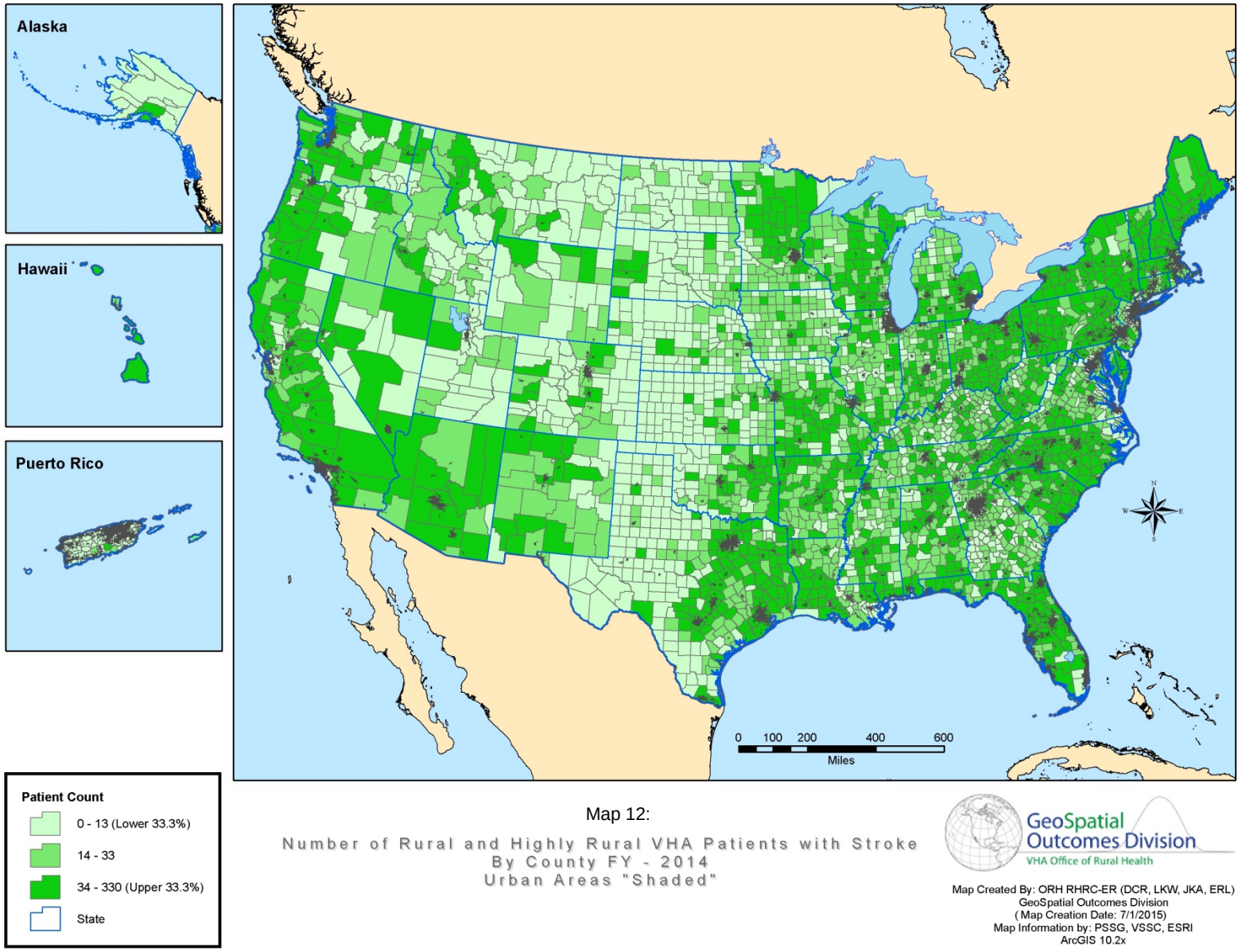
Map 11:

Percent of Rural and Highly Rural VHA Patients with Stroke
Of All Rural and Highly Rural VHA Patient
By State FY - 2014

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 6/30/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Stroke



Map 12:

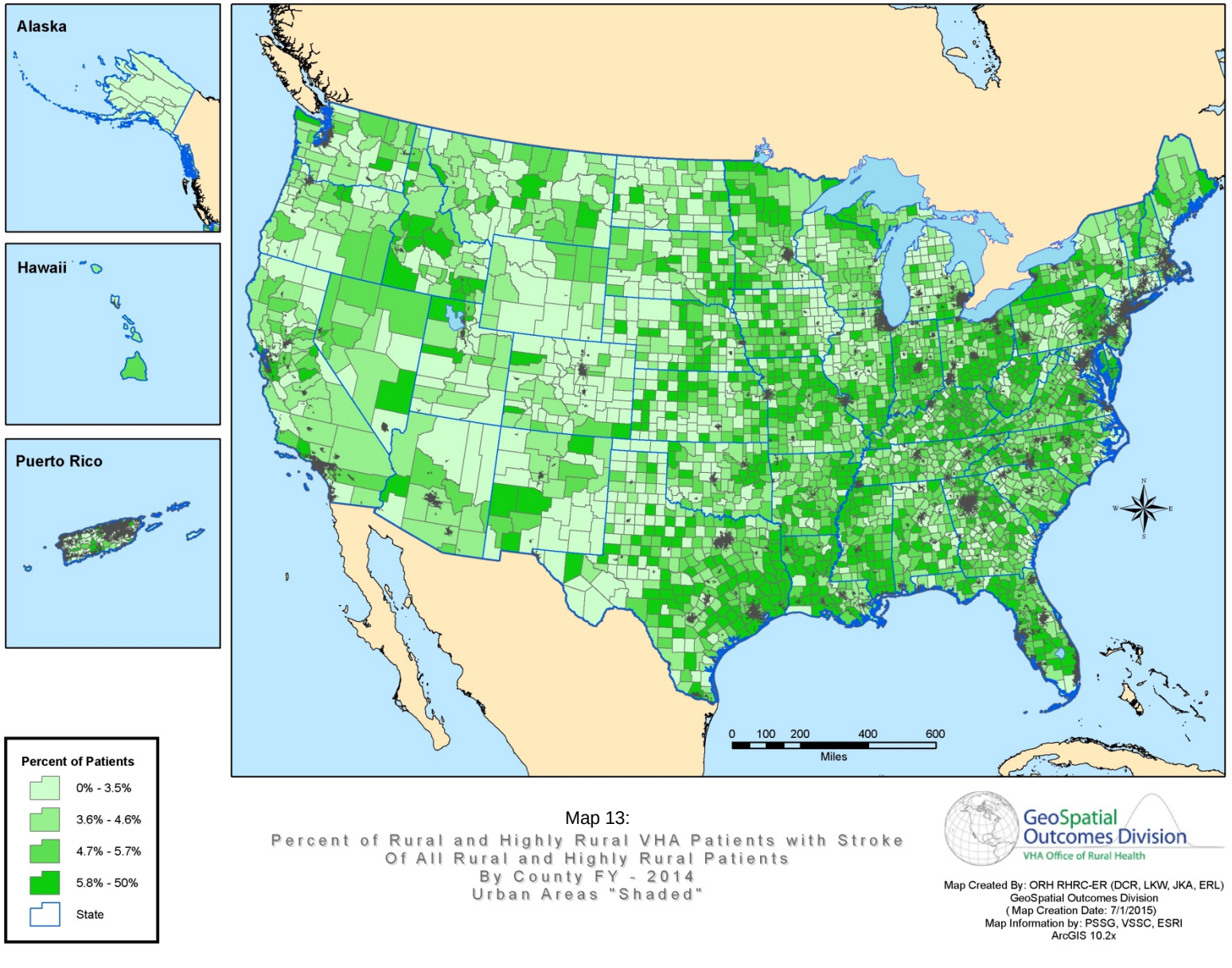
Number of Rural and Highly Rural VHA Patients with Stroke
By County FY - 2014
Urban Areas "Shaded"

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 7/1/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Stroke

GeoSpatial Outcomes Division
VHA Office of Rural Health



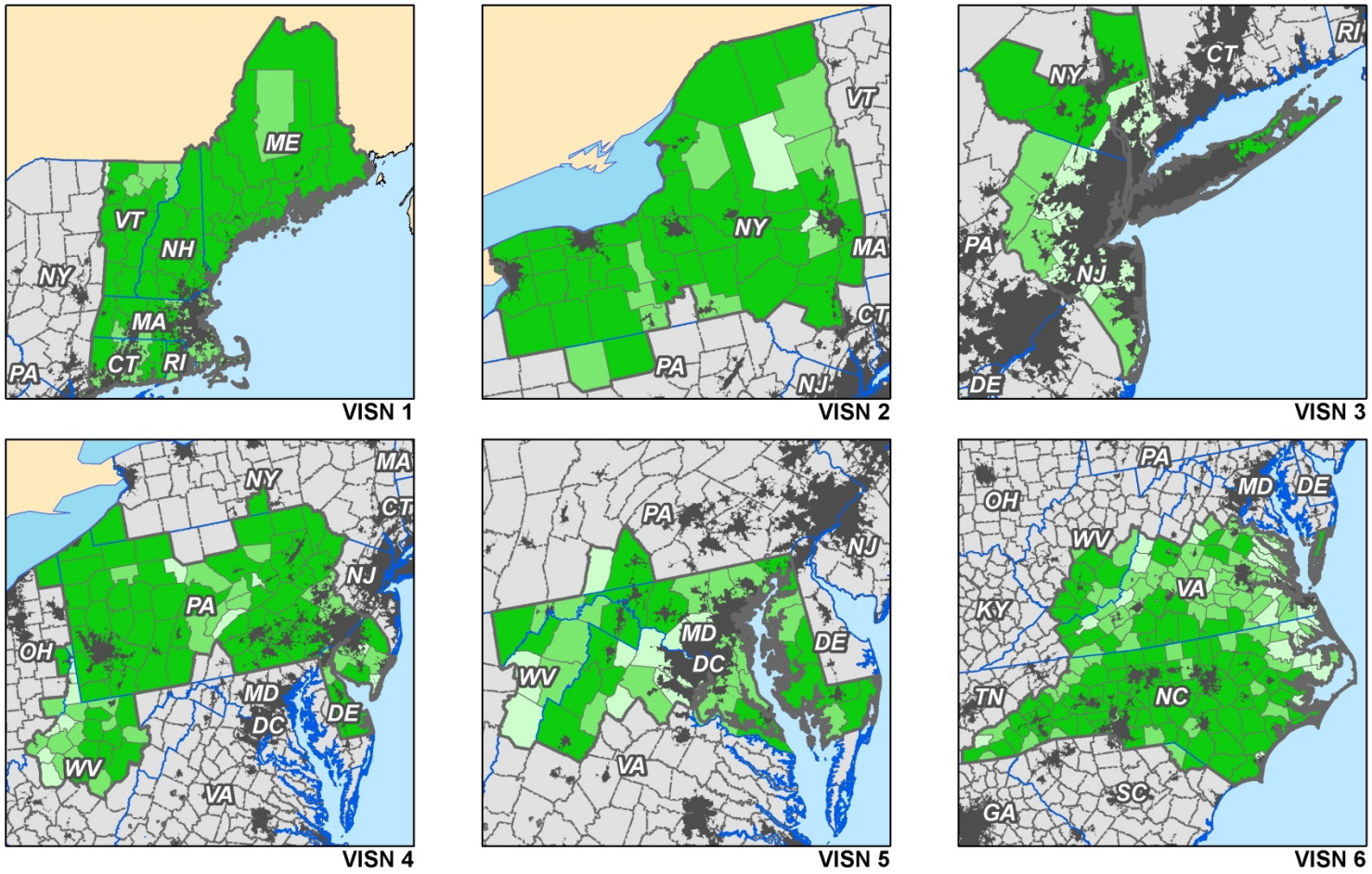
Map 13:

Percent of Rural and Highly Rural VHA Patients with Stroke
Of All Rural and Highly Rural Patients
By County FY - 2014
Urban Areas "Shaded"

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 7/1/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Stroke



Patient Count

- 0 - 13 (Lower 33.3%)
- 14 - 33
- 34 - 330 (Upper 33.3%)
- VISN
- State

Map 14:

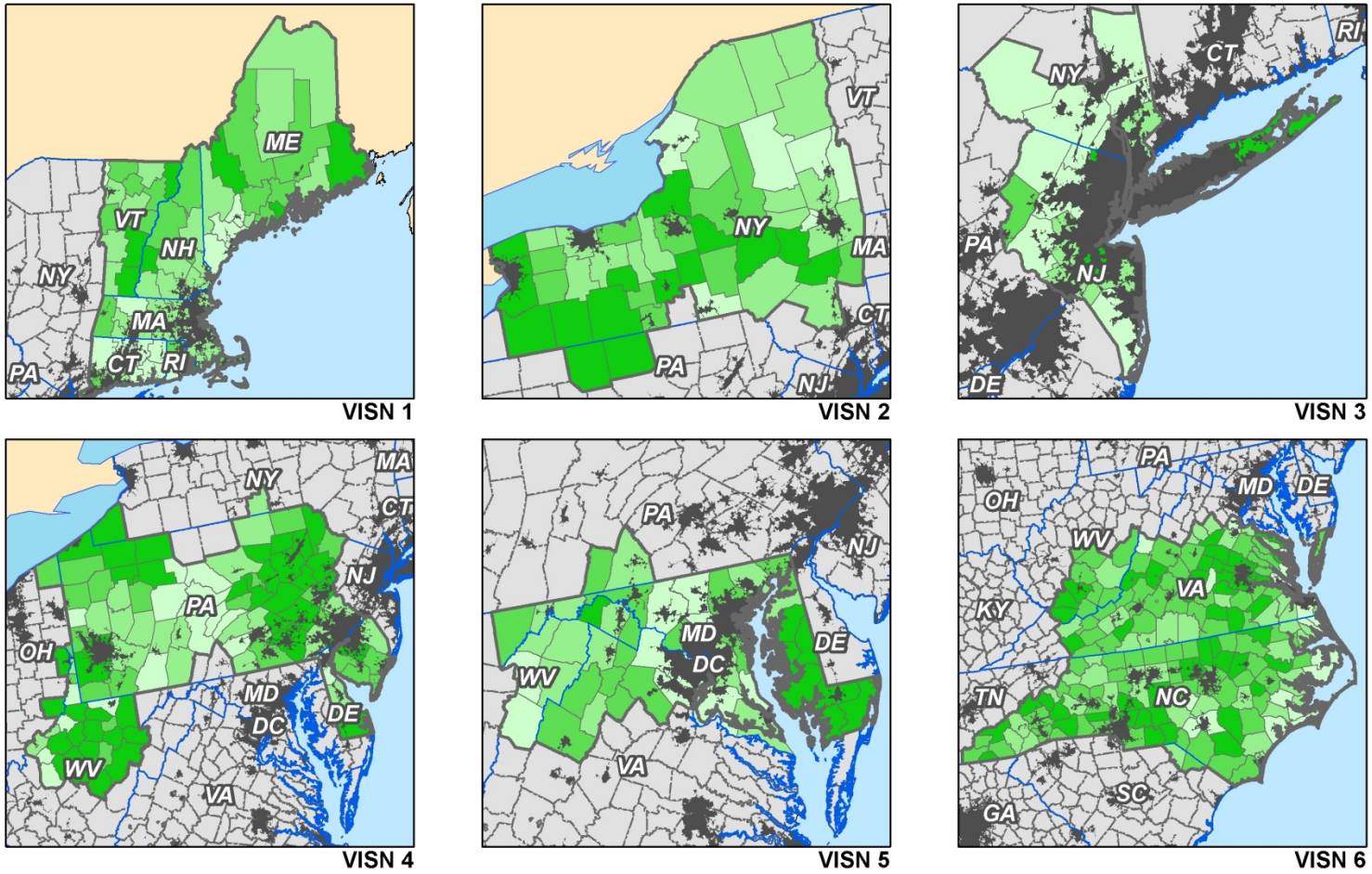
Number of Rural and Highly Rural VHA Patients with Stroke
By County FY - 2014
Urban Areas "Shaded"

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 7/1/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Stroke

GeoSpatial Outcomes Division
VHA Office of Rural Health



Percent of Patients
- 0% - 3.5%
- 3.6% - 4.6%
- 4.7% - 5.7%
- 5.8% - 50%
- VISN
- State

Map 15:

Percent of Rural and Highly Rural VHA Patients with Stroke
Of All Rural and Highly Rural Patients
By County FY - 2014
Urban Areas "Shaded"

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 7/1/2015)
Map Information by: PSSG, VSSC, ESRI
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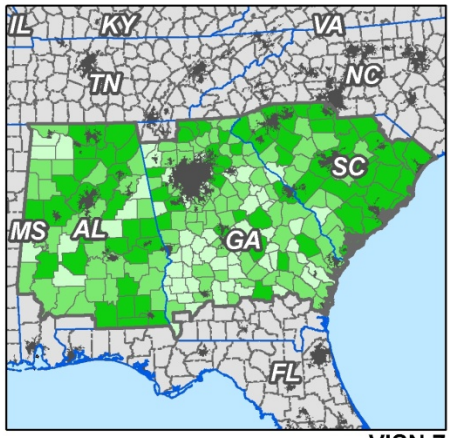
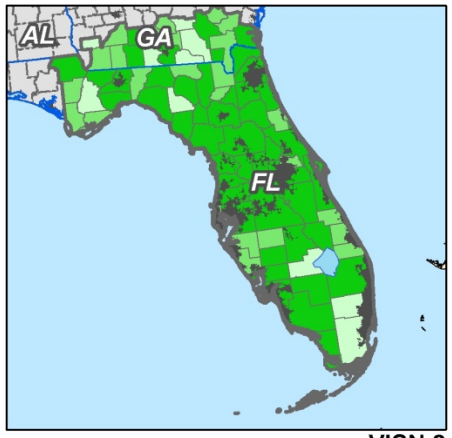
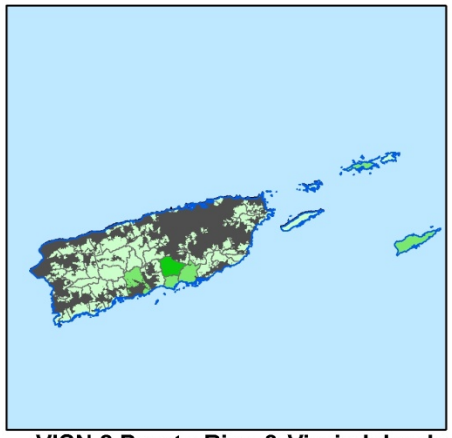


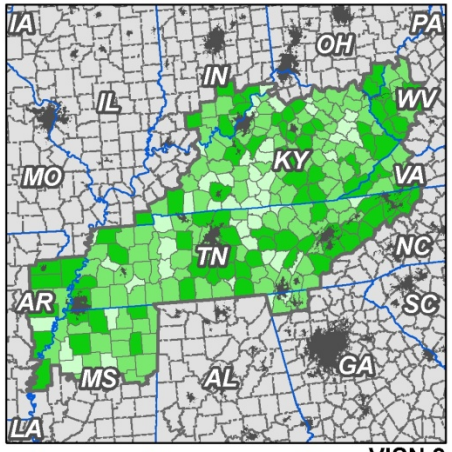
VISN 7



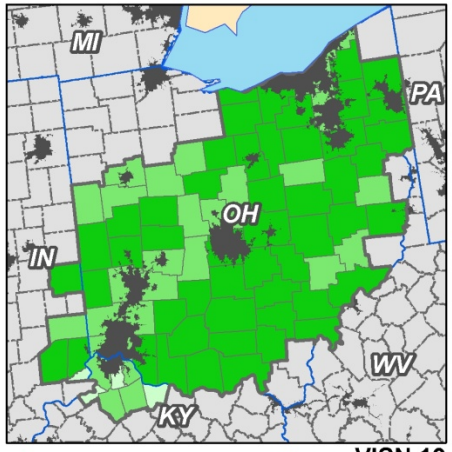
VISN 8



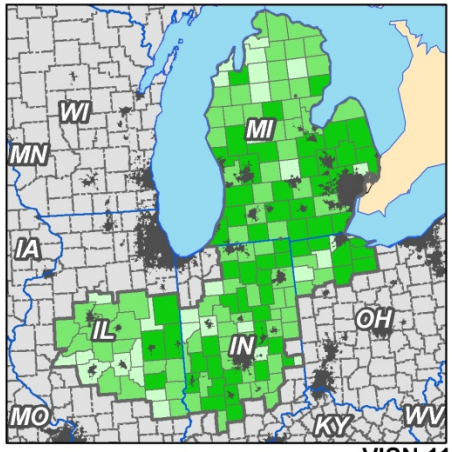
VISN 8 Puerto Rico & Virgin Islands



VISN 9



VISN 10



VISN 11

Patient Count
- 0 - 13 (Lower 33.3%)
- 14 - 33
- 34 - 330 (Upper 33.3%)
- VISN
- State

Map 16:

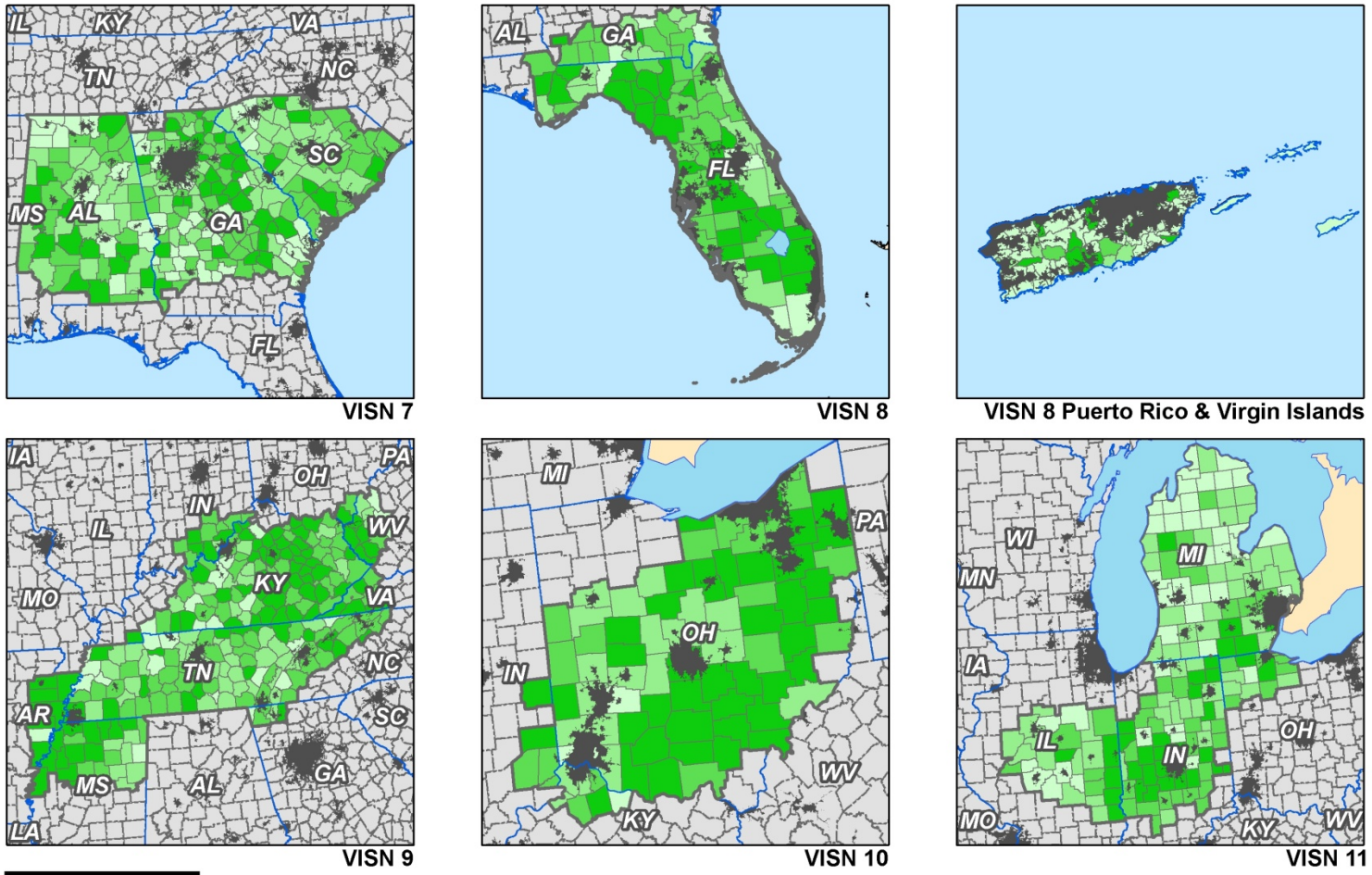
Number of Rural and Highly Rural VHA Patients with Stroke
By County FY - 2014
Urban Areas "Shaded"

