

I. MARKET METHODOLOGY

I.1 THE BOOZ-ALLEN CARES TEAM ANALYZED DEPARTMENT OF VETERANS AFFAIRS (DVA) POPULATION DATA, DRIVE TIMES, AND GEOGRAPHIC BOUNDARIES TO DETERMINE MARKET AND SUBMARKET LINES.

I.1.1 Boundary lines were drawn using five-digit zip code boundaries.

The Booz·Allen CARES Team brought together an expert group of clinical, real property, and geospatial analysts to form a core market team. The market team determined that five-digit zip code boundaries were the most specific and accurate form to use when defining markets and submarkets. Three-digit zip codes, especially in Wisconsin and the Upper Peninsula of Michigan, were too large to adequately reflect the nuances of veteran migration and proximity to various facilities. The Upper Peninsula, for example, contains only three zip codes each of which is just three digits, despite covering approximately 15,000 square miles. Likewise, county boundaries were too large to provide the level of specificity required.

I.1.2 Booz·Allen converted veteran enrollee three-digit zip code data projections into five-digit projections.

One of the challenges the team encountered after determining that five-digit zip code boundaries were preferable was converting the FY 2010 projected three-digit veteran enrollee population data into five-digit zip codes. To accomplish the conversion, Booz·Allen compared the current (FY 2000) number of enrolled veterans in every five-digit zip code area with the number in corresponding three-digit zip codes. The team then applied that percentage to projected FY 2010 three-digit zip code information. For example, if 500 enrolled veterans live in zip code 12345 and 2,500 live in three-digit zip 123, the team divided 500 by 2,500 to yield 0.2. Next, we took 0.2 and multiplied it by the projected FY 2010 veteran enrollee population in three-digit zip 123 (36,000), and calculated that 7,200 veterans will live in zip code 12345 in FY 2010.

I.1.3 Booz·Allen created a dot density map to illustrate the projected population distribution of veteran enrollees in FY 2010.

With this veteran enrollee projected FY 2010 population data, the Booz·Allen CARES Team, using geographic information systems (GIS) mapping tools, created a dot density map (Map 10, VISN 12: Enrolled Veteran Population 2010) to gain a clearer sense of the population distribution throughout the network.

I.1.4 Booz·Allen considered several methods of grouping populations.

Using the dot density map, the team grouped veteran populations in radii of varying mileage, depending on the urban/suburban/rural mix of the area. Drive time standards for community hospital access range from 12 miles (60 minutes) in urban areas to 60 miles (90 minutes) in rural areas. The

team applied this metric to all foci of enrollee population data in VISN) 12, drawing radii around areas of significant population density, or areas of some population density which, while in the network, are far from any VA Medical Center (VAMC).

The team was mindful, however, that standard circles are only a guide; they do not achieve the targeted specificity. The team therefore devised several guidelines to ensure that market and submarket creation was as precise as possible.

- **Proximity to nearest VAMC.** Using GIS mapping tools, the Booz·Allen Team determined time and distance needed to travel from more than 300 individual zip code points to VAMCs across the network.
- **Natural features.** Again with the help of mapping tools, the team identified natural boundaries, such as bodies of water, that may increase travel time to a particular VAMC. For example, veterans living in the northern reaches of the Door Peninsula in Wisconsin may be closer to Iron Mountain VAMC than to Milwaukee VAMC; however, because Green Bay separates the peninsula from Iron Mountain, the driving time to Iron Mountain is much more than that to Milwaukee.
- **Parochial migration.** The Booz·Allen CARES Team analyzed hundreds more individual zip code points to track historical migration by using VA's utilization data. When zip codes were equidistant between two or more VAMCs, the team used historical patterns for where users create admissions in each five-digit zip to determine which market or submarket each zip was placed in. For example, Rockford, IL, is approximately an hour and a-half from Madison, Milwaukee, and Hines VAMCs. This utilization data enabled the team to determine that a large majority of veterans in the Rockford area were going to the Madison facility. The team then drew the market and submarket to reflect this information.
- **Transportation systems (highways, subways).** The team consulted experts from the Southeastern Wisconsin Regional Planning Commission and the Chicago Area Transportation Study to learn how mass transit and highway systems affect travel time.

I.1.5 Using drive times and parochial migration data, Booz-Allen created three markets VISN 12.

Southern Market

The Southern Market envelops most of northern Illinois (including the city of Chicago) and a portion of northwest Indiana. Hines and North Chicago VAMCs as well as the VA Chicago Health Care System's Lakeside and West Side Divisions are in the Southern Market. Because veterans in Rockford were likely to go to the Madison VAMC whereas veterans living just south of the Wisconsin border but closer to Lake Michigan tended to go to the Milwaukee VAMC, the boundary line separating the Southern and the Central Markets was drawn just south of the Wisconsin-Illinois border. The Southern Market has two submarkets—the City of Chicago and the Suburban Submarket. There is also a sparsely populated collar zone just beyond the Suburban Submarket.

