

4. PLANNING PRINCIPLES

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In this chapter, we discuss the principal factors considered as service delivery options (SDOs) that were being developed. These factors provided the foundation for ensuring SDOs:

- Distributed the supply to appropriately meet veteran demand
- Promoted access, quality, and efficiency
- Preserved VA’s commitment to special disability programs
- Provided a full continuum of care in a tiered fashion—from primary care to tertiary care
- Complied with the Absolute and Discriminating Criteria by which these options shall ultimately be evaluated.

4.1 THE GEOGRAPHIC DISTRIBUTION OF DEMAND WAS A FUNDAMENTAL DRIVER OF SDO DEVELOPMENT.

Perhaps the most fundamental factor in option development was determining what healthcare services will be needed in FY 2010. As outlined in Chapter 3, these projections came from several sources, but the principal source for acute inpatient and ambulatory services was provided by the VA's actuary. These projections account for aging, mortality, and the morbidity of the enrollee population in Veterans Integrated Service Network (VISN) 12, and the extent to which the enrollee population relies on the VA as its source of care.

Demand was projected in the following categories:

- Acute inpatient medical, surgical, and psychiatric services
- Special Disability Services
- Residential Rehabilitation Service
- Long-term/Extended Care Services
- Ambulatory Care Services.

Because healthcare generally serves users locally, the projected enrollee demand was geographically distributed. This formed the foundation of demand markets for determining veteran healthcare services and allowed the appropriate distribution of those services. This was a key step in developing options that provided the right care, at the right place, at the right time.

4.2 TO BETTER DEFINE MARKETS AND APPROPRIATELY PLACE HEALTHCARE SERVICES, STANDARDS FOR ACCESS TIMES NEEDED TO BE DEVELOPED.

The Capital Asset Realignment for Enhanced Services (CARES) Discriminating Criteria established a 30-minute standard for access to primary care. There was no similar standard offered for inpatient care, specialty ambulatory care, or tertiary care. Yet the Discriminating Criteria require a quantitative assessment of accessibility in these domains. Furthermore, such guidelines are necessary when designing a tiered system of care driven by market-based demand. The following questions provide concrete examples of the kinds of issues that must be addressed to provide a full continuum of care in an accessible fashion:

- What is the upper limit of time a patient should travel to be admitted to the hospital for common diagnoses such as exacerbation of emphysema, unstable angina, or pneumonia?
- What is the upper limit of time a patient should travel to obtain specialty ambulatory care for such things as a cardiology appointment, colonoscopy, stress test, or post-operative appointment with the orthopedic surgeon after a hip replacement?
- What is the upper limit of time a patient should travel for tertiary care such as a coronary artery bypass graft?

- How should these upper limits of time vary according to whether the patient resides in an urban, suburban, or rural environment?

The more relevant metric in all these questions is time rather than distance because time is generally a better measure of the actual burden to the patient. However, to establish markets with geographic boundaries, these time limits must be converted into distance measurements. This conversion will be significantly affected by many factors such as patient disability, mode of travel, kinds of roads, natural obstacles (e.g., mountains), time of day, and whether it is predominantly urban, suburban, or rural travel. Consequently, even when using Geographic Information System mapping tools, time distance conversions should be considered approximations.

To establish the upper limits of travel time for specialty ambulatory care, routine inpatient care, and tertiary inpatient care, the Booz-Allen CARES Team conducted an extensive review of the literature and consulted more than 30 healthcare agencies, organizations, departments of health, academic centers, and healthcare experts. We also conducted a survey of veterans and discussed the issue with a group of physician consultants to the CARES process.

Not surprisingly, this effort did not produce definitive standards for access times. However, it did produce a clustering of reference points that helped define standards. Though some veterans currently travel quite far for VA care, our survey data suggested that 89 percent of veterans (n = 205) felt they should have access to care within an hour of where they live. Input from physicians was consistent with these parameters.