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 7/1/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Stroke

GeoSpatial Outcomes Division
VHA Office of Rural Health



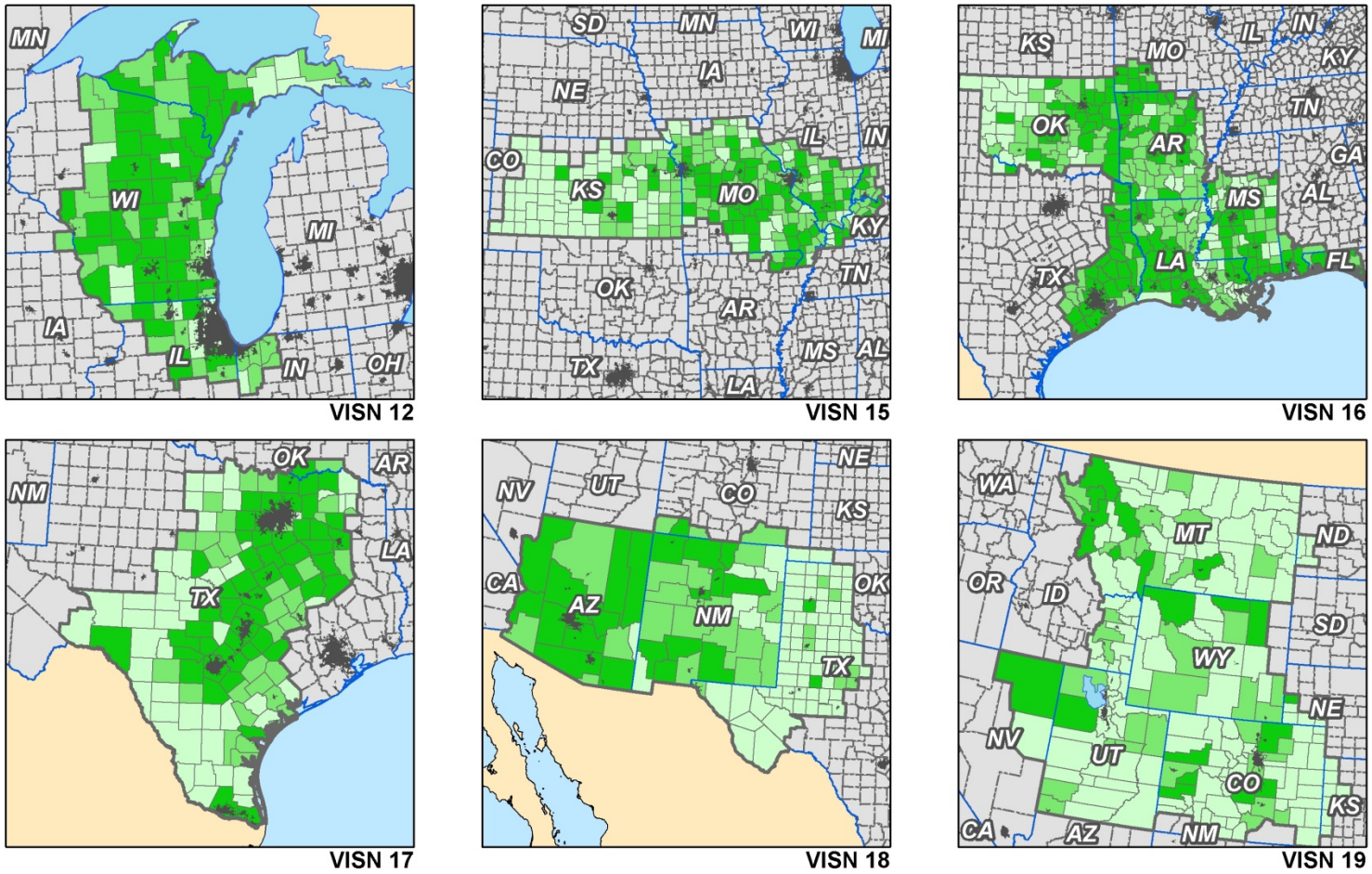
Map 17:

Percent of Rural and Highly Rural VHA Patients with Stroke
Of All Rural and Highly Rural Patients
By County FY - 2014
Urban Areas "Shaded"

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 7/1/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Stroke



Patient Count

- 0 - 13 (Lower 33.3%)
- 14 - 33
- 34 - 330 (Upper 33.3%)
- VISN
- State

Map 18:

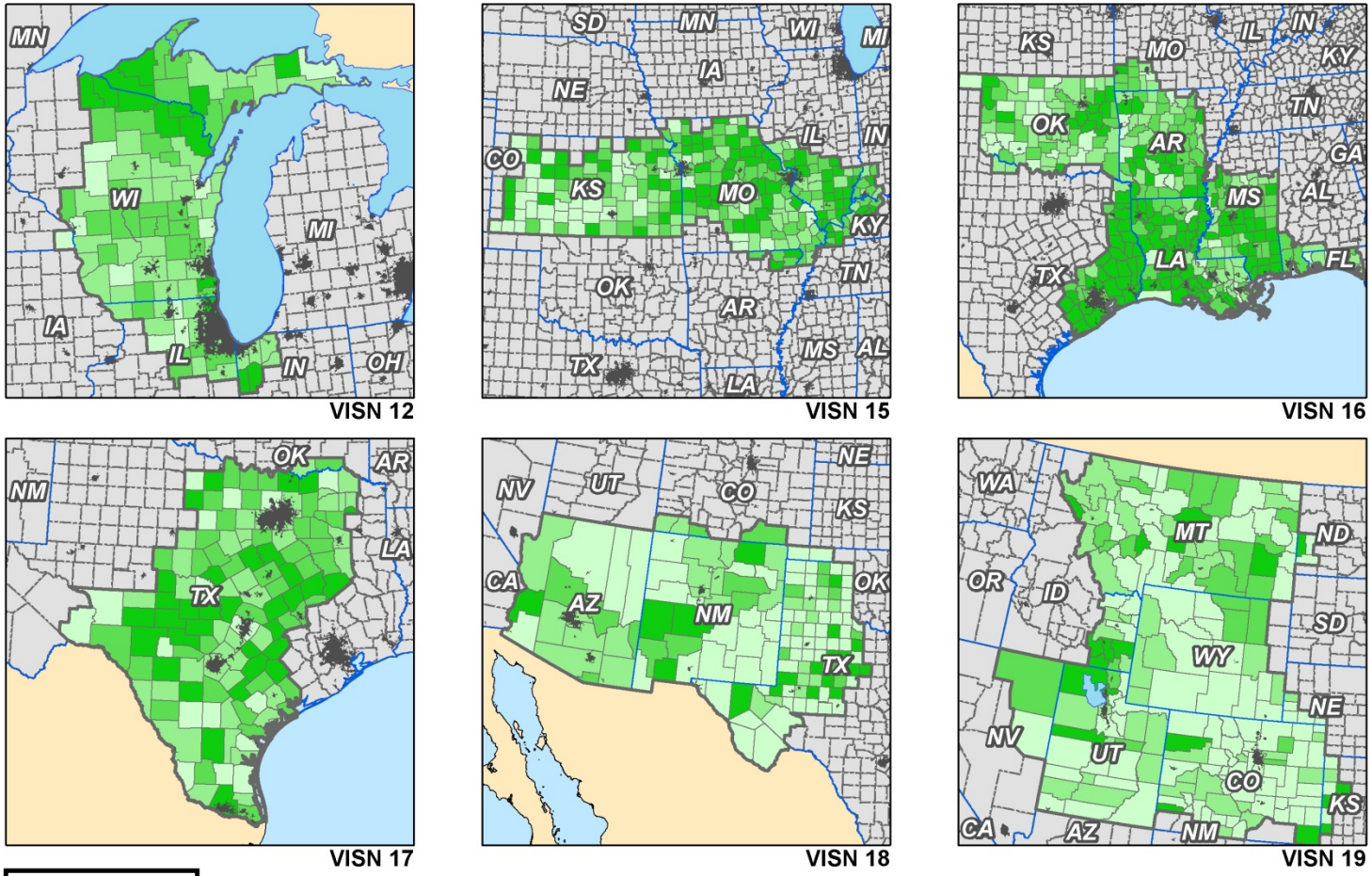
Number of Rural and Highly Rural VHA Patients with Stroke
By County FY - 2014
Urban Areas "Shaded"

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 7/1/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Stroke

GeoSpatial Outcomes Division
VHA Office of Rural Health



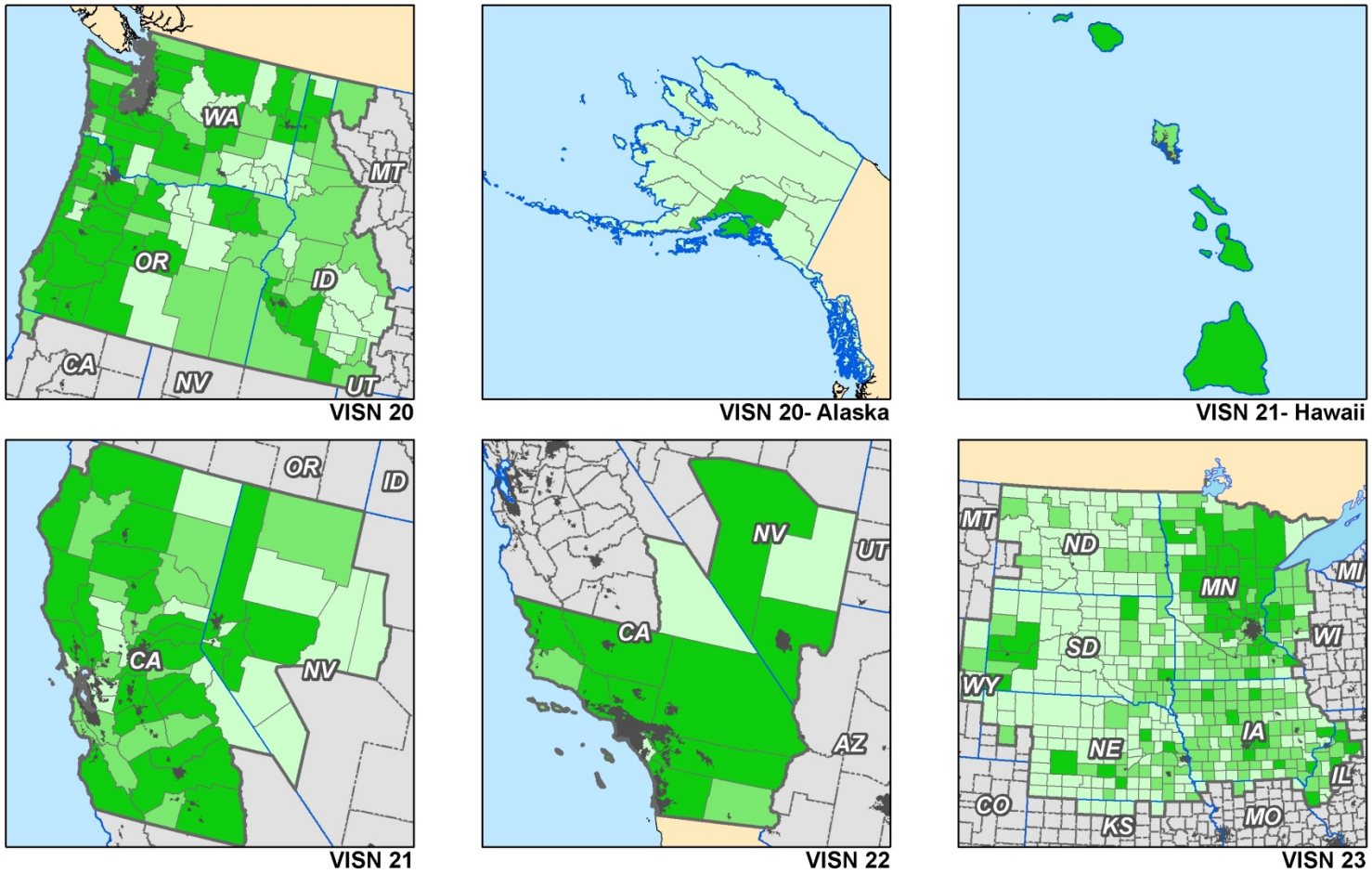
Map 19:

Percent of Rural and Highly Rural VHA Patients with Stroke
Of All Rural and Highly Rural Patients
By County FY - 2014
Urban Areas "Shaded"

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 7/1/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Stroke



Map 20:

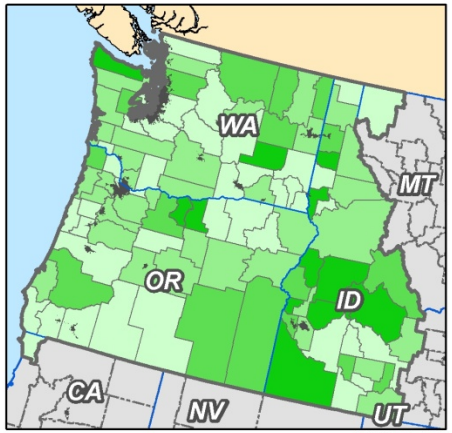
Number of Rural and Highly Rural VHA Patients with Stroke
By County FY - 2014
Urban Areas "Shaded"

GeoSpatial Outcomes Division
VHA Office of Rural Health

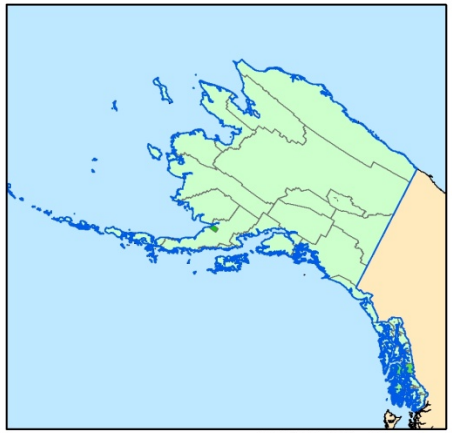
Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 7/1/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

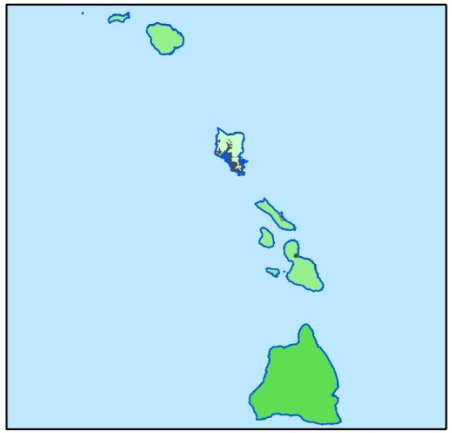
Stroke

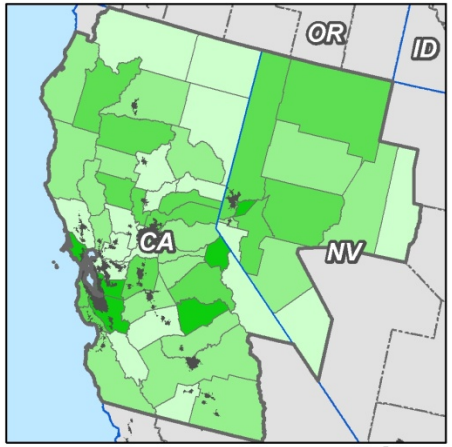
GeoSpatial Outcomes Division
VHA Office of Rural Health



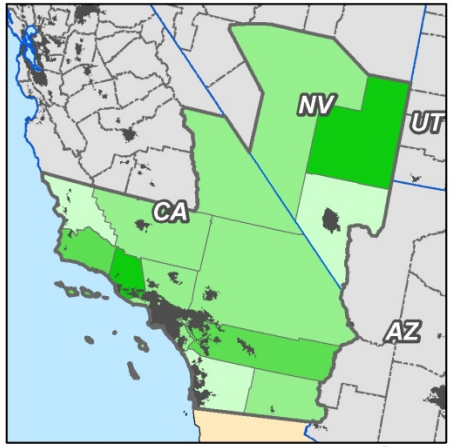
VISN 20


VISN 20- Alaska

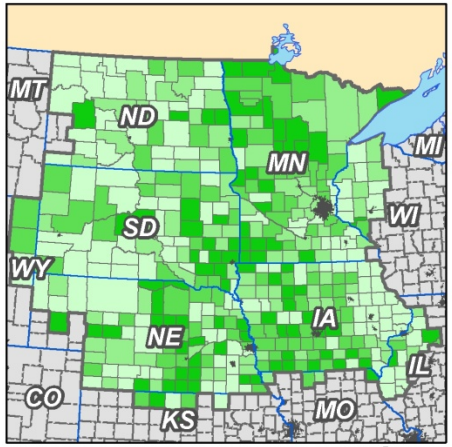

VISN 21- Hawaii



VISN 21



VISN 22



VISN 23

Percent of Patients
- 0% - 3.5%
- 3.6% - 4.6%
- 4.7% - 5.7%
- 5.8% - 50%
- VISN
- State

Map 21:

Percent of Rural and Highly Rural VHA Patients with Stroke Of All Rural and Highly Rural Patients By County FY - 2014 Urban Areas "Shaded"

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 7/1/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Section III Highlights: Rural and Highly Rural VHA Subgroups of Patients with Stroke

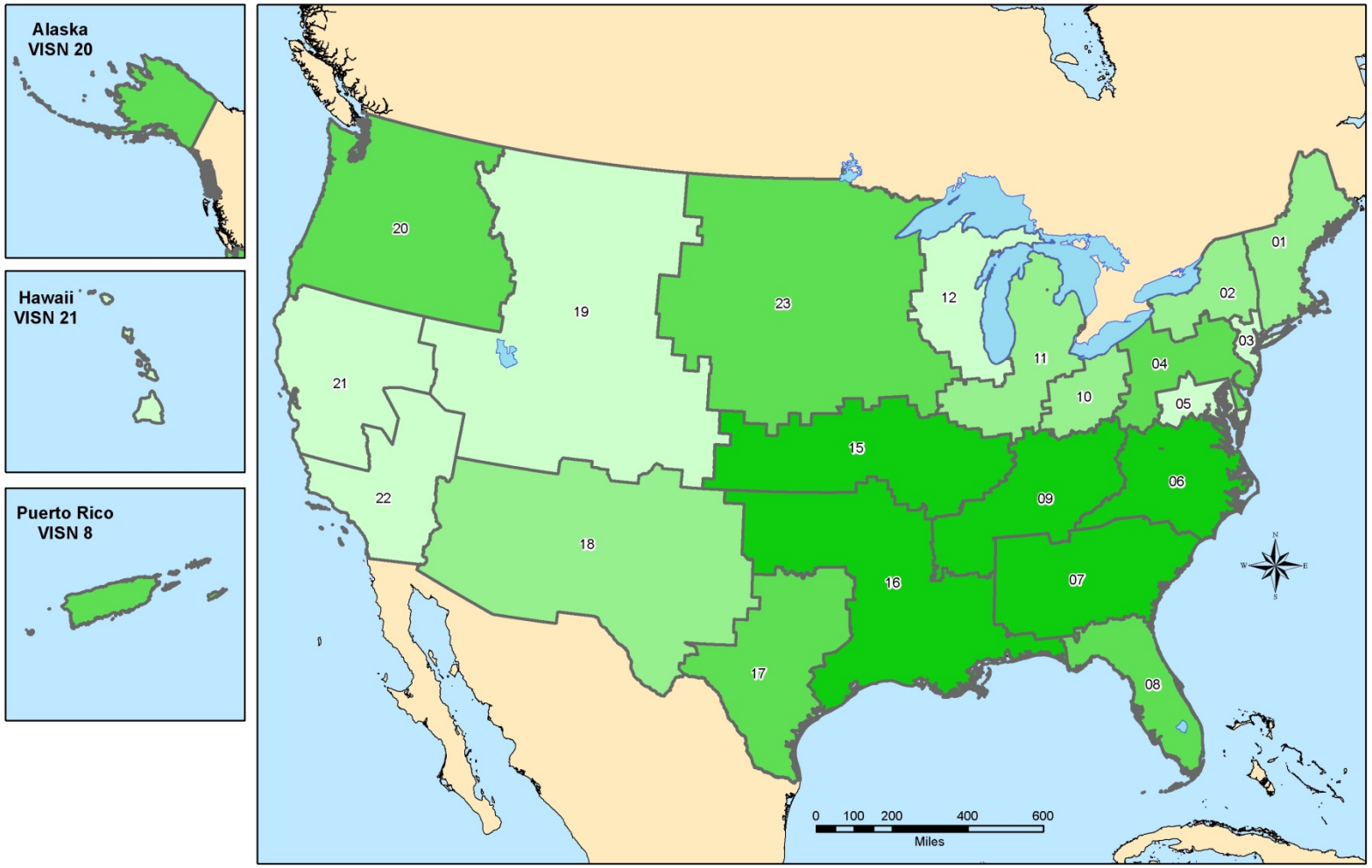
GENDER

Table 3 further illustrates overall prevalence of Stroke in each VISN, broken down by gender of patient and the same rurality categories as in Table 2. For the purposes of simplicity, the percent-column adjacent to the rurality columns are a combined percentage of rural and highly rural patients, indicated in red text. Female patients in rural and highly rural areas comprisedless than 1.5% of total number of Stroke patients in each VISN. VISN 15 (Heartland) represented the highest prevalence of female rural and highly rural Stroke patients at 1.46%. Male patients, as expected, represented a much higher percentage of total Stroke patients in each network. In three networks, more than 50% of male Stroke patients lived in rural and highly rural areas. Male Stroke patients in the Midwest Network (VISN 23) comprised the highest prevalence of 61.85% of total Stroke patients in that network. New York/NewJersey Network (VISN 3) had the lowest prevalence of rural and highly rural Stroke patients - both for males (5.41%) and females (0.16%). Patients with an unknown gender from the data repositories were not included in the table since they represented a very small number and made virtually no impact to the prevalence statistics.