Central Market

The Central Market takes in the northernmost part of Illinois, most of Wisconsin, and one county in Minnesota. Milwaukee, Madison, and Tomah VAMCs are in the Central Market. The team applied utilization data to determine that Green Bay, which is equal in drive time to both Iron Mountain and Milwaukee, is in the Central Market. The team defined the western portion of the northern boundary by calculating drive time from those zip codes to Tomah and Madison and determining that they were close enough to include in the Central Market. The Central Market has five submarkets.

Northern Market

The Northern Market, while the largest in land mass, is the least populated. The only facility in the Northern Market is Iron Mountain VAMC. Veterans in Sault Ste. Marie do not have what is normally considered a reasonable drive time to the closest VAMC, which is Iron Mountain. However, the sparse population in this part of the network made it necessary to include the entire Upper Peninsula of Michigan, and northern Wisconsin in one market. There are six submarkets in the Northern Market.

Exhibit I-1. Summary Table of Markets and Submarkets with 2010 Enrollee Population

MARKET	SUBMARKET	2010 ENROLLEE POPULATION
Southern	Downtown	43,105
	Suburban	59,925
	Suburban Collar Zone	5,630
Central	Milwaukee	33,544
	Madison	17,914
	La Crosse	7,938
	Wisconsin Rapids	3,370
	Green Bay	11,370
	Madison West Zone	2,469
Northern	Iron Mountain	5,984
	Hancock	924
	Ironwood	1,303
	Marquette	1,405
	Rhineland	3,728
	Sault Ste. Marie	795
	Northwestern Wisconsin Zone	1,424
	East-Central UP Zone	370

I.1.6 The Booz-Allen CARES team created 13 submarkets throughout the VISN.

The two submarkets Booz-Allen created in the Southern Market take in 94.5 percent of the market's enrolled veterans.

- **Chicago City Submarket.** The Chicago Area Transportation Study suggested that public transportation was used extensively in the city, where the 606 three-digit zip predominates. Outside of this area, the public transportation system is not as robust; therefore, we used the 606 three-digit zip area to define this submarket.
- **Suburban Submarket.** Having established a limit of approximately 60 minutes in drive time in suburban areas, the team mapped zip codes from the Hines VA Medical Center accordingly. Highways were integral in determining the boundaries for this submarket. Additionally, utilization data on the northern part of the submarket aided the team in determining whether veterans were historically more likely to access Hines.
- **Suburban Collar Zone.** This zone (which is not included within a submarket because it does not lie within an acceptable drive time boundary) encompasses all of the Southern Market outside of the Suburban Submarket.

The team created five submarkets in the Central Market that take in 97.8 percent of the Market's enrolled veterans.

- **Milwaukee Submarket.** Milwaukee and Madison are approximately 80 miles apart, making it necessary to draw the Milwaukee Submarket's western boundary line closer than the standard 90-minute drive time. To do this, Booz-Allen mapped individual zip codes between the two cities to determine migration patterns. The data research resulted in a boundary line slightly closer to Milwaukee than to Madison because the team found that veterans equidistant between the two VAMCs were more likely to go to Madison. The northern boundary line was drawn to around the 90-minute drive time mark.
- **Madison Submarket.** The team applied utilization data to define the southern boundary of the Madison Submarket. The boundary between Madison and Tomah was drawn similarly. The boundary line was closer to Tomah than to Madison, resulting in a larger Madison Submarket. Drive time was considered in drawing the western boundary.
- **La Crosse Submarket.** Even though a VAMC is located in Tomah, the population for this portion of the VISN is located to the west in La Crosse. For that reason, the team drew a submarket using La Crosse as the center. Tomah VAMC is included in the submarket.
- **Green Bay Submarket.** The Green Bay Submarket has the highest enrollee population among submarkets without a VAMC. To the north of the Milwaukee Submarket and to the south of the Iron Mountain Submarket, the boundaries were drawn for the most part via time/distance calculations.

- **Wisconsin Rapids Submarket.** This submarket was drawn in recognition of a small population base to the northeast of Tomah VAMC, but the area is not within drive time standards to any VA facility.
- **Southwestern Wisconsin Zone.** This zone (which is not included within a submarket because it does not lie within an acceptable drive time boundary) is located to the west of the Madison Submarket and to the south of the La Crosse Submarket.

The six submarkets Booz-Allen created in the Northern Market take in 83.2 percent of the market's enrolled veterans.

The team applied a special set of rules when creating submarkets in the Northern Market. They determined that drive times from northern Wisconsin and the Upper Peninsula of Michigan to Iron Mountain VAMC (the only VA facility in the Northern Market) were so large that submarkets should be created around even small population bases.

- Iron Mountain Submarket (this submarket was created using almost exclusively a drive time limit of 90 minutes)
- Rhinelander Submarket
- Ironwood Submarket
- Hancock Submarket
- Marquette Submarket
- Sault Ste. Marie Submarket
- Northwestern Wisconsin Zone
- East Central UP Zone.

The five submarkets were created using drive time limits from pockets of population in the area. Each population center has veterans who travel (despite lengthy drive times) to Iron Mountain VA Medical Center at disproportionately higher ratios than anywhere else in the network. The two zones were not included within a submarket because they do not lie within an acceptable drive time boundary. The three major markets and the submarkets they include are portrayed in the map following this page (Map 11, VISN 12: Acute Care Markets and Submarkets).