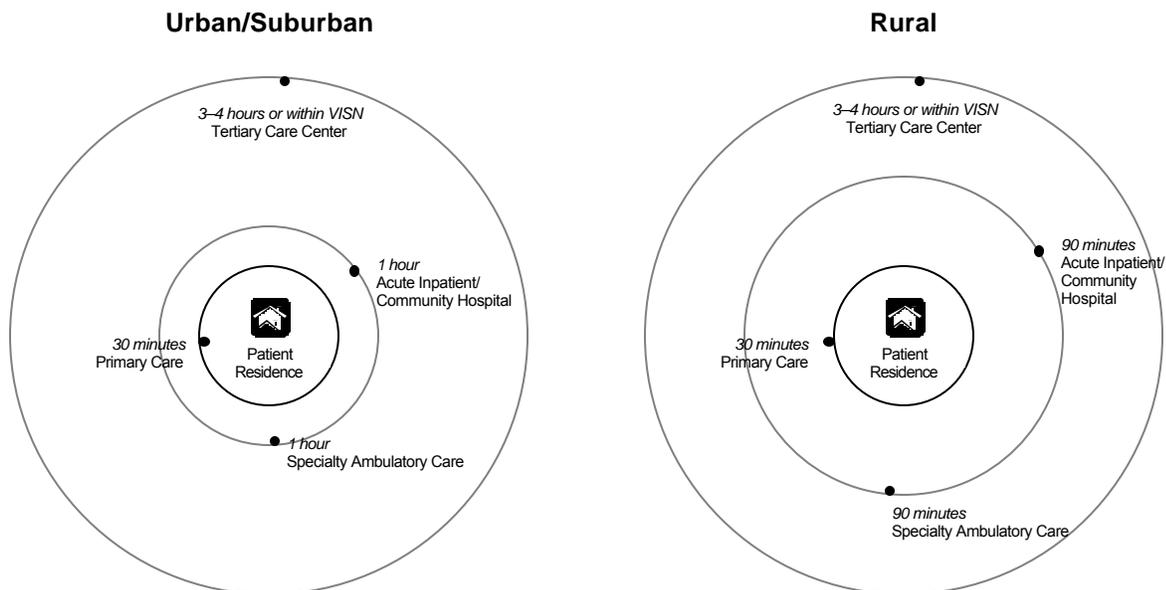
The standards we used are represented in Exhibit 4-1. These standards defined the geographic size of markets and submarkets in urban, suburban, and rural environments.

Exhibit 4-1. Travel Time Standards

Type of Service	Urban	Suburban	Rural
Emergency Care	Closest	Closest	Closest
Ambulatory Care			
– Primary Care	30 min/6 mi*	30 min/20 mi	30 min/20 mi
– Specialty Care	60 min/12 mi*	60 min/40 mi	90 min/60 mi
Community Hospital	60 min/12 mi*	60 min/40 mi	90 min/60 mi
Extended Care	60 min/12 mi*	60 min/40 mi	90 min/60 mi
Tertiary Hospital	3–4 hour/VISN	3–4 hour/VISN	Within the VISN

* Source for time distance conversion in Chicago is Chicago Area Transportation Study.

These benchmarks can be represented graphically as the tiered services are placed at increasing radii from the veteran. The time radii are different in urban/suburban environments compared to rural environments.

Exhibit 4-2. Proximity to the Patient Population in a Tiered Healthcare System

These standards, along with the population thresholds defined below, were among the principal forces driving market definition and SDO development. By adhering to these standards, we were able to develop SDOs that improved access for veterans. These will become increasingly important as the population ages and becomes less mobile.

4.3 AFTER IDENTIFYING THE PRINCIPAL POPULATION CLUSTERS IN VISN 12, WE USED THE TIME/DISTANCE ACCESS STANDARDS TO DEFINE 13 SUBMARKETS THAT WERE AGGREGATED TO FORM THREE MAJOR MARKETS.

Veteran-demand submarkets, or simply “markets” as we generally refer to them, have two principal drivers. The first is enrolled population. Populations of different sizes generate different volumes of workload and will support different configurations of supply. A population of 10,000 enrollees will be insufficient to support a hospital; but it could support an ambulatory care clinic. Based on projected hospitalization rates of VISN 12 enrollees, it would require a population of approximately 30,000 enrollees to fill a 100-bed hospital. (This is a gross estimate and its derivation is described in Section 4.4.4.)