Table 3: National and VISN Numbers and Percentages of VHA Patients with Stroke, by Rurality and Gender, FY-2014

Prevalence Statistics by Gender and Rurality- Stroke, FY-2014											
Veterans Integrated Service Network	Total Number of Stroke Patients	Female					Male				
		HR	R	%	U	Unk	HR	R	%	U	Unk
New England (01)	9,962	*	87	0.87	165	*	33	3,412	34.58	6,265	*
Upstate NY (02)	6,735	*	96	1.43	90	*	*	3,164	47.01	3,382	*
NY/NJ (03)	6,431	*	10	0.16	149	*	*	348	5.41	5,924	*
VISN 04 (04)	16,225	*	137	0.84	291	*	3	5,975	36.84	9,815	*
Capitol (05)	5,500	*	21	0.38	192	*	*	1,315	23.91	3,970	*
Mid-Atlantic (06)	15,162	*	181	1.19	355	*	3	7,421	48.96	7,200	*
Southeast (07)	15,495	*	180	1.16	411	*	*	7,070	45.63	7,832	*
Sunshine (08)	27,140	*	148	0.55	764	*	3	4,626	17.06	21,589	3
Mid South (09)	13,993	*	159	1.14	211	*	*	8,000	57.19	5,614	*
Ohio (10)	12,429	*	104	0.84	247	*	3	4,628	37.26	7,444	*
Vets in Partnership (11)	12,436	*	97	0.78	247	*	*	5,078	40.85	7,007	*
Great Lakes (12)	10,987	*	74	0.67	235	*	41	3,518	32.39	7,114	*
Heartland (15)	11,672	7	163	1.46	168	*	74	6,401	55.47	4,856	*
South Central (16)	23,769	*	288	1.21	427	*	28	11,748	49.54	11,274	3
Heart of Texas (17)	11,169	*	125	1.12	341	*	74	4,152	37.84	6,472	*
Southwest (18)	9,556	9	80	0.93	273	*	438	2,524	31.00	6,226	4
Rocky Mtn. (19)	6,215	26	56	1.32	164	*	798	1,720	40.51	3,449	*
Northwest (20)	9,702	14	118	1.36	245	*	529	3,419	40.69	5,373	3
Sierra Pacific (21)	9,368	*	58	0.62	208	*	131	2,551	28.63	6,324	91
Desert Pacific (22)	10,821	6	28	0.31	348	*	122	881	9.27	9,434	*
Midwest (23)	12,681	16	139	1.22	114	*	588	7,255	61.85	4,571	*
Grand Total	257,448	82	2,349	0.94	5,645	2	2,875	95,206	38.10	151,135	115

Stroke



Patient Count
- 10 - 82 (Lower 25%)
- 83 - 105
- 106 - 155
- 156 - 288 (Upper 25%)

Map 22:

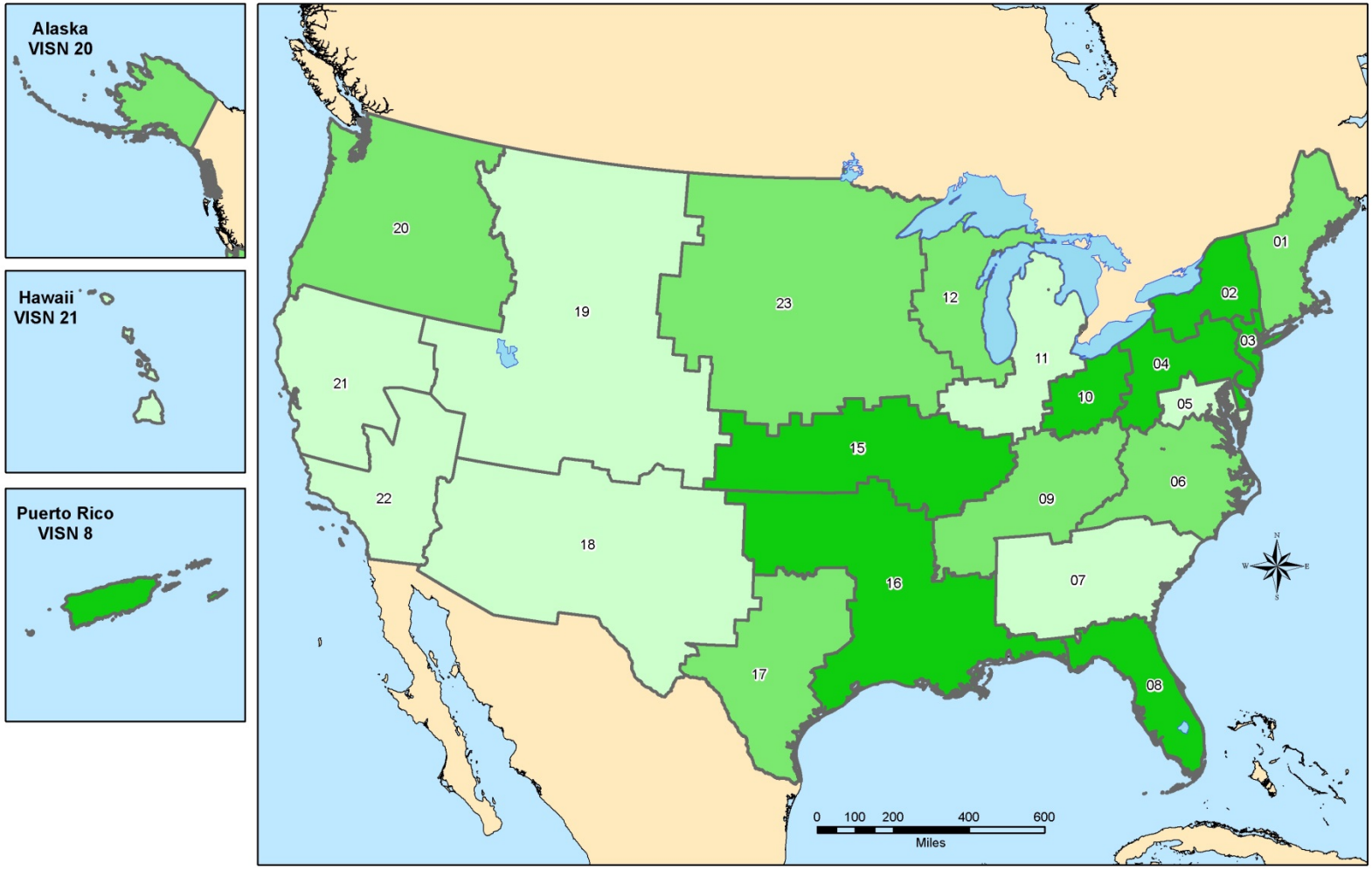
Number of Rural and Highly Rural VHA Patients with Stroke
Female
By VISN FY - 2014

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 7/2/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Stroke

GeoSpatial Outcomes Division
VHA Office of Rural Health



Percent of Patients
- 1.1% - 1.8%
- 1.9%
- 2% - 2.9%

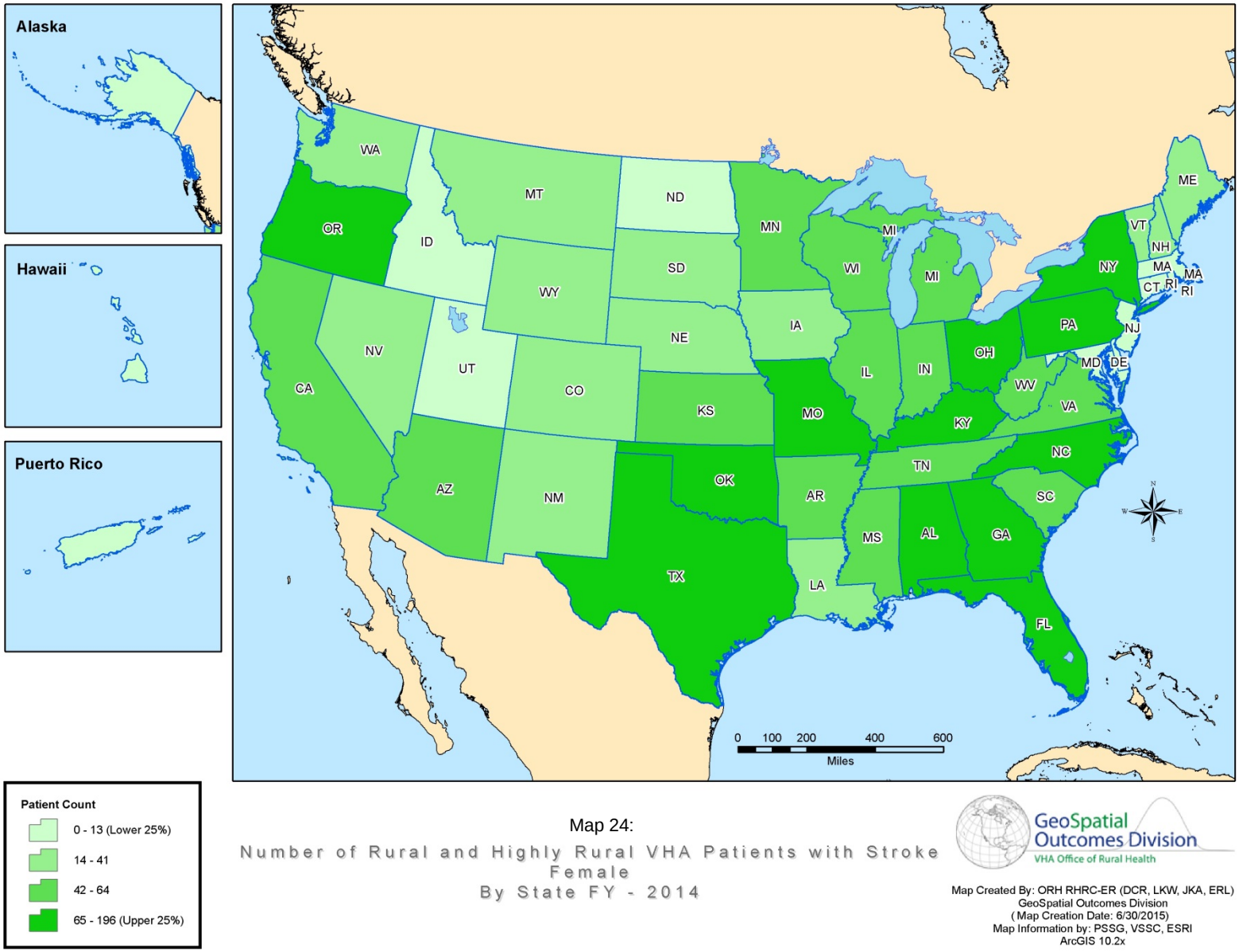
Map 23:

Percent of Rural and Highly Rural VHA Patients with Stroke Female
Of All Rural and Highly Rural VHA Patients Female
By VISN FY - 2014

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 7/2/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Stroke



Map 24:

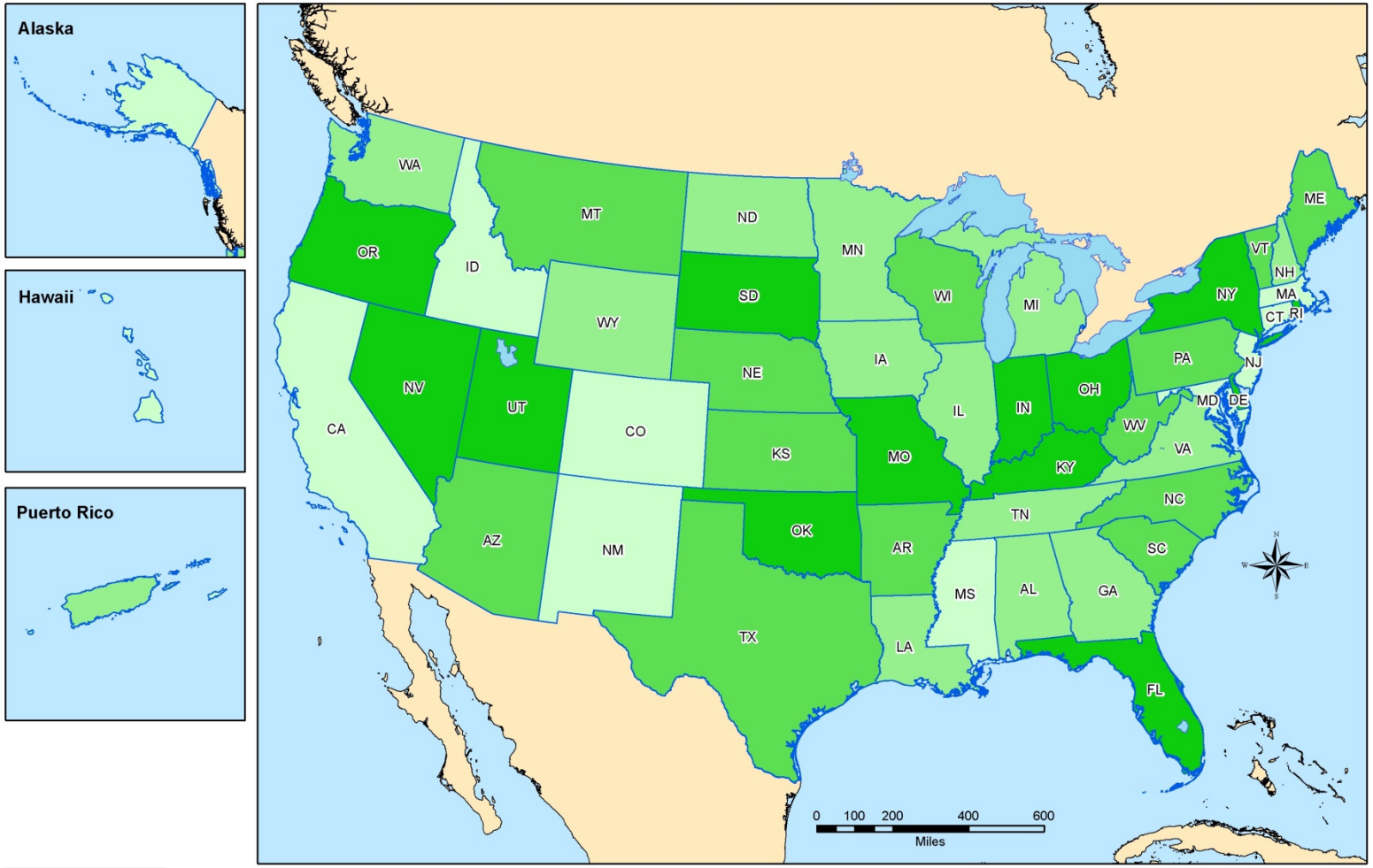
Number of Rural and Highly Rural VHA Patients with Stroke
Female
By State FY - 2014

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 6/30/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Stroke

GeoSpatial Outcomes Division
VHA Office of Rural Health



Percent of Patients
- 0% - 1.6%
- 1.7% - 1.8%
- 1.9% - 2.1%
- 2.2% - 4.9%

Map 25:

Percent of Rural and Highly Rural VHA Patients with Stroke
Female
Of All Rural and Highly Rural VHA Patient Female
By State FY - 2014

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 6/30/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

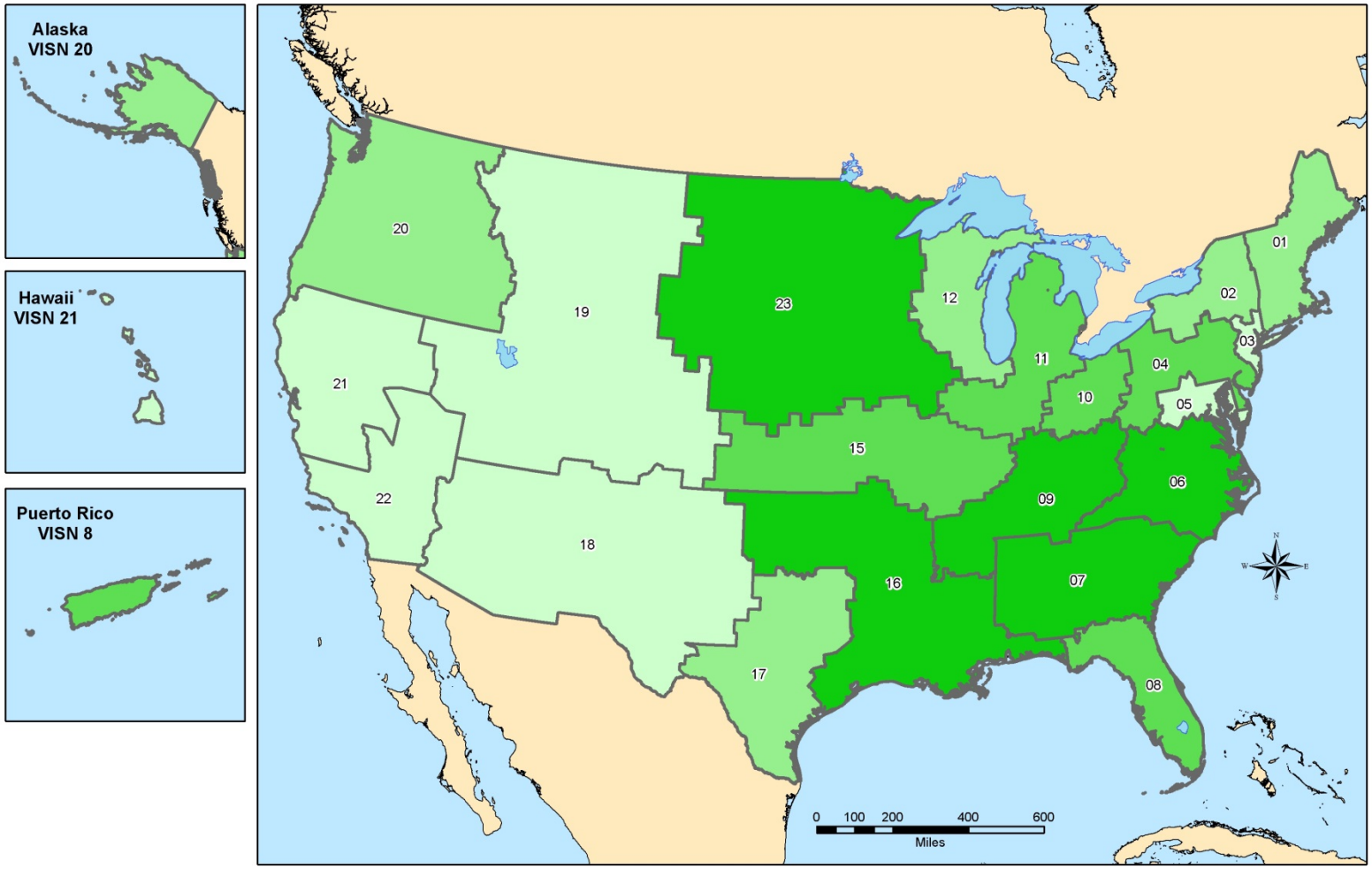
AGE GROUP

Examining the age groups of rural and highly rural patients is also of particular interest to the policy and planning community within the VHA. In Table 4, only rural and highly rural categories were included, since that is the focus, and urban and unknown categories were omitted. Also omitted were the approximately 114 patients assigned into an unknown age group from the data repositories, since they compriseda very small amount in comparison to 257,448 total Stroke patients. For simplicity's sake, the percent-column adjacent to the rurality columns are a combined percentage of rural and highly rural patients, indicated in red text. The 65-74 age group, at the National level, had the highest prevalence of Stroke patients representation in rural and highly rural areas at 15.62%. The same age group showed signficant prevalance in rural and highly rural areas at the network level. For example, South Central Network (VISN 16) has 4,913 rural and highly rural Stroke patients aged 65-74, representing 20.67% of the total number of Stroke patients in that network. Other networks with rural and highly rural patients in the 65-74 age bracket that represented more than 20% of their total Stroke patients were VISNs 6, 9, 15, 16, and 23. Several VISNs had the highest prevalence of rural and highly rural patients in the 75 years of age and older category including VISNs 1, 2, 3, 4, 5, 12, 19, and 23. Patients under the age of 45 in rural and highly rural areas had the lowest prevalence of Stroke at less than 1% in all VISNs and at the National level.

Table 4: National and VISN Numbers and Percentages of VHA Patients with Stroke, by Rurality and Age Group, FY-2014

Prevalence Statistics by Age Group and Rurality- Stroke, FY-2014															
Veterans Integrated Service Network	Total Number of Stroke Patients	<45			45-54			55-64			65-74			75+		
		HR	R	%	HR	R	%	HR	R	%	HR	R	%	HR	R	%
New England (01)	9,962	*	28	0.28	*	92	0.93	8	509	5.19	12	1,350	13.67	12	1,520	15.38
Upstate NY (02)	6,735	*	31	0.46	*	106	1.59	*	534	7.93	*	1,212	18.01	*	1,377	20.45
NY/NJ (03)	6,431	*	4	0.06	*	2	0.03	*	53	0.82	*	139	2.16	*	160	2.49
Stars and Stripes (04)	16,225	*	46	0.28	*	168	1.04	*	860	5.30	*	2,281	14.07	*	2,758	17.00
Capitol (05)	5,500	*	11	0.20	*	48	0.87	*	222	4.04	*	516	9.38	*	539	9.80
Mid-Atlantic (06)	15,162	*	70	0.46	*	255	1.68	*	1,515	10.00	*	3,127	20.62	*	2,635	17.39
Southeast (07)	15,495	*	97	0.63	*	366	2.36	*	1,596	10.30	*	2,942	18.99	*	2,249	14.51
Sunshine (08)	27,140	*	54	0.20	*	180	0.66	*	880	3.24	*	1,911	7.04	*	1,749	6.45
Mid South (09)	13,993	*	88	0.63	*	299	2.14	*	1,632	11.66	*	3,378	24.15	*	2,762	19.74
Ohio (10)	12,429	*	51	0.41	*	182	1.46	*	900	7.26	*	1,917	15.43	*	1,682	13.54
Vets in Partnership (11)	12,436	*	45	0.36	*	180	1.45	*	1,050	8.44	*	2,203	17.72	*	1,697	13.65
Great Lakes (12)	10,987	*	22	0.20	*	95	0.88	6	526	4.84	19	1,375	12.69	14	1,574	14.45
Heartland (15)	11,672	*	62	0.53	4	208	1.82	14	1,224	10.61	24	2,666	23.05	37	2,404	20.91
South Central (16)	23,769	*	129	0.54	*	395	1.66	5	2,484	10.47	11	4,902	20.67	12	4,127	17.41
Heart of Texas (17)	11,169	*	47	0.42	*	144	1.30	10	872	7.90	29	1,759	16.01	34	1,455	13.33
Southwest (18)	9,556	4	27	0.32	9	88	1.02	79	397	4.98	194	1,062	13.14	161	1,030	12.46
Rocky Mtn. (19)	6,215	6	24	0.48	17	67	1.35	124	322	7.18	345	660	16.17	332	703	16.65
Northwest (20)	9,702	*	30	0.31	18	97	1.19	87	629	7.38	253	1,526	18.34	183	1,255	14.82
Sierra Pacific (21)	9,368	*	22	0.23	*	53	0.59	23	408	4.60	61	1,081	12.19	46	1,045	11.65
Desert Pacific (22)	10,821	*	11	0.10	3	33	0.33	19	170	1.75	65	367	3.99	39	328	3.39
Midwest (23)	12,681	3	56	0.47	11	155	1.31	79	1,051	8.91	228	2,596	22.27	283	3,536	30.12
Grand Total	257,448	21	955	0.38	70	3,213	1.28	457	17,834	7.10	1,249	38,970	15.62	1,160	36,585	14.66

Stroke



Patient Count
- 299 - 2,447 (Lower 25%)
- 2,448 - 3,277
- 3,278 - 5,131
- 5,132 - 9,052 (Upper 25%)

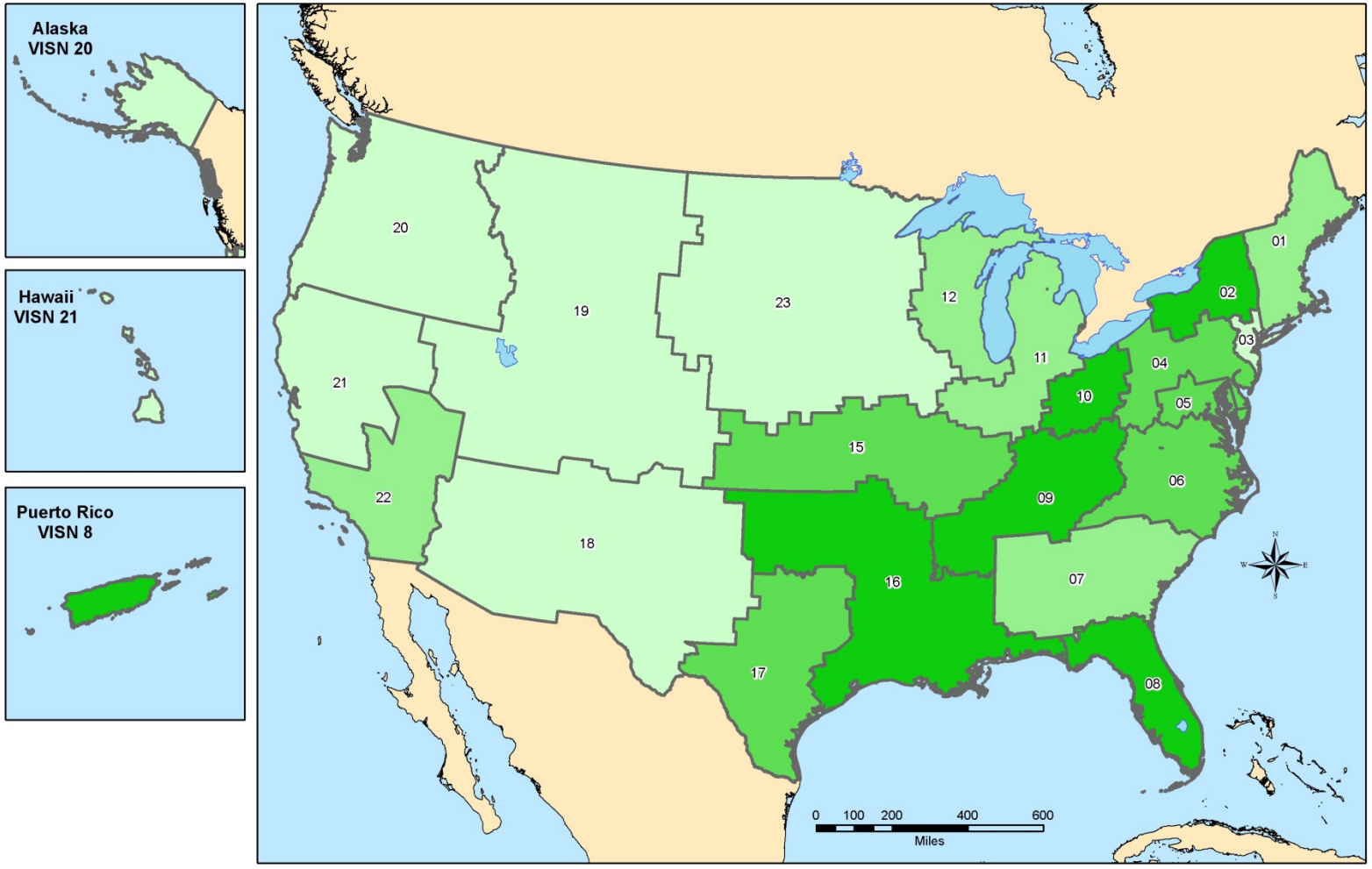
Map 26:
Number of Rural and Highly Rural VHA Patients with Stroke
Age 65 and Over
By VISN FY - 2014

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 7/2/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Stroke

GeoSpatial Outcomes Division
VHA Office of Rural Health



Percent of Patients
- 4.4% - 5.6%
- 5.7% - 6.5%
- 6.6% - 7%
- 7.1% - 8%

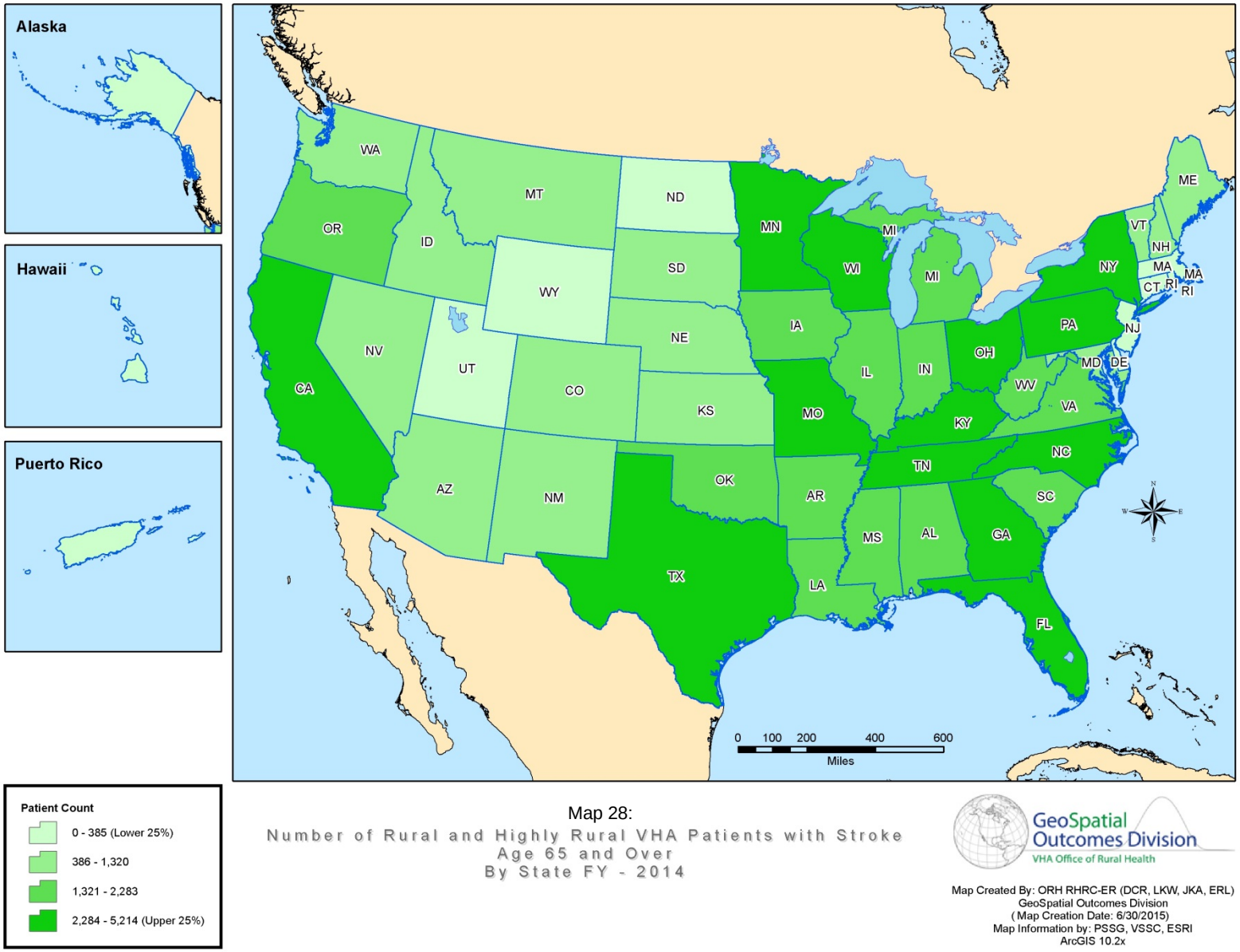
Map 27:

Percent of Rural and Highly Rural VHA Patients with Stroke Age 65 and Over
Of All Rural and Highly Rural VHA Patients Age 65 and Over
By VISN FY - 2014

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 7/2/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Stroke



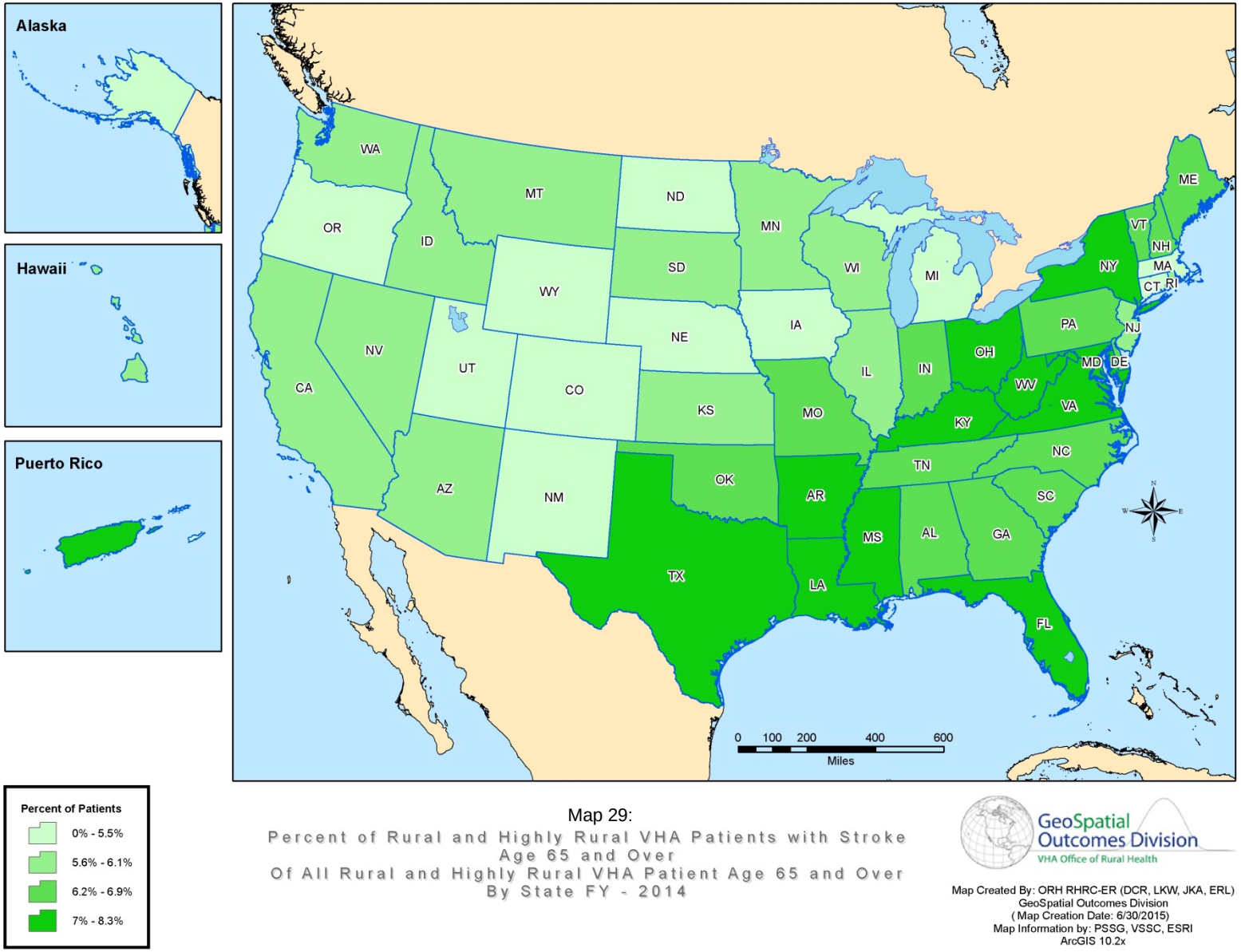
Map 28:
Number of Rural and Highly Rural VHA Patients with Stroke
Age 65 and Over
By State FY - 2014

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 6/30/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Stroke

GeoSpatial Outcomes Division
VHA Office of Rural Health

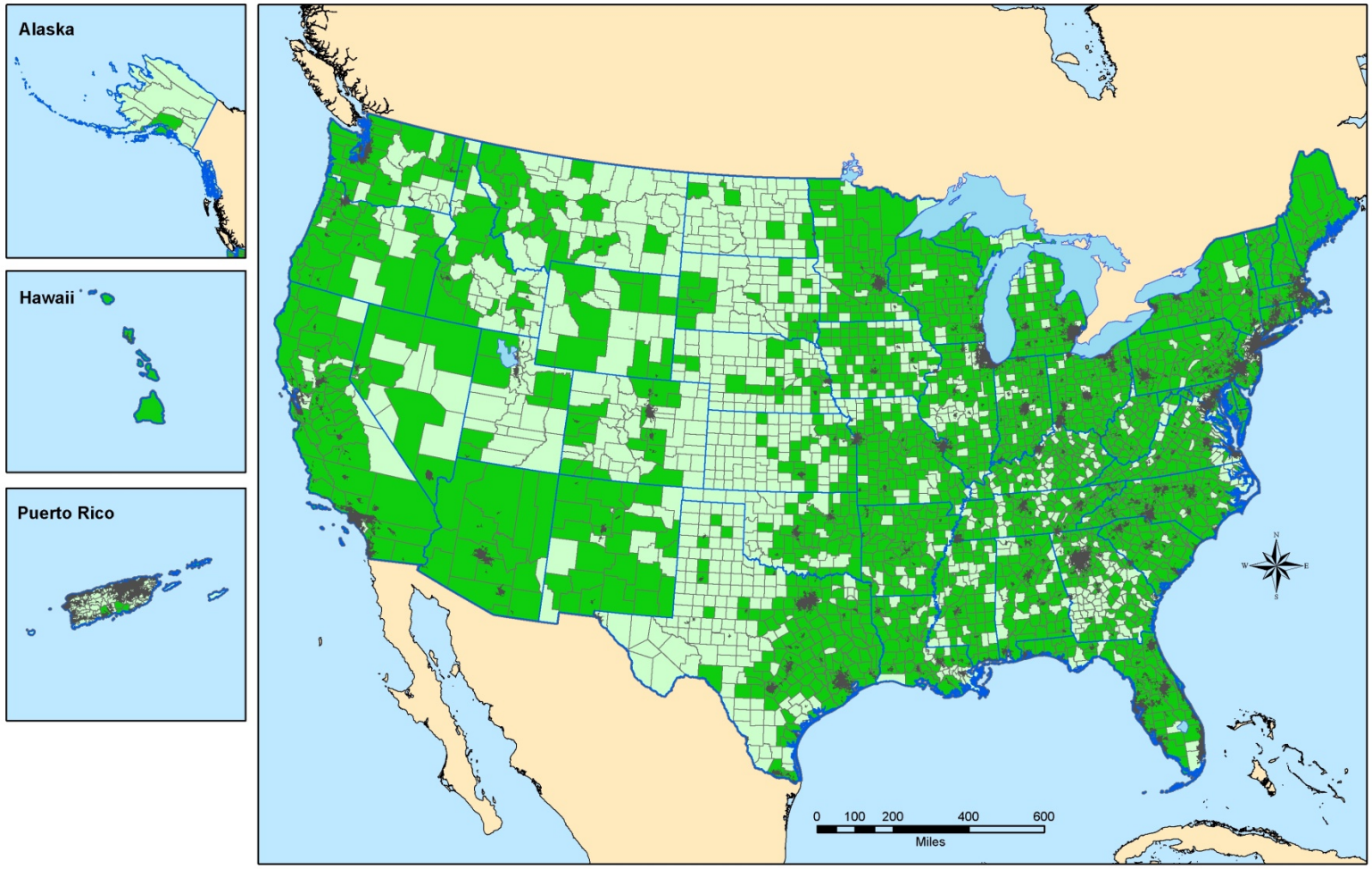


Map 29:
Percent of Rural and Highly Rural VHA Patients with Stroke
Age 65 and Over
Of All Rural and Highly Rural VHA Patient Age 65 and Over
By State FY - 2014

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 6/30/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Stroke



Map 30:

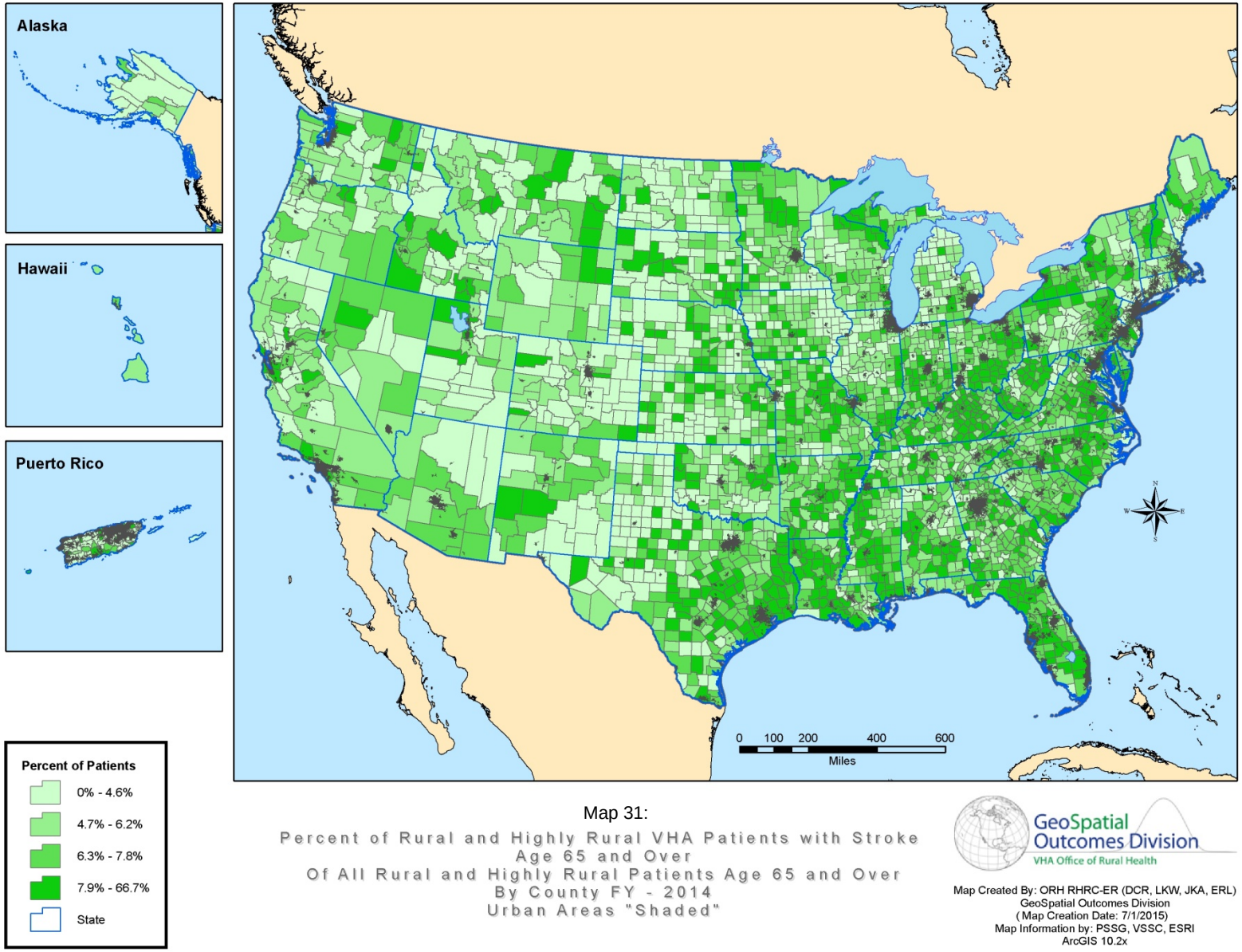
Number of Rural and Highly Rural VHA Patients with Stroke
Age 65 and Over
By County FY - 2014
Urban Areas "Shaded"

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 7/1/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Stroke

GeoSpatial Outcomes Division
VHA Office of Rural Health



Map 31:

Percent of Rural and Highly Rural VHA Patients with Stroke
Age 65 and Over
Of All Rural and Highly Rural Patients Age 65 and Over
By County FY - 2014
Urban Areas "Shaded"

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 7/1/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

SERVICE CONNECTION AND LOW INCOME ENROLLMENT PRIORITY GROUPS

Table 5 examines selected enrollment priority groups and what percentage of those patients resided in rural and highly rural areas. At the National level, rural and highly rural Stroke patients with a service-connected disability represented 17.06% of the total number of Stroke patients in the VHA. Meanwhile, at the network level, the top two VISNs with the highest proportion of rural and highly rural service-connected patients with Stroke were located in Midwest Network (VISN 23) at 30.75% and Mid South Network (VISN 9) at 26.66%. Both networks are located in the central regions of the contiguous United States.