The second driver is the geographic distribution of population. If those 30,000 enrollees are diffusely distributed in a 500-mile radius, there will be an insufficient cluster of demand to support a hospital. However, if those 30,000 live within a 60-mile radius they create a concentrated critical mass sufficient to support a facility. The population in this area defines a demand market that can be appropriately supplied with a hospital.

This does not imply that all markets or submarkets must have large populations. It means that populations of varying size, clustered in different geographic configurations, are approached with

different supply strategies. This leads to a tiered system of care, from primary to tertiary care that matches local supply to demand. The SDOs generate supply strategies to provide accessible, effective care in these different markets. Furthermore, approaching demand from a market perspective ensures that access, a CARES priority, will figure prominently in allocating supply in each SDO.

Because markets are so fundamental to the CARES process, a significant portion of the analytic process was devoted to defining markets and submarkets (see Appendix I for a complete discussion of how markets were developed). There were two fundamental steps in the process. The first was to identify population clusters using a dot density map. The second was to use the access standards previously defined to determine submarket boundaries and the appropriate location of different types of services within these submarkets.

Once we identified the principal population clusters—there were a total of 13 in the VISN—we mapped outward from the epicenter of each cluster to form 13 submarkets. Often the epicenters of population corresponded to existing VA Medical Centers (VAMC) as in the case of Chicago and Milwaukee. Sometimes, as in the cases of La Crosse and Green Bay, that was not the case. Tomah is located approximately 1 hour east of the La Crosse population center, and the Green Bay submarket has no VAMC at all. It is important to note that submarkets are driven by population (demand) not the location of VAMCs.

The submarkets were then aggregated to create three major markets, the Southern, Central, and Northern Markets. However, because most healthcare is local, the submarket analysis is most relevant when matching supply to demand.

Below we describe some key steps in defining the boundaries of demand submarkets.

- Identified population clusters with dot density maps and grouped in appropriate time/distance radii. These time/distance benchmarks are shown in Exhibit 4-1.
- Determined proximity to nearest the VAMC and/or foci of community supply. Using GIS mapping tools, we mapped time and distance from more than 300 individual zip code points to identified sources of supply.
- Identified natural features. Using mapping tools, we identified natural boundaries, such as bodies of water, that might increase travel time.
- Adjusted for parochial migration—we analyzed VA inpatient admission data in hundreds of individual zip codes to track the historical migration of veterans to different VAMCs. This was particularly useful when veterans lived in zip codes that were equidistant between two VAMCs. This helped define possible preferences and projected future behaviors.
- Studied transportation systems—we consulted experts from the Southeastern Wisconsin Regional Planning Commission and the Chicago Area Transportation Study to account for local idiosyncrasies of travel with mass transit.

The result of these analyses was the creation of the demand markets and submarkets described below. SDOs were developed in relation to each market with the intent of meeting the unique

healthcare delivery challenges presented by each market. Those challenges ranged from how to enhance access in rural environments (the Northern Market) to how to reconfigure excess supply to efficiently accommodate a decline in projected demand (Chicago City Submarket). The three specific markets and submarkets, which emerged from this analysis, are shown in Map 5, Acute Care Markets and Submarkets, following this page.

4.3.1 The Southern Market encompasses two submarkets—the city of Chicago and the surrounding suburban area. It is projected to serve approximately 109,000 enrollees in 2010.

The Southern Market of VISN 12 includes much of the northern tip of Illinois and part of northwest Indiana. The Southern Market is divided into two submarkets. The first is the Chicago City Submarket proper, whose boundary is defined by the 606 zip code. This boundary was selected because the city's public transportation system is less robust beyond that point. The second submarket is the Suburban Submarket that envelops the city and whose outer boundary is defined by a distance approximately 60 to 75 minutes from the Hines VAMC. Just beyond the Suburban Submarket is a Suburban Collar Zone that is more sparsely populated and too distant to be included in the Suburban Submarket. The Chicago City Submarket is projected to provide residency to 43,105 enrollees. The Suburban Submarket and Suburban Collar Zone will encompass 65,555 enrollees in 2010. The challenge presented by the Southern Market revolves around reconfiguring excess supply to efficiently accommodate a decline in projected demand in the Chicago City Submarket.