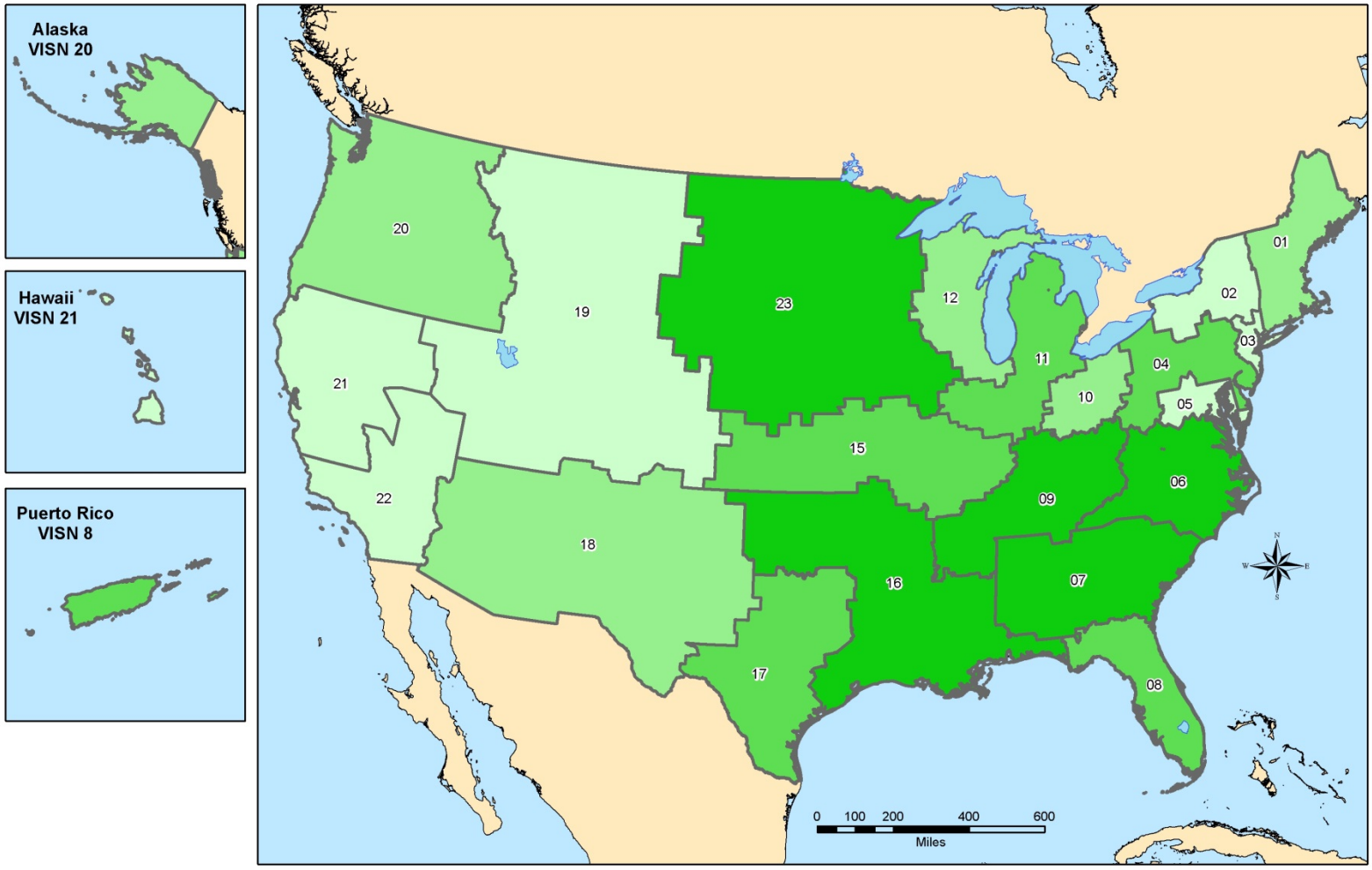
Patients with Stroke residing in rural and highly rural areas who were enrolled in Priority Group 5 represented 10.79% of the total Stroke patient population across the United States. Mid South Network (VISN 9) had the highest proportion at 17.33%. VISNs 2, 4, 6, 7, 9, 10, 11, 15, 16, 17, 19, 20 and 23 all had more than 10%.

The map series following Table 5 examines the numbers and percentages of rural and highly rural Service-Connected Veterans (numerator) of the total rural and highly rural Service-Connected Veteran patient population (denomintor) in Map 32 – Map 37. Similar information is presented for the Low Income (Priority 5) Veterans in Map 38 – Map 43.

Table 5: National and VISN Numbers and Percentages of VHA Patients with Stroke, by Rurality and Enrollment Priority Group, FY-2014

Prevalence Statistics by Service Connection Type and Low Income by Rurality- Stroke, FY-2014											
Veterans Integrated Service Network	Total Number of Stroke Patients	Service Connected Priority 1-3					Low Income				
		HR	R	%	U	Unk	HR	R	%	U	Unk
New England (01)	9,962	15	1,526	15.47	2,766	*	10	837	8.50	1,523	*
Upstate NY (02)	6,735	*	1,173	17.42	1,256	*	*	1,013	15.07	1,061	*
NY/NJ (03)	6,431	*	136	2.11	2,238	*	*	80	1.24	1,736	*
Stars and Stripes (04)	16,225	*	2,086	12.86	3,544	*	*	1,765	10.88	2,637	*
Capitol (05)	5,500	*	480	8.73	1,650	*	*	412	7.49	1,338	*
Mid-Atlantic (06)	15,162	*	3,503	23.11	3,590	*	*	2,101	13.86	1,963	*
Southeast (07)	15,495	*	3,387	21.87	3,977	*	*	1,973	12.73	2,125	*
Sunshine (08)	27,140	*	1,980	7.30	9,116	*	*	1,489	5.49	6,051	*
Mid South (09)	13,993	*	3,729	26.66	2,461	*	*	2,424	17.33	1,703	*
Ohio (10)	12,429	*	1,779	14.33	2,764	*	*	1,514	12.20	2,484	*
Vets in Partnership (11)	12,436	*	2,291	18.43	2,871	*	*	1,472	11.84	2,373	*
Great Lakes (12)	10,987	12	1,392	12.78	2,303	*	12	891	8.22	2,182	*
Heartland (15)	11,672	29	2,880	24.92	2,073	*	15	1,924	16.61	1,501	*
South Central (16)	23,769	12	5,496	23.17	5,371	*	5	3,396	14.31	3,181	*
Heart of Texas (17)	11,169	38	2,097	19.12	3,636	*	26	1,144	10.48	1,531	*
Southwest (18)	9,556	190	1,117	13.68	2,984	*	139	739	9.19	1,768	3
Rocky Mtn. (19)	6,215	326	782	17.83	1,644	*	232	452	11.01	964	*
Northwest (20)	9,702	229	1,675	19.62	2,618	*	177	942	11.53	1,532	*
Sierra Pacific (21)	9,368	62	1,130	12.72	2,946	66	38	723	8.12	1,754	16
Desert Pacific (22)	10,821	69	401	4.34	4,215	*	33	278	2.87	2,868	*
Midwest (23)	12,681	258	3,642	30.75	2,448	*	118	1,399	11.96	930	*
Grand Total	257,448	1,249	42,682	17.06	66,471	67	812	26,968	10.79	43,205	21

Stroke



Patient Count
- 136 - 1,192 (Lower 25%)
- 1,193 - 1,904
- 1,905 - 2,909
- 2,910 - 5,508 (Upper 25%)

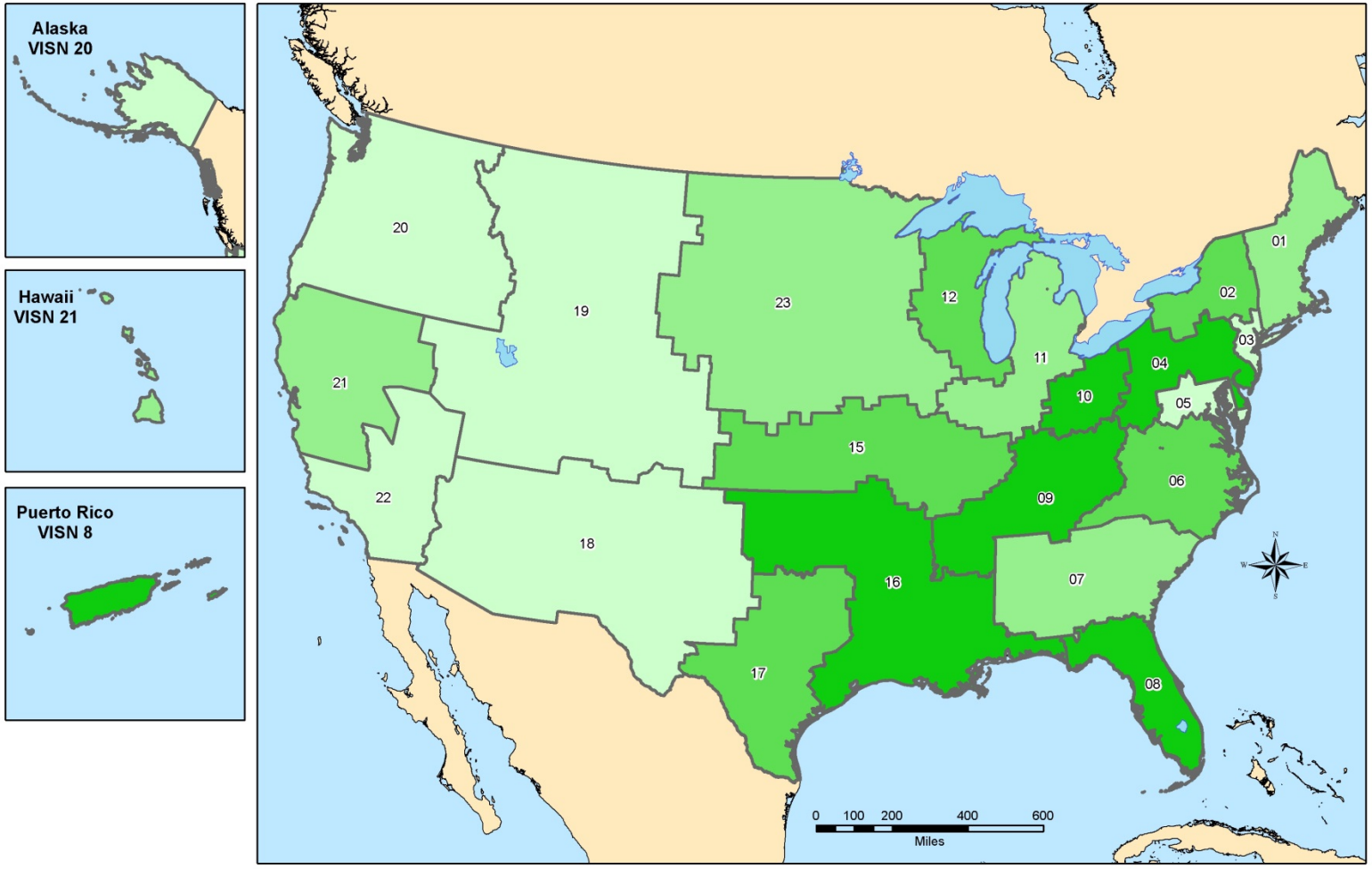
Map 32:
Number of Rural and Highly Rural VHA Patients with Stroke
Priority 1-3
By VISN FY - 2014

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 7/2/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Stroke

GeoSpatial Outcomes Division
VHA Office of Rural Health



Map 33:

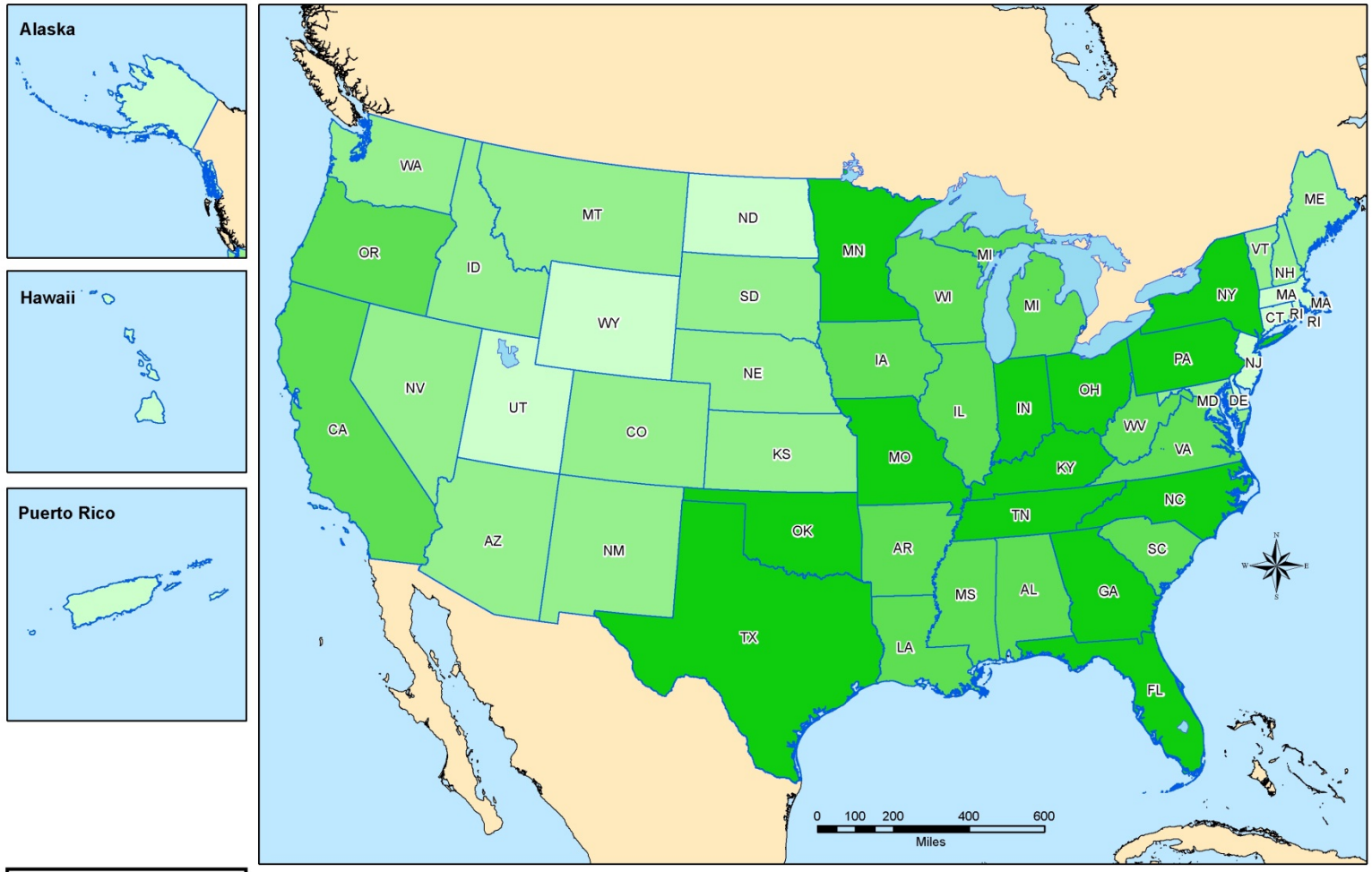
Percent of Rural and Highly Rural VHA Patients with Stroke Priority 1-3
Of All Rural and Highly Rural VHA Patients Priority 1-3
By VISN FY - 2014

Percent of Patients
- 3.2% - 3.9%
- 4% - 4.3%
- 4.4% - 4.8%
- 4.9% - 5.8%

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 7/2/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Stroke



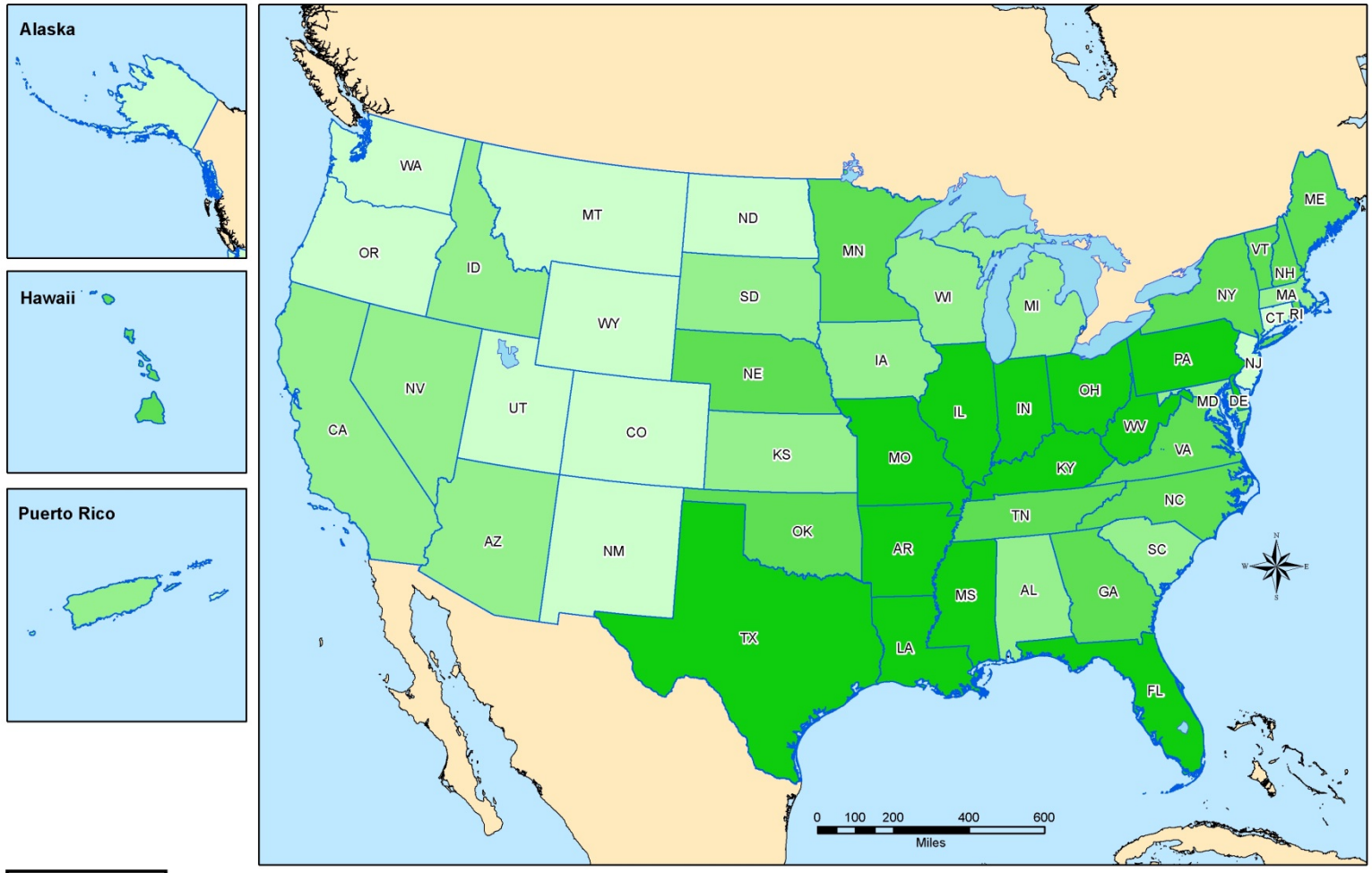
Map 34:
Number of Rural and Highly Rural VHA Patients with Stroke
Priority 1-3
By State FY - 2014

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 6/30/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Stroke

GeoSpatial Outcomes Division
VHA Office of Rural Health



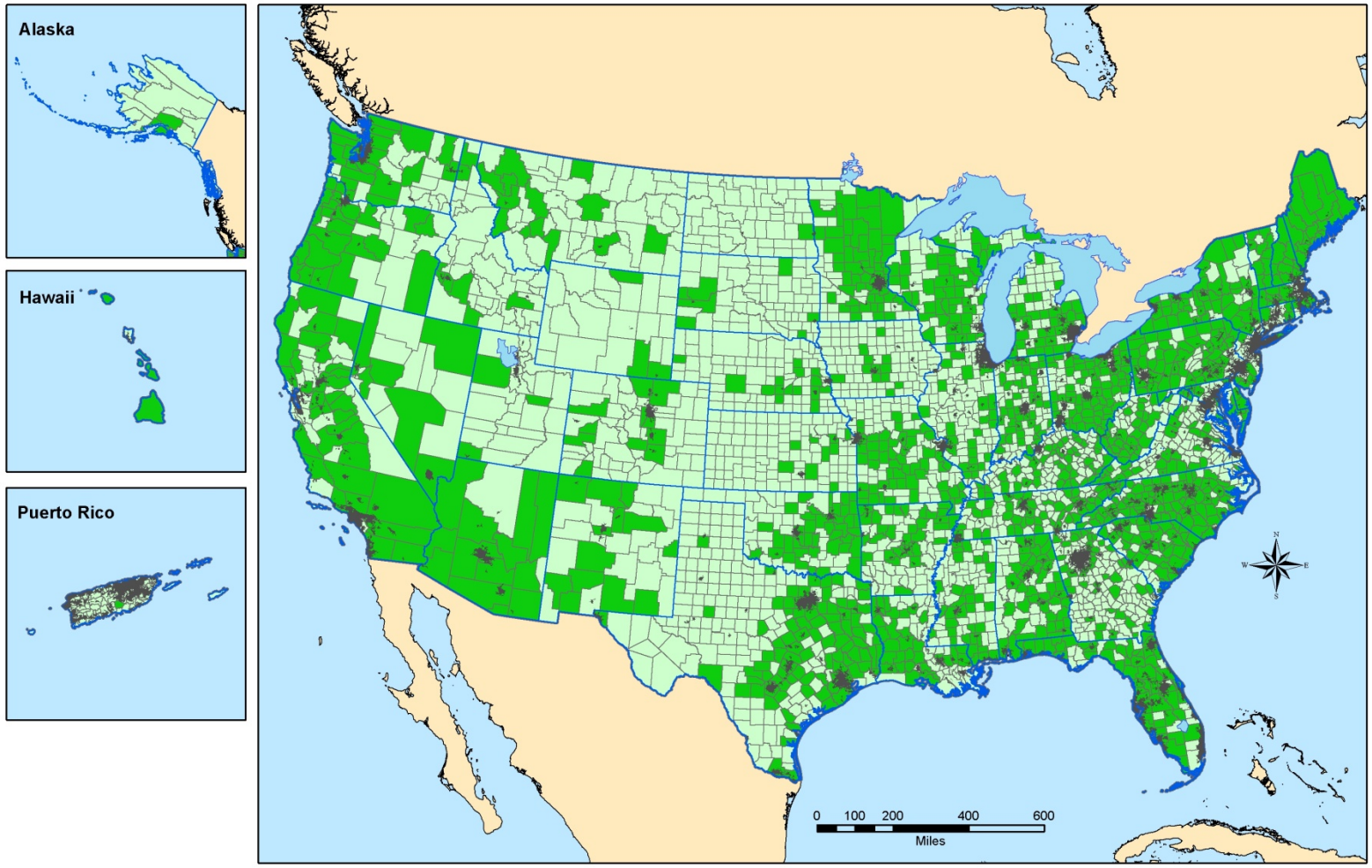
Percent of Patients
- 0% - 3.8%
- 3.9% - 4.1%
- 4.2% - 4.5%
- 4.6% - 5.7%

Map 35:
Percent of Rural and Highly Rural VHA Patients with Stroke Priority 1-3
Of All Rural and Highly Rural VHA Patient Priority 1-3
By State FY - 2014

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 6/30/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Stroke