4.3.2 The Central Market encompasses much of Wisconsin (including Milwaukee and Madison), consists of five submarkets, and is projected to serve approximately 77,000 enrollees.

Other than the Milwaukee, Madison, and Green Bay areas, the Central Market is largely rural. We have divided the Central Market into five submarkets as shown previously on the map. These submarkets were defined by the population clusters they encompass. The Milwaukee, Madison and Tomah/La Crosse Submarkets have VAMCs within their boundaries. The remaining submarkets, Green Bay and Wisconsin Rapids, are far from a VAMC and the veterans who live in these submarkets have significant barriers obstructing their access. The projected enrollee population for each submarket is shown in Map 5, Acute Care Markets and Submarkets, following this page. Geographic access barriers are important drivers of the three options developed for this largely rural market. Most of these submarkets are sparsely populated and do not generate sufficient workload to support a hospital, another reality that drives the options in the Central Market.

4.3.3 The Northern Market encompasses all of Michigan's upper peninsula and parts of Northern Wisconsin. It is very large, extremely rural, consists of 6 submarkets, and is projected to serve approximately 16,000 enrollees.

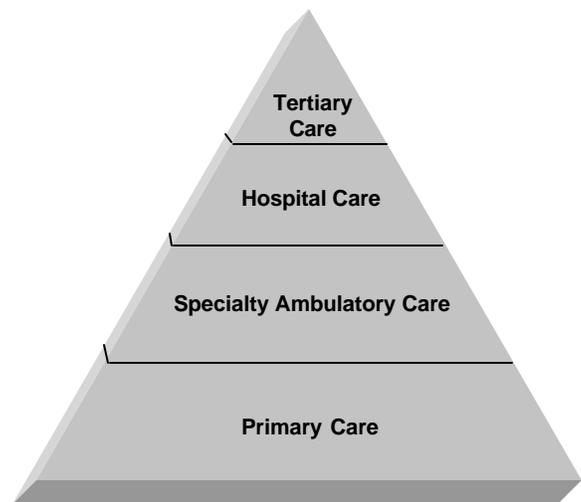
The Northern Market is largely composed of Michigan's sparsely populated Northern Peninsula. Geographically, it is the largest market in the VISN. The Iron Mountain VAMC, the only VA facility in this rural area, is located roughly in the geographic center of the market. Our analysis

indicated that the Northern Market could be divided into six submarkets based on their distance from the Iron Mountain VAMC and their proximity to other population centers. We estimated the number of enrollees projected for each of these submarkets in 2010; these figures are displayed in Map 5, Acute Care Markets and Submarkets. Each submarket contains a VA community-based outpatient clinic (CBOC). Many of the access challenges in the rural sectors of the Central Market are greatly amplified in the Northern Market.

4.4 ONCE THE DEMAND SUBMARKETS WERE DEFINED, A TIERED SYSTEM OF SUPPLY, FROM PRIMARY CARE TO TERTIARY CARE, WAS DEVELOPED TO MEET THE NEEDS OF EACH SUBMARKET.

While not always the case, healthcare is generally provided and consumed along a continuum of care that proceeds from the less complex and specialized to the more complex and specialized. A tiered system of care, or supply, serves that continuum as it proceeds from primary care up the tiers to tertiary care. Conceived as a pyramid, primary care provides the foundation, specialty ambulatory care provides the next level of care, hospital care is near the top, and tertiary care is at the apex. Extended care services and special disability services are distributed at the appropriate levels as well.

The patient uses the “lower levels” the most frequently and so it requires fewer patients to generate a critical mass of demand to justify that service. Because these services are used more frequently, they should be geographically closer to the patient. Furthermore, these basic services generally require less capital intensive facilities, and they are easier to supply. The upper levels are used with much less frequency by any given patient or enrollee, but they require many more patients to support them. However, they need not necessarily be proximate to the patient. These services and the facilities required to support them are more “scarce” and more capital intensive.



Our goal was to produce SDOs that provide the right care, at the right place, at the right time. This required appropriate distribution of the tiers of supply to meet demand. Below we describe our approach to that process.

4.4.1 The Primary Care Tier

Primary care, as noted above, provides the foundation of a tiered care system. It includes general internal medicine and mental health services among other basic services. It should be broadly distributed and easily accessible. Since a primary care panel size is approximately 1,000 patients (see Appendix H, Ambulatory Provider Productivity Benchmarks), there is not a significant population threshold required to justify this service. We used access times as our principal guide for how and

where to provide this service. For example, in the Southern Market more than 90 percent of veterans were within 30 minutes of primary care. Therefore, it was felt that no CBOCs needed to be added. On the other hand, in the Central Market only 78 percent of enrollees were within 30 minutes, and in the Northern Market, only 58 percent are projected to be within the 30-minute access range. Consequently, CBOCs were added in these markets.

4.4.2 The Specialty Ambulatory Care Tier

Specialty ambulatory care is the next level up from primary care. It includes outpatient visits to the cardiologist, urologist, pulmonologist, orthopedist, or other physician specialists as well as visits to Spinal Cord Injury (SCI) outreach centers—the spokes on that system of care. Specialty diagnostic services like MRIs, colonoscopies, and nuclear medicine scans are also included. This category also includes ambulatory surgery, which is a special case and is described below. We established the access standard for Specialty Ambulatory Care as 60 minutes in urban and suburban environments, and 90 minutes in rural environments. The options preserved at least the current spectrum of specialty ambulatory services at the eight VISN 12 facilities. This provided a reasonable distribution of specialty ambulatory services. Notable exceptions include the La Crosse/Tomah Submarket, the Green Bay Submarket and most of the Northern Market. The SDO development process addressed these issues in different ways.

4.4.3 Ambulatory Surgery Centers

As noted above, ambulatory surgery centers are a subset of specialty ambulatory care and deserve special consideration. Just below hospitals in the tiered levels, the ambulatory surgery center is a capital intensive investment and requires a certain population and service volume to justify its construction.

Assuming a minimum of 2 operating rooms doing approximately 1,100 cases a year and using the projected actuarial use rate of 94.3 outpatient surgical cases/1000 enrollees, we concluded it would require an enrolled population of 20,000 to 25,000 enrollees within a 60-minute travel radius (90 minutes + in rural areas) to support a freestanding ambulatory surgery center. In the VISN 12 population, clusters of this size are already associated with hospitals performing outpatient surgery. We were unable to identify other markets capable of supporting a freestanding VA surgicenter.

4.4.4 The Hospital Tier

In a tiered system of care, the hospital occupies the apex of the tier, with the tertiary hospital at the highest point. Markets that support a hospital will typically support a nursing home. Therefore, within a hospital supply market a relatively full continuum of care is achieved, with the exception perhaps of some tertiary services. However, a significant population threshold is required to justify new hospital construction.

In this analysis, a population of 30,000 enrolled veterans served as an approximate threshold to define a hospital market. We used actuarial workload projections to calculate this figure. These

projections estimate that it will require 500 medical and surgical beds to serve the 202,909 enrolled veterans in 2010. This yields a ratio of 400 veterans to 1 medical-surgical bed. Doing similar calculations for projected acute psychiatric workload yields 1,350 enrollees per bed.

Employing this use rate, further calculations suggest that 30,000 enrollees are required to support a 100-bed hospital. (Although a 100-bed hospital is a relatively small hospital, it can provide a reasonable range of services. As hospital size falls further, the cost per patient goes up because of the obligated fixed costs.) This figure is only a gross estimate that we used in scanning the VISN for submarkets of this size.