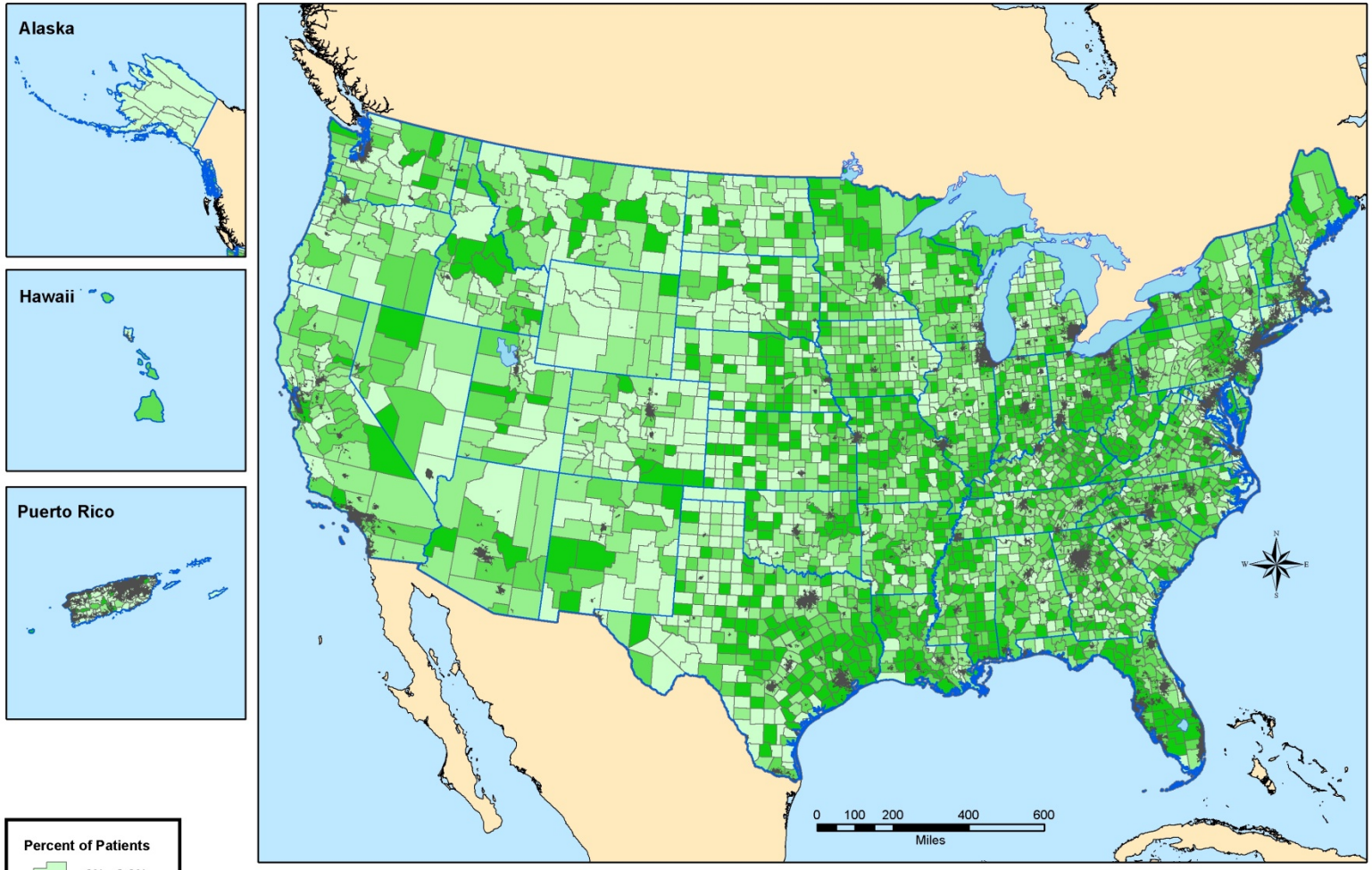
Map 36:
Number of Rural and Highly Rural VHA Patients with Stroke
Priority 1-3
By County FY - 2014
Urban Areas "Shaded"

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 7/1/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Stroke

GeoSpatial Outcomes Division
VHA Office of Rural Health



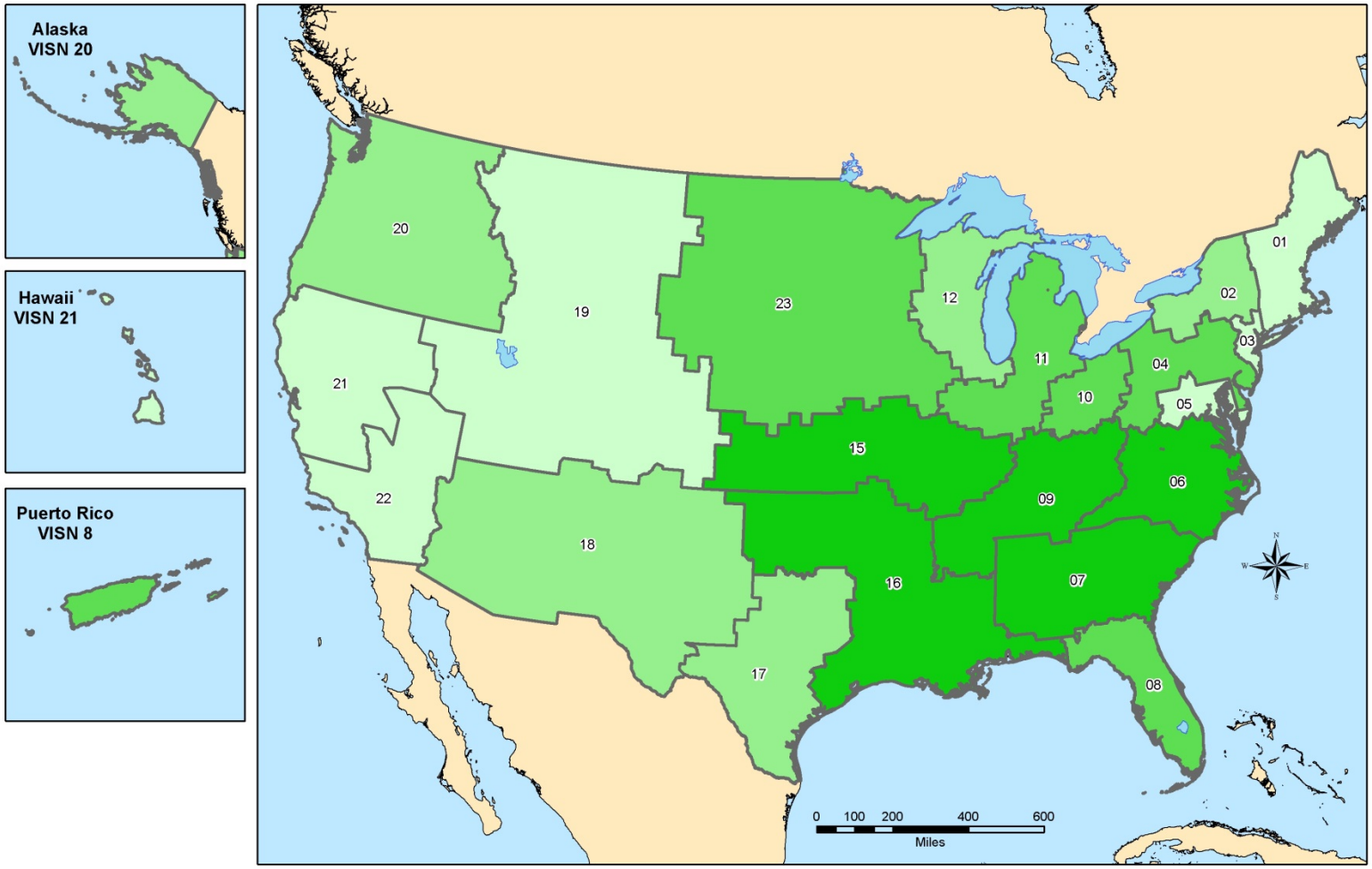
Map 37:

Percent of Rural and Highly Rural VHA Patients with Stroke Priority 1-3
Of All Rural and Highly Rural Patients Priority 1-3
By County FY - 2014
Urban Areas "Shaded"

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 7/1/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Stroke



Patient Count
- 80 - 847 (Lower 25%)
- 848 - 1,170
- 1,171 - 1,765
- 1,766 - 3,401 (Upper 25%)

Map 38:

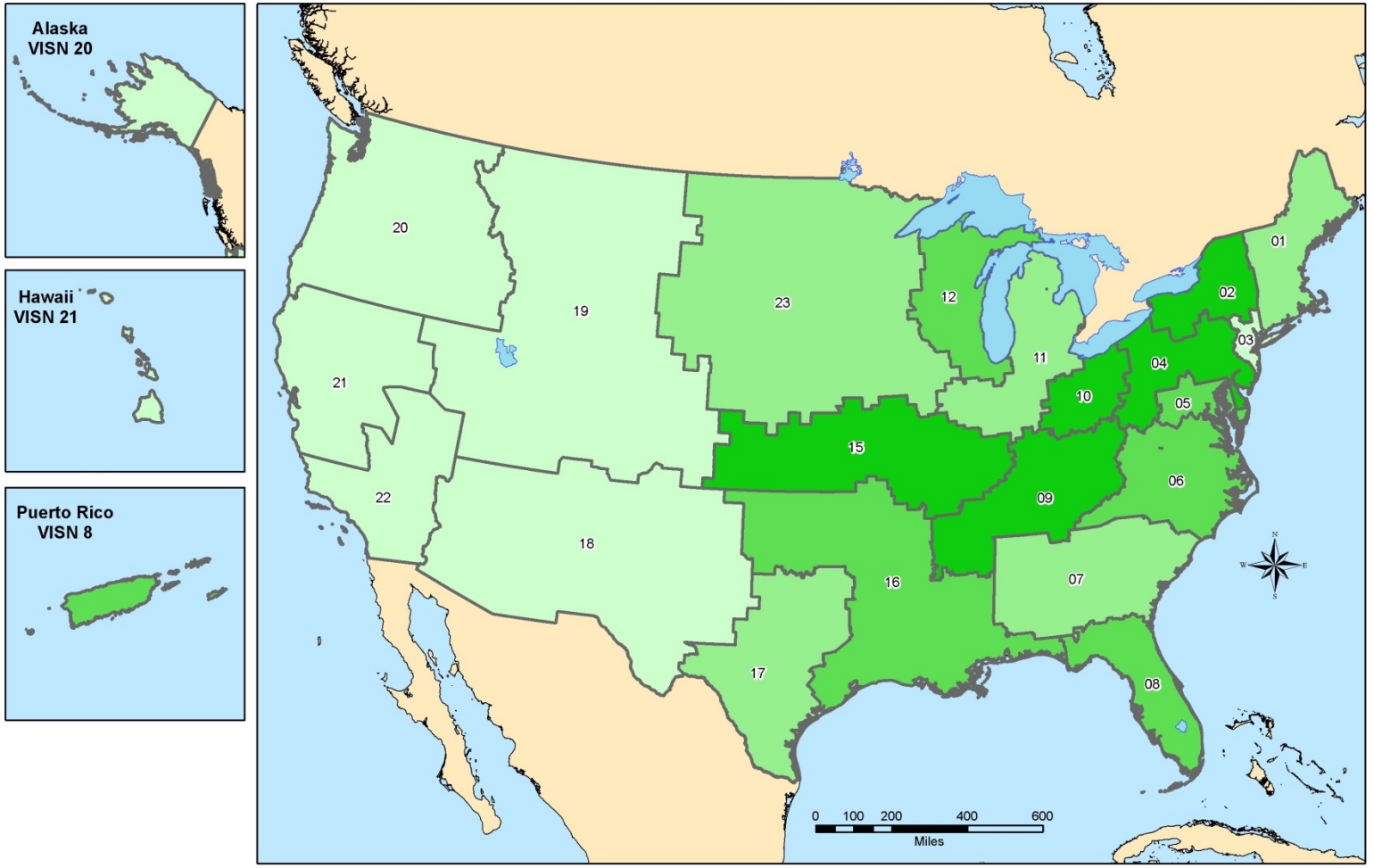
Number of Rural and Highly Rural VHA Patients with Stroke
Priority 5
By VISN FY - 2014

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 7/2/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Stroke

GeoSpatial Outcomes Division
VHA Office of Rural Health



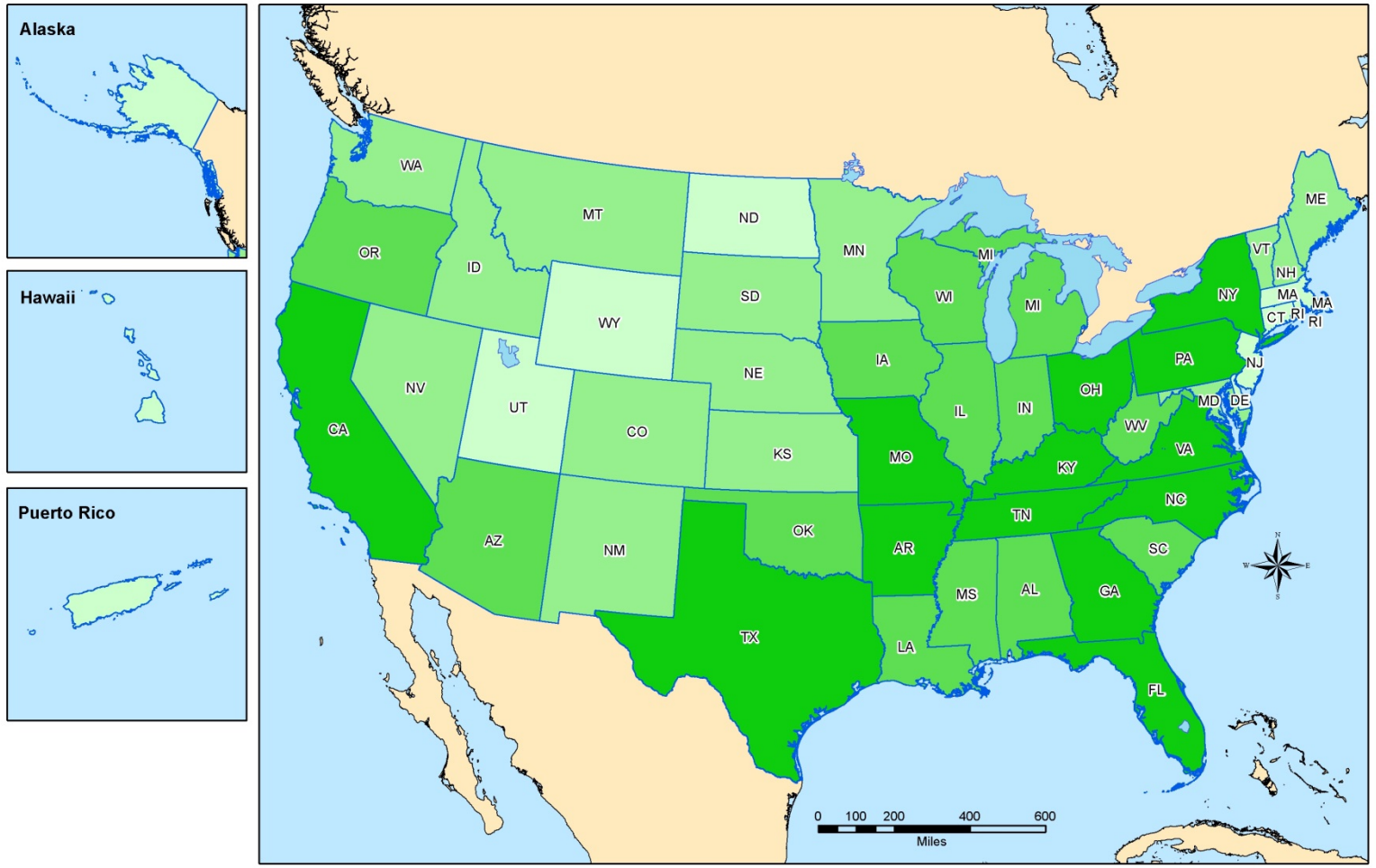
Percent of Patients
- 3.9% - 4.9%
- 5% - 6.1%
- 6.2% - 6.4%
- 6.5% - 7.4%

Map 39:
Percent of Rural and Highly Rural VHA Patients with Stroke Priority 5
Of All Rural and Highly Rural VHA Patients Priority 5
By VISN FY - 2014

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 7/2/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Stroke



Patient Count
- 0 - 116 (Lower 25%)
- 117 - 436
- 437 - 839
- 840 - 1,917 (Upper 25%)

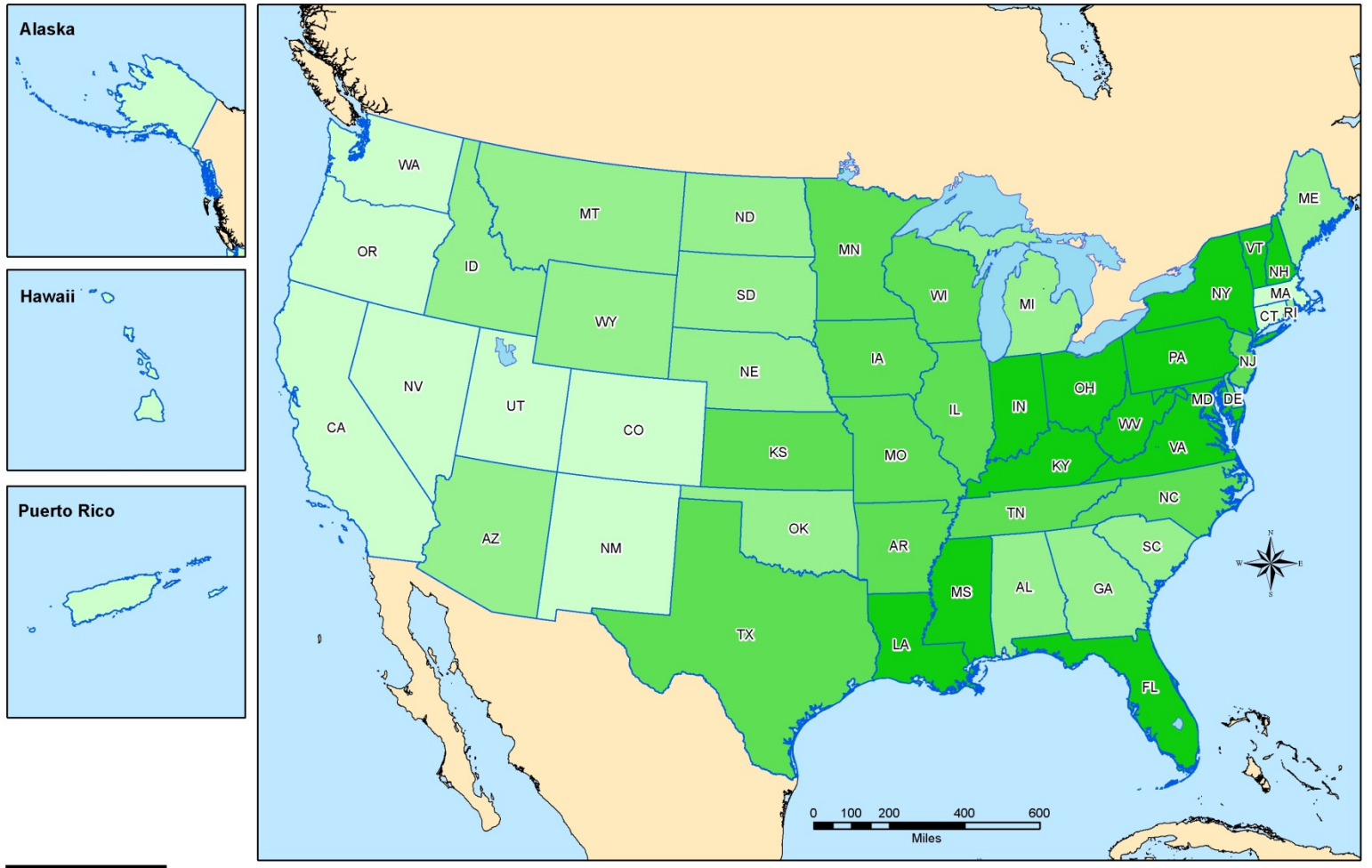
Map 40:
Number of Rural and Highly Rural VHA Patients with Stroke
Priority 5
By State FY - 2014

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 6/30/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Stroke

GeoSpatial Outcomes Division
VHA Office of Rural Health



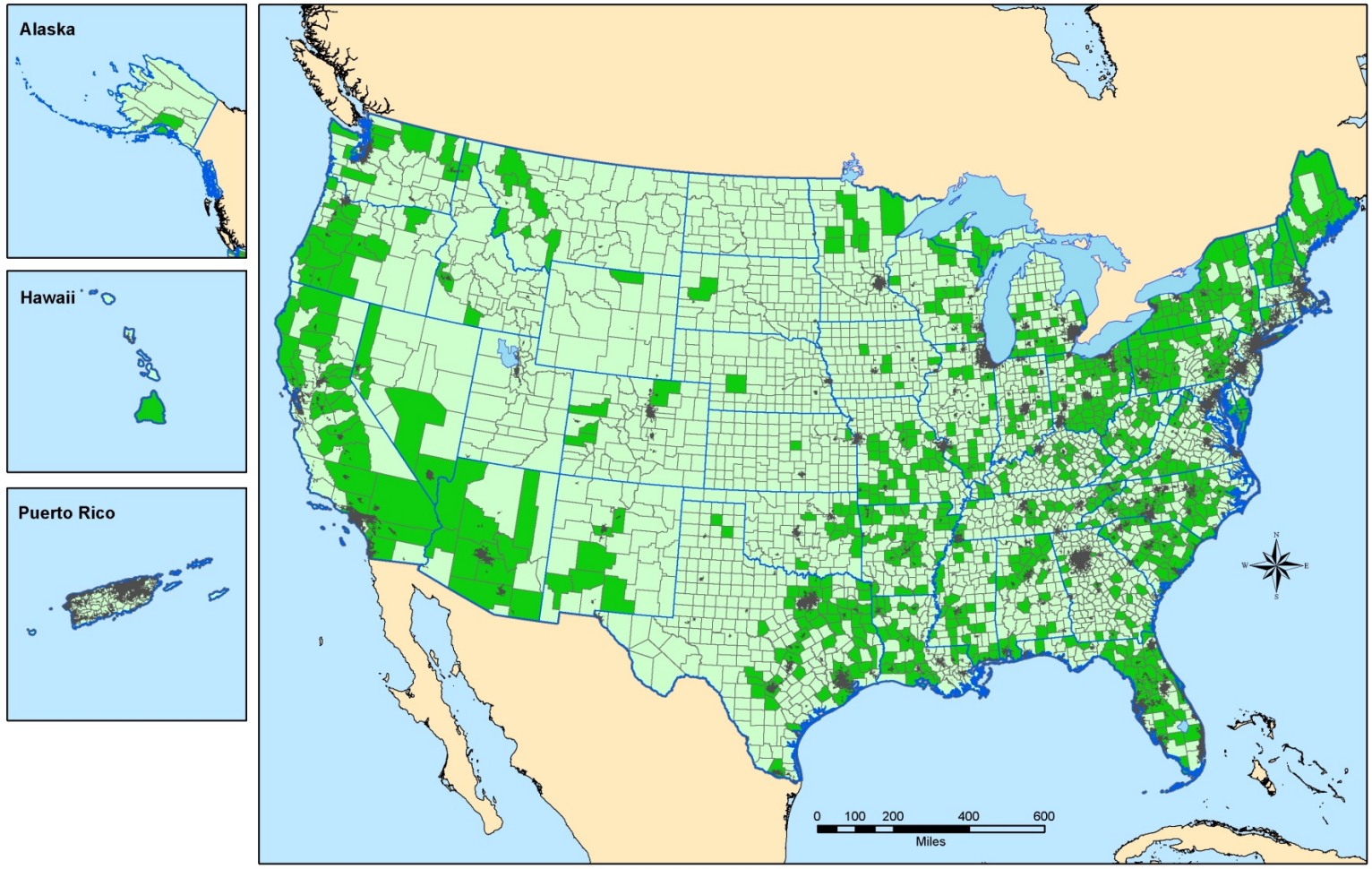
Percent of Patients
- 0% - 4.8%
- 4.9% - 5.8%
- 5.9% - 6.5%
- 6.6% - 7.4%

Map 41:
Percent of Rural and Highly Rural VHA Patients with Stroke Priority 5
Of All Rural and Highly Rural VHA Patient Priority 5
By State FY - 2014

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 6/30/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Stroke