This analysis yielded 3 major submarkets of more than 30,000 enrollees within appropriate travel time radius (60 minutes for urban/suburban and 90 minutes for rural environments). These submarkets are the Chicago City Submarket, the Suburban Submarket, and the Milwaukee Submarket. Each of these submarkets already has at least one hospital while the City of Chicago Submarket has two and is over-supplied with the hospital tier of care.

Some submarkets that would not justify new construction based on enrollment have VAMCs nonetheless. These are often used for alternative purposes like long-term care. Other submarkets with low enrollment have no VAMCs. The SDOs attempt to leverage current hospital supply and find alternative sources of supply for veterans who live in submarkets that cannot support a hospital-level tier of care.

4.4.5 The Tertiary Tier

The larger facilities in VISN 12 provide a varying spectrum of tertiary services. Our standard for access to these services is 3–4 hours, or within the VISN. In special cases, enrollees may have to leave the VISN to receive a very highly specialized service. As noted, certain population and demand thresholds are necessary to support a hospital. However there is another level of analysis that involves concentrating a sufficient volume of complex procedures at a given institution to promote quality outcomes. Research tends to indicate that there is a statistical relationship between low procedure volume and poor outcomes. A goal for the future would be to concentrate tertiary services where possible. In this way, “focused factories” of care, as Professor Regina Herzlinger of Harvard calls them, could be created to enhance both quality and efficiency. In VISN 12 there is a particular issue related to the placement of coronary bypass procedures, which are currently performed in three institutions, all within two hours of each other. We discuss this further in Appendix N.

4.5 IN DISTRIBUTING SUPPLY TO PROJECTED DEMAND WE CONSTRUCTED OPTIONS THAT COULD SCALE UP OR DOWN BASED ON FUTURE FLUCTUATIONS OF DEMAND.

CARES is a strategic process using highly sophisticated projection models to anticipate veterans needs 10 years in the future and plan accordingly for those needs. However, if there is one thing certain about the future, it is that it is uncertain. Therefore, creating the SDOs’ capability to respond to unanticipated changes in demand has been an important consideration.

Scalability is the measure of an option’s capacity to handle significant fluctuations of demand. These fluctuations may be generated by unpredictable events such as those identified in the sensitivity analysis—military conflict, Medicare or DoD policy changes, economic changes, or a decline in the veteran population.

Upward scalability measures an option’s ability to adapt to increases in demand. This can be achieved by leveraging a facility with extra beds or by purchasing needed services in the private sector. Downward scalability measures an option’s ability to adjust to reductions in demand. This is generally achievable only when beds are “leased back” in Enhanced Use arrangements, or when inpatient services are purchased in the private sector. This enables downward adjustment of supply by leasing or contracting for fewer beds if demand falls.

In quantifying the scalability of an option, we focused primarily on the scalability of acute beds. These are the most capital intensive to build and the most expensive to maintain if not needed. Furthermore, it is currently common practice to contract for long-term care beds making this category of beds inherently scalable.

Each option was created with scalability in mind; however, different options have varying ranges of scalability. As we discuss the options, we comment on the scalability of each.

4.6 SPECIAL DISABILITY SERVICES ARE A UNIQUE MISSION AND CORE COMPETENCY OF VA AND FIGURED PROMINENTLY IN OPTION DEVELOPMENT.

Consideration of the special disability programs figured prominently in the development of options. The special disability services provided by the VA are often not replicated in the private sector, and if they are, the range of services is frequently truncated. Providing these services is a core competency of the VA that distinguishes it from other healthcare systems. As described in Chapter 3, we used different projection methodologies based on mandated capacity parameters. These methodologies assured that these programs would maintain a robust presence in future planning.

As with other services, we began with a geographic distribution demand for services and sought to allocate supply. Many of the current services are appropriately located in areas of major population density. These are maintained, the facilities are upgraded, and a new facility is constructed.

4.7 THE ABSOLUTE AND DISCRIMINATING CRITERIA ARE EVALUATION TOOLS BUT THEY ALSO INFORM THE PROCESS OF SDO DEVELOPMENT.

VA developed Absolute and Discriminating Criteria by which the options are to be evaluated. However, these criteria also inform the process of SDO development. The Discriminating Criteria in particular provide a roadmap for designing a system of care that complies with VA’s unique priorities.