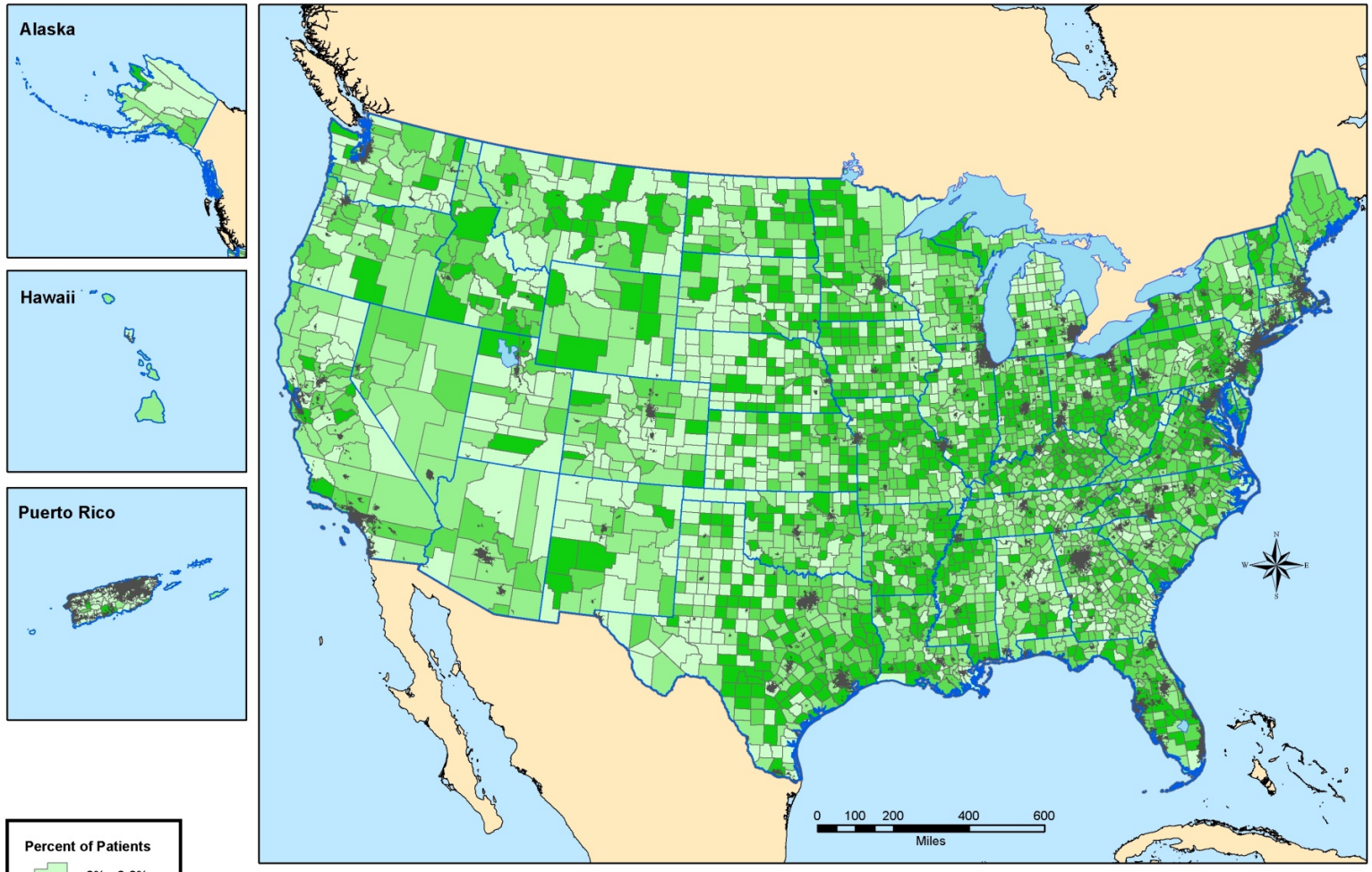
Map 42:
Number of Rural and Highly Rural VHA Patients with Stroke
Priority 5
By County FY - 2014
Urban Areas "Shaded"

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 7/1/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Stroke

GeoSpatial Outcomes Division
VHA Office of Rural Health



Map 43:
Percent of Rural and Highly Rural VHA Patients with Stroke Priority 5
Of All Rural and Highly Rural Patients Priority 5
By County FY - 2014
Urban Areas "Shaded"

GeoSpatial Outcomes Division
VHA Office of Rural Health

Map Created By: ORH RHRC-ER (DCR, LKW, JKA, ERL)
GeoSpatial Outcomes Division
(Map Creation Date: 7/1/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

Section IV Highlights: VHA Patients with Stroke (Outpatient Utilization)

Table 6 examines overall utilization of VHA health care facilities by those VHA patients with a primary diagnosis of Stroke. That is, patients who may have had an encounter with the diagnosis set as the primary diagnosis. At the National level, 2.21% (N=137,531) of all VHA patients had a primary diagnosis of Stroke. At the network level, the range ran from a low of 1.64% (N=3,316) in Rocky Mountain Network (VISN 19) to a high of 3.26% (N=7,531) in Ohio Network (VISN 10).

Using the example of Ohio Network (VISN 10), a very small percent (0.20%) of all 7,711,207 outpatient encounters were by those VHA patients with a primary diagnosis of Stroke. A closer examination can be conducted for counts and percentages of outpatient encounters by those residing in rural and highly rural areas. For the purposes of simplicity, a combined percentage – indicated in red text – was calculated for both rural and highly rural numbers, both at the network and National level. Again, looking at Ohio Network (VISN 10), combined rural patients with a primary diagnosis of Stroke represented only 0.06% of all outpatient encounters in that network, compared to 0.20% when compared over all rurality categories (highly rural, rural, urban, unknown).

Table 7 provides information on outpatient encounters for all patients with a primary diagnosis of Stroke by rurality. In this table, some very interesting urban-rural comparisons across VISNs emerge. For example, VISN 9 (Mid-South) had a total of 13,658 outpatient encounters for patients who had a primary diagnosis of Stroke. Over half (55.10%) of the encounters were from patients living in rural or highly rural areas of the VISN. Two other VISNs (15 and 23) had more than half of their Stroke outpatient encounters coming from rural and highly rural areas.

Table 6: Outpatient Encounters of Primary Diagnosis Stroke Patients

Overall Resource Utilization- Stroke (Primary Diagnosis Group) Compared to All Users, FY-2014										
Veterans Integrated Service Network	Total Number of Patients	Patients with Stroke		Outpatient Encounters						
				Total	Stroke					
	N	N	%	N	HR	R	%	U	Unk	%
New England (01)	253,326	5,174	2.04	7,306,431	27	3,538	0.05	7,236	0	0.15
Upstate NY (02)	136,497	3,525	2.58	4,189,442	11	3,431	0.08	4,397	0	0.19
NY/NJ (03)	174,457	3,524	2.02	5,308,815	0	436	0.01	8,232	0	0.16
Stars and Stripes (04)	310,940	7,555	2.43	8,188,223	9	6,470	0.08	10,299	0	0.20
Capitol (05)	150,012	2,977	1.98	3,919,003	0	1,138	0.03	5,260	0	0.16
Mid-Atlantic (06)	359,692	7,693	2.14	9,682,967	1	7,400	0.08	8,921	1	0.17
Southeast (07)	408,164	8,643	2.12	10,588,864	3	9,789	0.09	11,784	1	0.20
Sunshine (08)	576,411	13,798	2.39	17,255,468	0	4,841	0.03	23,408	0	0.16
Mid South (09)	298,396	7,138	2.39	8,424,188	1	7,525	0.09	6,131	1	0.16
Ohio (10)	231,319	7,531	3.26	7,511,566	7	4,412	0.06	10,892	1	0.20
Vets in Partnership (11)	282,135	7,383	2.62	7,691,758	0	5,529	0.07	8,316	0	0.18
Great Lakes (12)	266,879	5,964	2.23	7,705,668	35	3,324	0.04	8,514	0	0.15
Heartland (15)	245,357	6,322	2.58	7,009,124	62	7,861	0.11	6,509	0	0.21
South Central (16)	502,681	12,809	2.55	13,310,260	28	12,969	0.10	15,286	2	0.21
Heart of Texas (17)	306,581	6,426	2.10	7,950,682	42	4,964	0.06	9,937	0	0.19
Southwest (18)	271,557	5,387	1.98	6,738,226	468	2,782	0.05	7,484	3	0.16
Rocky Mtn. (19)	202,350	3,316	1.64	4,987,574	697	1,774	0.05	4,125	4	0.13
Northwest (20)	288,322	5,333	1.85	6,791,502	505	3,464	0.06	6,471	0	0.15
Sierra Pacific (21)	293,645	5,076	1.73	6,828,680	177	2,512	0.04	6,693	98	0.14
Desert Pacific (22)	328,951	6,047	1.84	8,520,022	104	1,011	0.01	16,348	0	0.20
Midwest (23)	324,728	5,910	1.82	8,146,785	395	5,708	0.07	5,478	0	0.14
Grand Total	6,212,400	137,531	2.21	168,055,248	2,572	100,878	0.06	191,721	111	0.18

Table 7: Outpatient Encounters by Patients with a Primary Diagnosis of Stroke by Rurality

Veterans Integrated Service Network	Outpatient Encounters by Patients with Primary Stroke DX					
	Total	Rurality				
	N	HR	R	%	U	Unk
New England (01)	10,801	27	3,538	33.01	7,236	0
Upstate NY (02)	7,839	11	3,431	43.91	4,397	0
NY/NJ (03)	8,668	0	436	5.03	8,232	0
VISN 04 (04)	16,778	9	6,470	38.62	10,299	0
Capitol (05)	6,398	0	1,138	17.79	5,260	0
Mid-Atlantic (06)	16,323	1	7,400	45.34	8,921	1
Southeast (07)	21,577	3	9,789	45.38	11,784	1
Sunshine (08)	28,249	0	4,841	17.14	23,408	0
Mid South (09)	13,658	1	7,525	55.10	6,131	1
Ohio (10)	15,312	7	4,412	28.86	10,892	1
Vets in Partnership (11)	13,845	0	5,529	39.93	8,316	0
Great Lakes (12)	11,873	35	3,324	28.29	8,514	0
Heartland (15)	14,432	62	7,861	54.90	6,509	0
South Central (16)	28,285	28	12,969	45.95	15,286	2
Heart of Texas (17)	14,943	42	4,964	33.50	9,937	0
Southwest (18)	10,737	468	2,782	30.27	7,484	3
Rocky Mtn. (19)	6,600	697	1,774	37.44	4,125	4
Northwest (20)	10,440	505	3,464	38.02	6,471	0
Sierra Pacific (21)	9,480	177	2,512	28.36	6,693	98
Desert Pacific (22)	17,463	104	1,011	6.38	16,348	0
Midwest (23)	11,581	395	5,708	52.70	5,478	0
TOTAL	295,282	2,572	100,878	35.03	191,721	111

Table 8 examines the overall outpatient encounters at VHA health care facilities by those VHA patients with a secondary diagnosis of Stroke. That is, patients who had an encounter with the Stroke as the secondary diagnosis. At the National level, 3.12% of all VHA patients had a secondary diagnosis of Stroke. At the network level, the range ran from a low of 2.27% in Rocky Mountain Network (VISN 19) to a high of 4.09% in the Stars and Stripes Network (VISN 4).

In Table 9 (similar to Table 7 for patients with a primary diagnosis of Stroke) reports information on outpatient encounters for all patients with a secondary diagnosis of Stroke by rurality. The percentage of encounters by rural and highly rural patients constituted a large share of the total Stroke encounters in VISN 23 (57.98%). Other VISNs with more than half of the Stroke encounters from rural and highly rural areas were: VISN 9 (54.68%), VISN 15 (50.10%) and VISN 16 (52.32%).

Table 8: Outpatient Encounters of Patients with a Secondary Diagnosis of Stroke

Overall Resource Utilization- Stroke (Secondary Diagnosis Group) Compared to All Users, FY-2014										
Veterans Integrated Service Network	Total Number of Patients	Patients with Stroke		Outpatient Encounters						
				Total	Stroke					
	N	N	%	N	HR	R	%	U	Unk	%
New England (01)	253,326	7,580	2.99	7,306,431	33	5,705	0.08	11,086	0	0.23
Upstate NY (02)	136,497	5,201	3.81	4,189,442	6	5,877	0.14	7,870	0	0.33
NY/NJ (03)	174,457	4,832	2.77	5,308,815	0	585	0.01	9,540	0	0.19
Stars and Stripes (04)	310,940	12,720	4.09	8,188,223	2	9,208	0.11	15,877	0	0.31
Capitol (05)	150,012	4,211	2.81	3,919,003	0	2,062	0.05	7,826	0	0.25
Mid-Atlantic (06)	359,692	11,991	3.33	9,682,967	6	12,419	0.13	13,993	1	0.27
Southeast (07)	408,164	11,553	2.83	10,588,864	1	11,089	0.10	13,601	0	0.23
Sunshine (08)	576,411	21,045	3.65	17,255,468	3	8,042	0.05	37,528	2	0.26
Mid South (09)	298,396	10,887	3.65	8,424,188	2	12,364	0.15	10,249	0	0.27
Ohio (10)	231,319	8,857	3.83	7,511,566	59	7,217	0.10	14,099	0	0.28
Vets in Partnership (11)	282,135	8,460	3.00	7,691,758	2	6,808	0.09	10,697	1	0.23
Great Lakes (12)	266,879	8,207	3.08	7,705,668	52	5,087	0.07	12,060	0	0.22
Heartland (15)	245,357	8,918	3.63	7,009,124	93	9,690	0.14	9,742	0	0.28
South Central (16)	502,681	17,453	3.47	13,310,260	47	18,180	0.14	16,611	0	0.26
Heart of Texas (17)	306,581	8,529	2.78	7,950,682	127	7,723	0.10	13,273	2	0.27
Southwest (18)	271,557	7,057	2.60	6,738,226	694	3,629	0.06	10,293	4	0.22
Rocky Mtn. (19)	202,350	4,601	2.27	4,987,574	1,229	2,840	0.08	7,052	0	0.22
Northwest (20)	288,322	7,044	2.44	6,791,502	973	5,992	0.10	10,640	3	0.26
Sierra Pacific (21)	293,645	6,980	2.38	6,828,680	220	3,615	0.06	10,040	131	0.21
Desert Pacific (22)	328,951	8,061	2.45	8,520,022	189	1,140	0.02	15,751	0	0.20
Midwest (23)	324,728	9,852	3.03	8,146,785	828	10,028	0.13	7,867	0	0.23
Grand Total	6,212,400	194,039	3.12	168,055,248	4,566	149,300	0.09	265,695	144	0.25

Table 9: Outpatient Encounters by Patients with a Secondary Diagnosis of Stroke by Rurality

Veterans Integrated Service Network	Outpatient Encounters by Patients with Secondary Stroke DX					
	Total	Rurality				
	N	HR	R	%	U	Unk
New England (01)	16,824	33	5,705	34.11	11,086	0
Upstate NY (02)	13,753	6	5,877	42.78	7,870	0
NY/NJ (03)	10,125	0	585	5.78	9,540	0
VISN 04 (04)	25,087	2	9,208	36.71	15,877	0
Capitol (05)	9,888	0	2,062	20.85	7,826	0
Mid-Atlantic (06)	26,419	6	12,419	47.03	13,993	1
Southeast (07)	24,691	1	11,089	44.92	13,601	0
Sunshine (08)	45,575	3	8,042	17.65	37,528	2
Mid South (09)	22,615	2	12,364	54.68	10,249	0
Ohio (10)	21,375	59	7,217	34.04	14,099	0
Vets in Partnership (11)	17,508	2	6,808	38.90	10,697	1
Great Lakes (12)	17,199	52	5,087	29.88	12,060	0
Heartland (15)	19,525	93	9,690	50.10	9,742	0
South Central (16)	34,838	47	18,180	52.32	16,611	0
Heart of Texas (17)	21,125	127	7,723	37.16	13,273	2
Southwest (18)	14,620	694	3,629	29.57	10,293	4
Rocky Mtn. (19)	11,121	1,229	2,840	36.59	7,052	0
Northwest (20)	17,608	973	5,992	39.56	10,640	3
Sierra Pacific (21)	14,006	220	3,615	27.38	10,040	131
Desert Pacific (22)	17,080	189	1,140	7.78	15,751	0
Midwest (23)	18,723	828	10,028	57.98	7,867	0
TOTAL	419,705	4,566	149,300	36.66	265,695	144

Stroke

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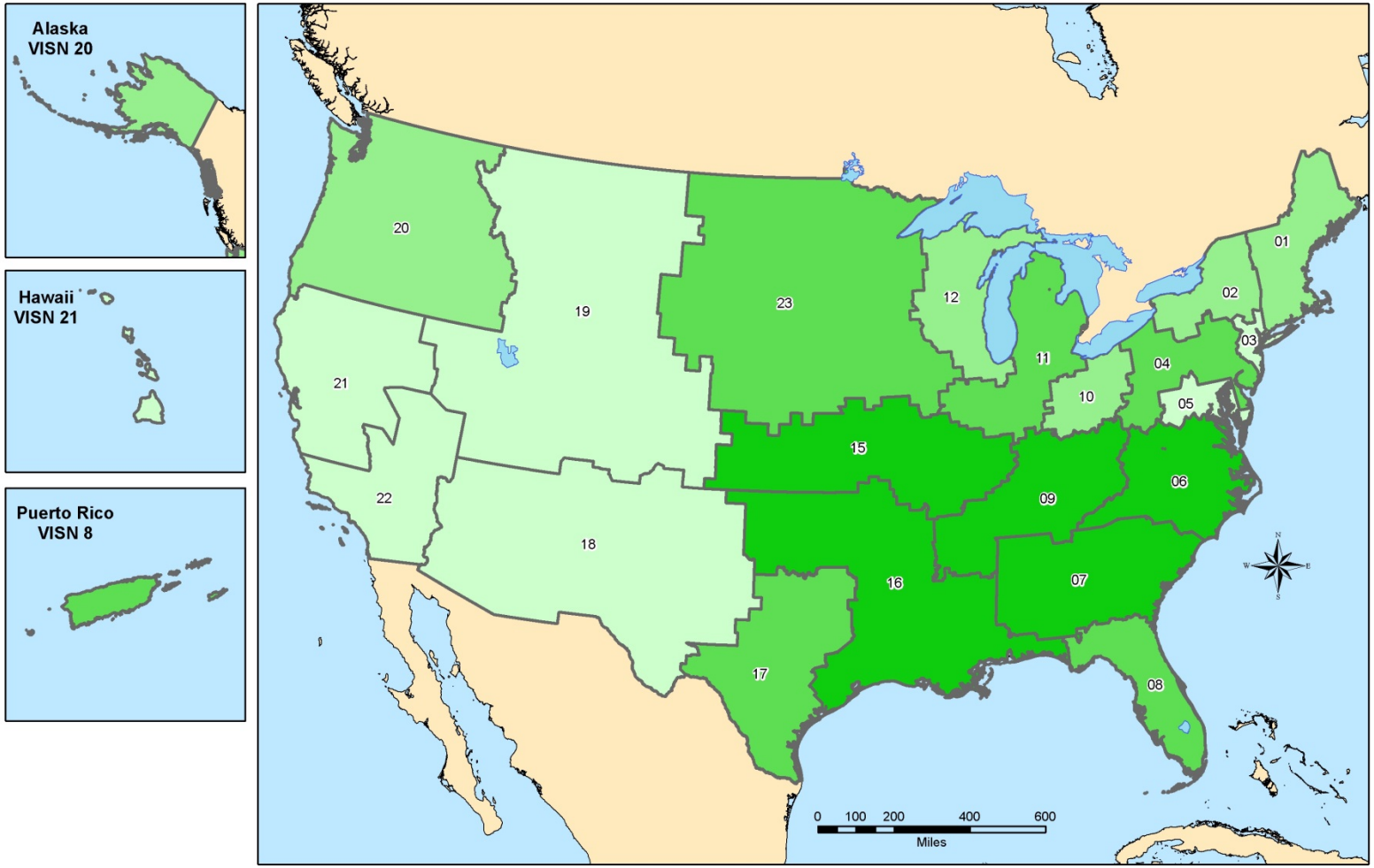

Patient Encounters
- 1,021 - 7,573 (Lower 25%)
- 7,574 - 11,695
- 11,696 - 16,959
- 16,960 - 31,224 (Upper 25%)

Map 44:
Number of Rural and Highly Rural VHA Patients with Stroke Encounters
By VISN FY - 2014

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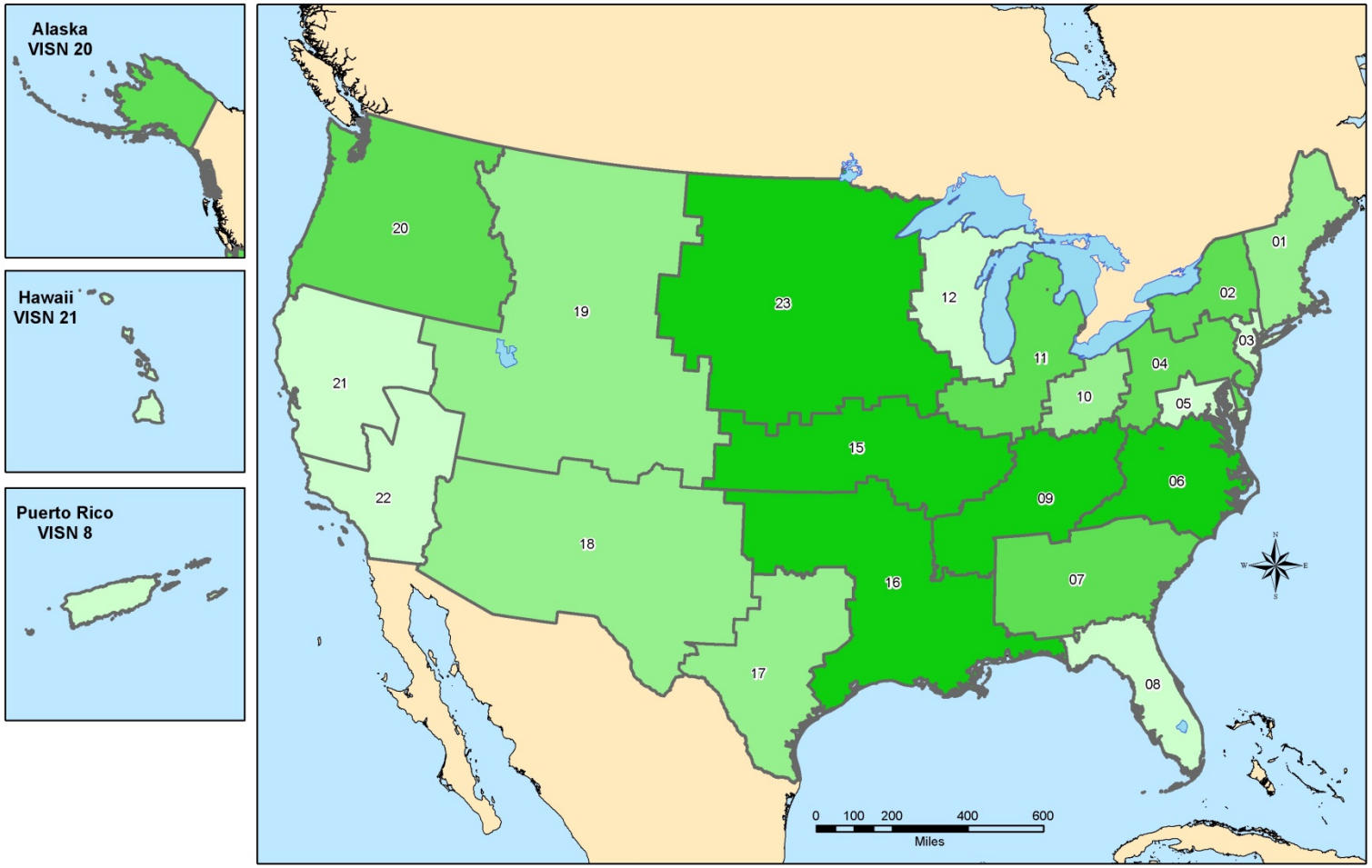
Stroke



Percent of Encounters
- 5.4% - 29.2%
- 29.3% - 36.9%
- 37% - 45.1%
- 45.2% - 56%

Map 45:

Percent of Rural and Highly Rural VHA Patients with Stroke Encounters
Of All VHA Patient Stroke Encounters
By VISN FY - 2014

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Stroke

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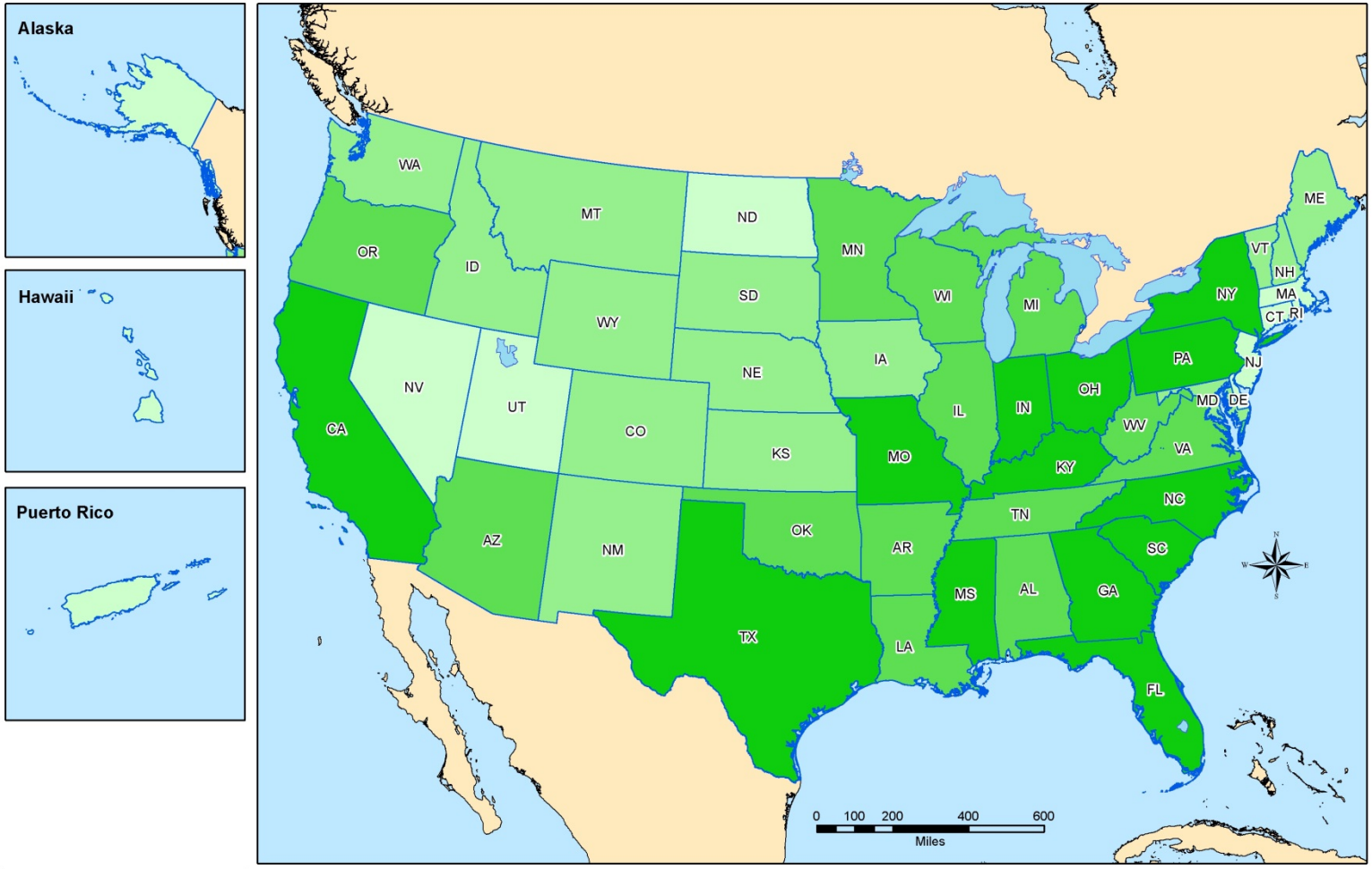

Map 46:

Number of Rural and Highly Rural VHA Patients with Stroke Encounters
By State FY - 2014

GeoSpatial Outcomes Division
VHA Office of Rural Health

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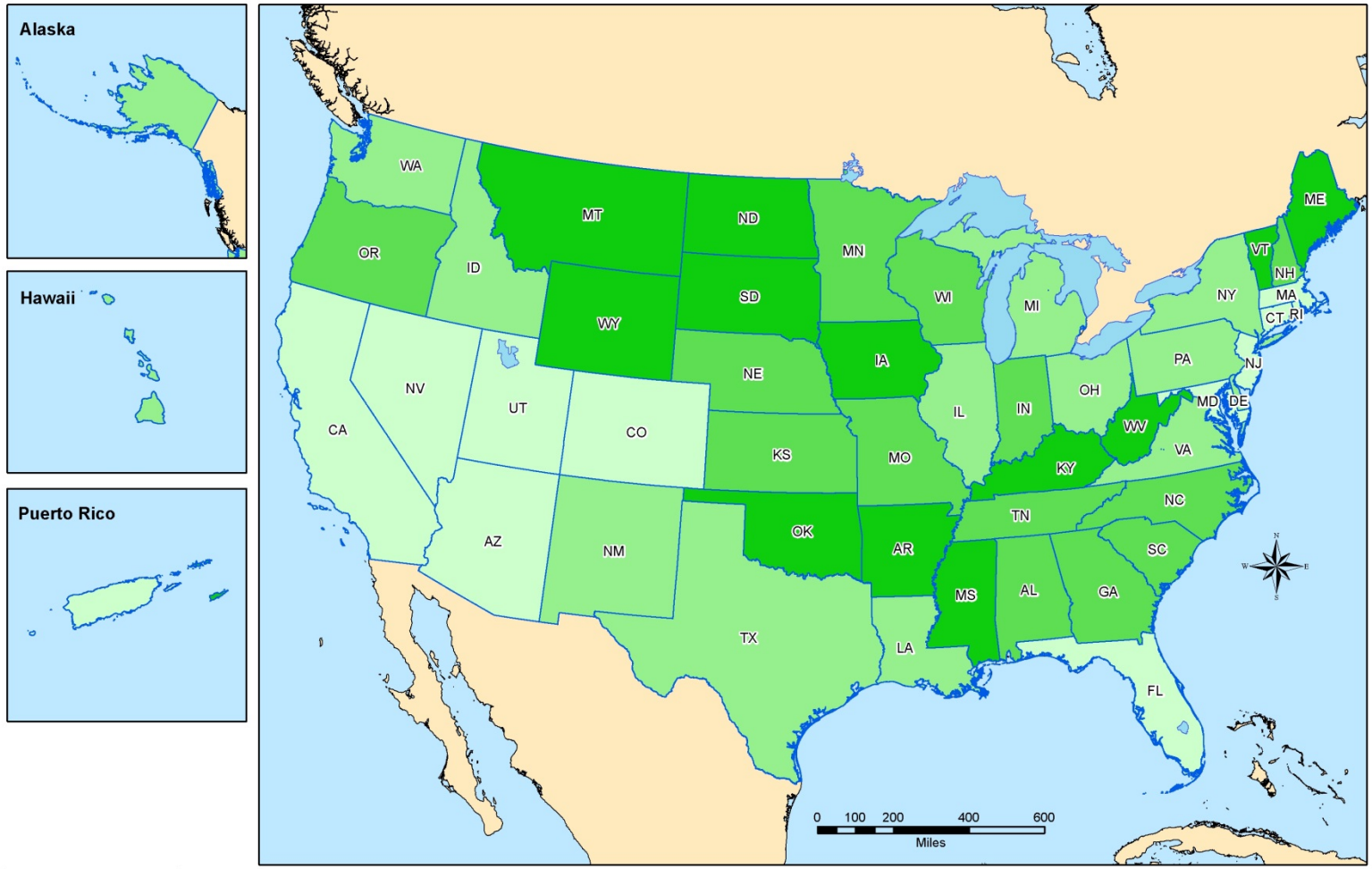
Stroke



Map 47:

Percent of Rural and Highly Rural VHA Patients with Stroke Encounters
Of All VHA Patient Stroke Encounters
By State FY - 2014

GeoSpatial Outcomes Division
VHA Office of Rural Health

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Stroke

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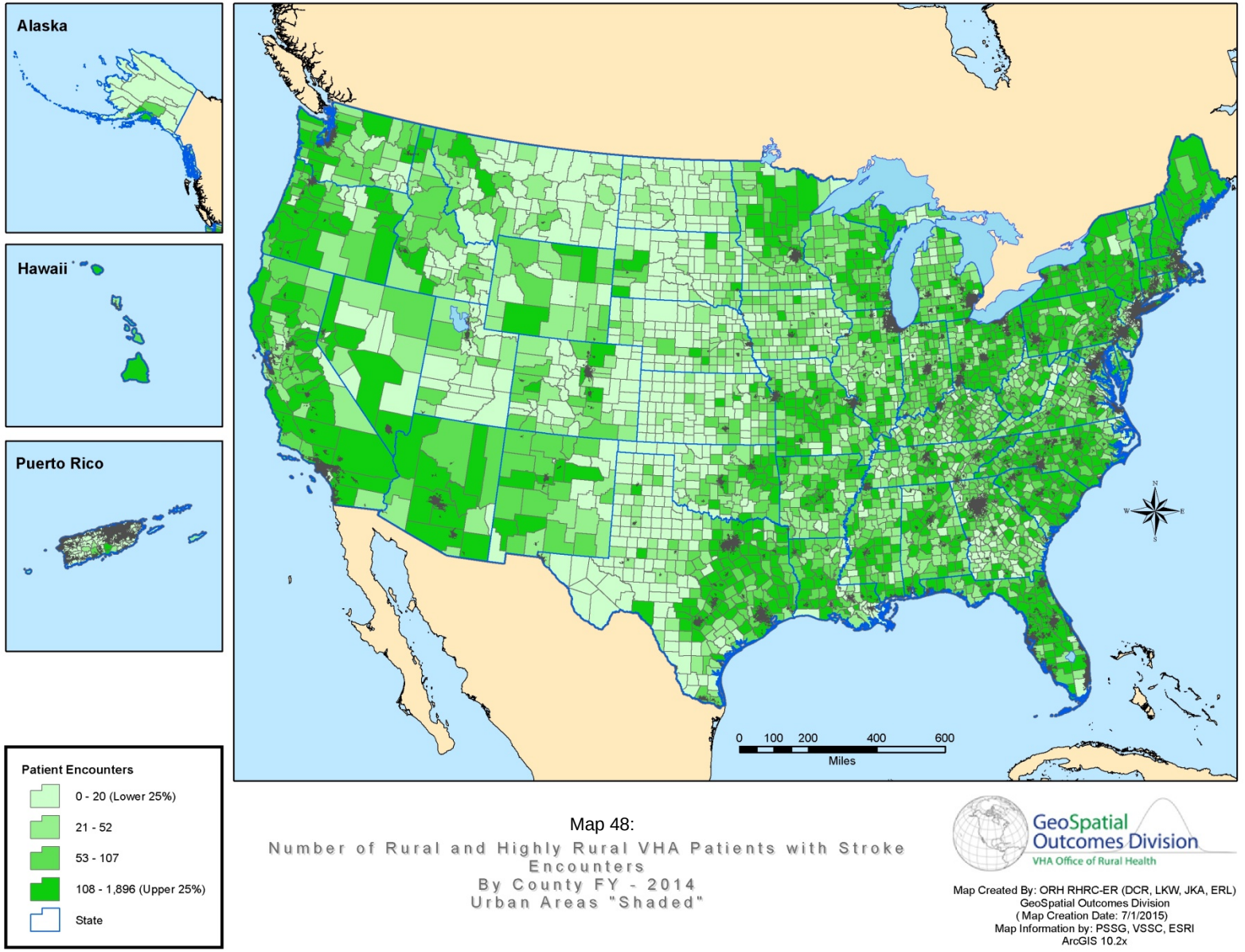

Map 48:

Number of Rural and Highly Rural VHA Patients with Stroke Encounters
By County FY - 2014
Urban Areas "Shaded"

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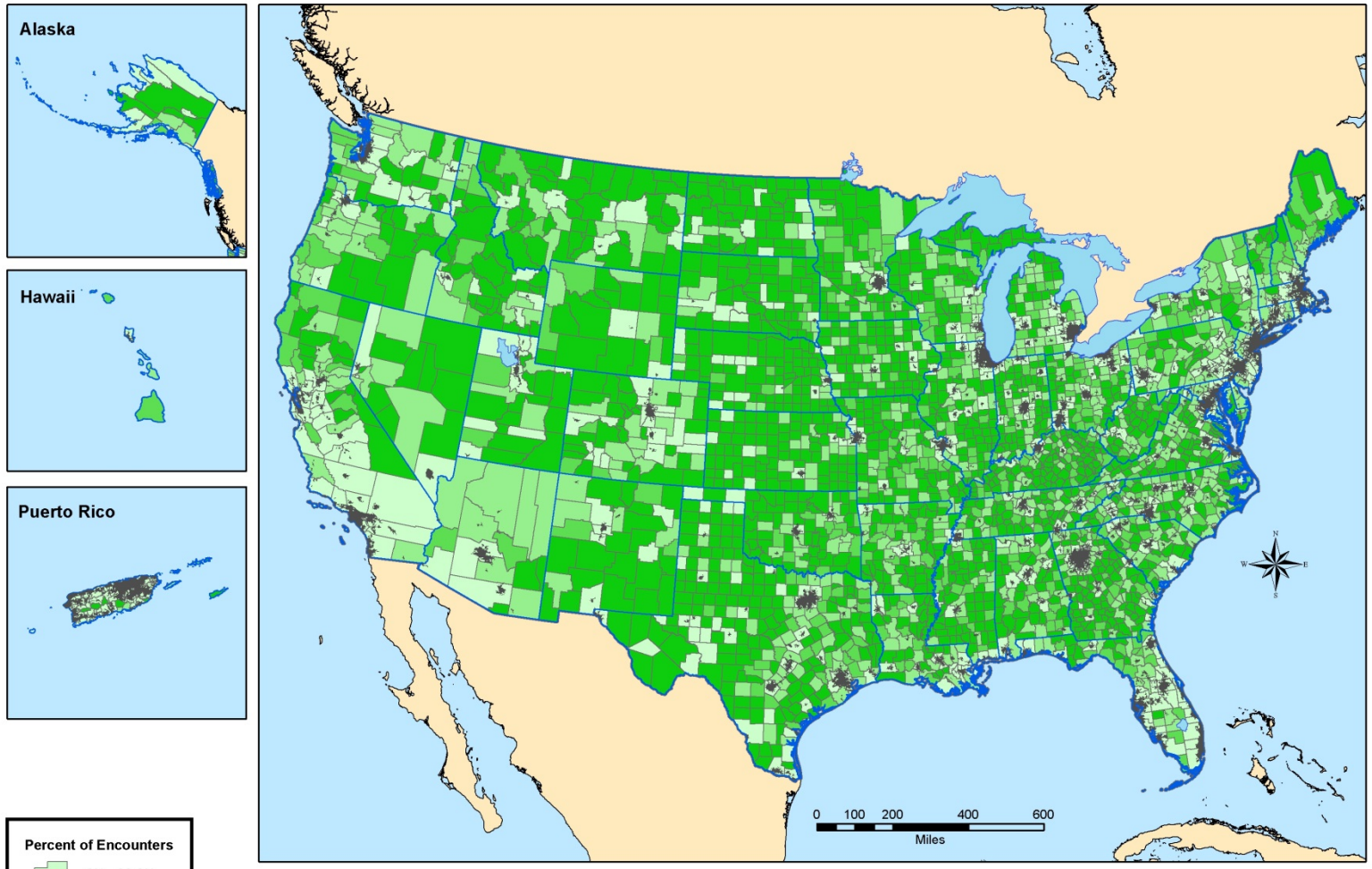
Stroke



Map 49:

Percent of Rural and Highly Rural VHA Patients with Stroke Encounters
Of All VHA Patient Stroke Encounters
By County FY - 2014
Urban Areas "Shaded"

GeoSpatial Outcomes Division
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GeoSpatial Outcomes Division
(Map Creation Date: 7/2/2015)
Map Information by: PSSG, VSSC, ESRI
ArcGIS 10.2x

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5) Enrollment Priority Groups, available at: http://www.va.gov/healthbenefits/resources/publications/IB10-441_enrollment_priority_groups.pdf.

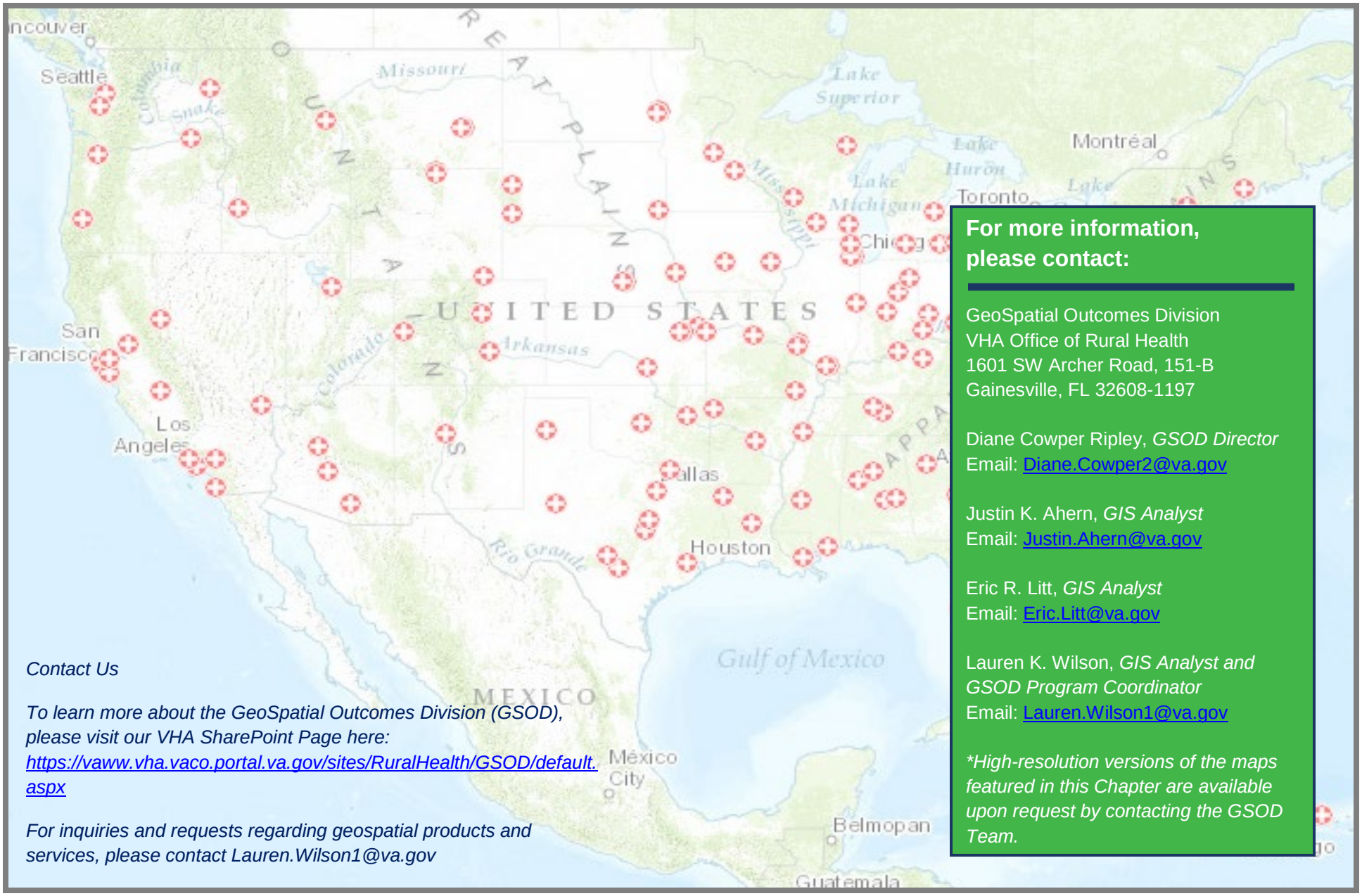
Project Team

Diane C. Cowper Ripley, Ph.D. is presently Site Co- Director of the HSR&D-funded Center of Innovation on Disability and Rehabilitation Research (CINDRR) and the Director of the Veterans Rural Health Resource Center-Eastern Region's GeoSpatial Outcomes Division (GSOD). Her research has focused on Veterans' access and utilization issues for over 31 years.

Justin K. Ahern, B.A. is a geographer and the newest staff member of the GeoSpatial Outcomes Division. He hopes to bring his diversity of skills and experiences to satisfy the GSOD's mission of supporting both Research and Operations related to improving access to health care for rural Veterans.

Eric R. Litt, B.A. is a geographer and has been with the VA since 2006. He also serves as Deputy Director of the GeoSpatial Outcomes Division. Mr. Litt has a strong interest in and deep commitment to assisting our Veterans by providing geospatial analyses that ultimately may improve access to health care services.

Lauren K. Wilson, B.S. serves as the program coordinator and GIS Analyst with the GeoSpatial Outcomes Division. She has been employed with the VA since 2009 and has been using GIS tools since 2005. Her main focus is geospatial analyses and geostatistics and their myriad uses for evidence-based research and policy influence for meaningful change in access to health care for rural Veterans.



Contact Us

To learn more about the GeoSpatial Outcomes Division (GSOD), please visit our VHA SharePoint Page here: https://vaww.vha.vaco.portal.va.gov/sites/RuralHealth/GSOD/default.aspx

For inquiries and requests regarding geospatial products and services, please contact Lauren.Wilson1@va.gov

For more information, please contact:

GeoSpatial Outcomes Division
VHA Office of Rural Health
1601 SW Archer Road, 151-B
Gainesville, FL 32608-1197

Diane Cowper Ripley, *GSOD Director*
Email: Diane.Cowper2@va.gov

Justin K. Ahern, *GIS Analyst*
Email: Justin.Ahern@va.gov

Eric R. Litt, *GIS Analyst*
Email: Eric.Litt@va.gov

Lauren K. Wilson, *GIS Analyst and GSOD Program Coordinator*
Email: Lauren.Wilson1@va.gov

**High-resolution versions of the maps featured in this Chapter are available upon request by contacting the GSOD Team.*