4.7.1 Absolute Criteria

The Absolute Criteria were developed by VA as minimum standards that each option must meet to be considered viable. There are two Absolute Criteria under one heading, “Healthcare Needs

- **Healthcare Needs and Requirements (Capacity)**

The first criterion focuses on the issue of capacity. Capacity in the Absolute Criteria is the appropriate level of services based on bed days of care and ambulatory encounters derived from enrollment projections and use rates. When developing options, we ensured that the distribution of beds and ambulatory care encounters followed the projected capacity levels provided by VA actuary projections as well as the projections developed for special disability and extended care programs.

This criterion also defines capacity as the presence of services. We developed a clinical inventory checklist detailing the services planned for each option. This assures that each option provides the complete continuum of care.

- **Healthcare Needs and Requirements (Safety and Suitable Environment)**

The second criterion addresses the quality of the environment in which care is provided to veterans. As indicated by the heading, “Safety and Suitable Environment,” the VA requirements for this criterion include the assessment of minimum VA and community standards for safety and environment of care such as those provided by the Joint Commission on Accreditation of Healthcare Organizations standards. This means that for each facility included in an option, an assessment of major technical, mechanical (e.g., heating, plumbing, air conditioning), and equipment issues that may impact an option’s feasibility is required. When planning the options, we analyzed each VISN 12 facility using this criterion to guide decisions made for placing services at a facility. We also used the criterion requirements for developing capital asset realignment plans.

4.7.2 Discriminating Criteria

VA developed the Discriminating Criteria to score the options. The different scores will help discriminate between the options and assist VA in choosing a preferred option.

The Discriminating Criteria are divided into five categories—Healthcare quality measured by access, healthcare quality measured by patient satisfaction, staffing and community impact, support of other VA missions, and optimizing use of resources. VA has assigned these categories different weights consistent with their perceived importance.

The respective weights assigned to each Discriminating Criteria category informed SDO development by helping to prioritize competing considerations. For instance access is weighted most heavily and therefore was highly emphasized in the process of option development. A brief description of the Discrimination Criteria follow.

- **Healthcare quality measured by access.** This category focuses on 3 components of access: travel time to obtain services, a 30-day scheduling goal for primary and specialty care, and a maximum 20-minute waiting time for a patient to be seen by a clinician. This is the most heavily-weighted criterion, 0.44 out of 1.0. Consequently, access played a significant role in option development.
- **Healthcare quality measured by patient satisfaction.** This category focuses on whether an option improves the current satisfaction of patients for access to care, coordination of care, and overall satisfaction. Surveys were conducted to ascertain patient preferences so that these may be considered in option development. This is assigned a weight of 0.215.
- **Optimizing use of resources.** This category assesses cost and revenue opportunities associated with an option. It includes five performance measures including life-cycle cost, enrollment cost, VA and community integrations, marketing access capacity, and enhanced use opportunities. This is assigned a weight of 0.197.
- **Support of other VA missions.** This category assesses an option's impact on the following missions: research, education, one VA, and VA and Department of Defense (DoD) contingency support. This is assigned a weight of 0.136.
- **Staffing and community impact.** This category assesses an option's impact on VA/DoD sharing and staffing and the community. This is assigned a weight of 0.087.

These evaluation criteria served as an overall “check-list” in the planning and development of options and helped provide priorities in developing SDOs.

4.8 IN SUMMARY, THE PRINCIPLES DESCRIBED IN THIS CHAPTER PROVIDE A FOUNDATION FOR UNDERSTANDING THE SDOS PRESENTED IN THE FOLLOWING CHAPTER.

There are other factors that were considered that are not described here. However, these selected guiding principles provide particular insight into the thought process behind development of the options. In particular we tried to demonstrate the intimate relationship between demand, market development, and the appropriate distribution of supply in developing options. This will provide the reader with the necessary foundation to better understand the SDOs, which are presented in the following chapter.