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**DENTAL SUPPORT FOR THE ARMY AFTER NEXT**

**BY**

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USAWC STRATEGIC RESEARCH PROJECT

**DENTAL SUPPORT FOR THE ARMY AFTER NEXT**

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## ABSTRACT

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The Army Dental Corps has consistently provided urgent, routine, and specialty care to soldiers during times of peace and war. Throughout history, as the Army changed (size of the force, types of missions, speed of deployments, the amount of forward presence, etc.), the Dental Corps adjusted and continued to support. The next 20+ years will likely see the most dramatic changes in the Army, with unparalleled technological advances (Revolution in Military Affairs, RMA), new combat scenarios, new force structure, etc. The Army After Next (AAN) will continue to be a great Army but it will be a different Army. This paper focuses on the likely dental support requirements for this future Army. A detailed examination of the best possible Dental Corps structure, taking into account the Revolution in Dental Affairs (RDA), dental officer career paths, Graduate Dental Education (GDE), and outsourcing, to support the AAN is presented.



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## PREFACE

Dental support to the soldiers of the U.S. Army has been steadfast and outstanding since 1911; at that time the Army Dental Corps was established. Through both World Wars, the Korean Conflict, Vietnam War, Desert Storm, and all the smaller campaigns, the Dental Corps took care of the dental needs of the fighting force. As we enter a new century, what will be the composition of that fighting force? What are the likely battle scenarios, and what will be the dental needs for the "Army After Next"?

This paper examines the type of Army needed for the year 2015 and beyond. It will envision the mission needs, the structure, and dental support requirements for the Army of the future. The dental slice will be examined in detail with emphasis on structure, Command and Control, Graduate Dental Education (GDE), career paths, outsourcing, and quality/efficiency of dental care delivery.



## HISTORY

Dentistry's association with the military dates back to the Revolutionary War. Paul Revere was a patriot and a dentist; in addition to his famous "Midnight Ride", he "...performed the first recorded case of military forensic identification on the remains of Major General Joseph Warren at Bunker Hill about 10 months after Warren's death in that famous battle."<sup>1</sup>

During the 1800's, most dental care was provided by civilian dentists, and soldiers were on their own to seek and pay for treatment. With the Civil and Spanish American Wars, Army units realized the need to provide dental care to soldiers, and in 1872, William Saunders, a West Point medical orderly, was placed on orders as the first U.S. Army dentist. Pressure continued to mount to establish a military dental corps but it was not until 3 March, 1911 that the Army Dental Corps of commissioned officers was established.

World Wars I and II required substantial dental support and the Dental Corps delivered. By 1918, dental officers on active duty numbered 4620, and they provided over 1.5 million restorations, over 384 thousand extractions, and over 73 thousand crowns and dentures during the war effort. From 1942-45, over 18,000 dentists served and provided over 69 million restorations, over 16 million extractions, and over 2.5 million full/partial dentures. "The concept of operations throughout WWII was unit

support (as opposed to area support), with each Army division typically having more than 30 dental officers."<sup>2</sup>

In the Korean and Vietnam Wars, area dental support was the primary means of providing dental care to soldiers. This system employs mobile dental teams and a command and control headquarters to support a division. Area support worked well, especially in Vietnam, since there were no front lines and few large troop movements; the dental teams typically set up in semi-fixed facilities to provide care to an area of operation. At the height of the Korean Conflict, 2641 dentists were on active duty compared to 2817 for Vietnam.

The Persian Gulf War saw a massive dental workload brought on by reserve force mobilization. The Dental Corps was overwhelmed and required the activation of 5 reserve dental units to help prepare reserve soldiers for the mission. At the peak of operations in Kuwait, 300 thousand soldiers were supported by 121 dental officers, including 25 oral and maxillofacial surgeons.

These world events of the 20th Century validated the need for a responsive, proactive Dental Corps for the U.S. Army. For the past 88 years, the Dental Corps has consistently and swiftly adjusted its end strength to deliver efficient, cost effective care. Historical milestones which helped provide this flexibility include: 1931-establishment of formal specialty training in Oral Surgery, with training for other specialties coming on line soon thereafter; 1938-establishment of flag rank (BG) for the Chief of

the Army Dental Corps; 1946-authorization of the rank of Major General for the Chief Dental Corps; 1950's-dental officers begin attending Command and General Staff College (CGSC); 1960-first Dental Corps officer graduates US Army War College; 1960-inauguration of the Army Preventive Dentistry Program; 1962-activation of the U.S. Army Institute of Dental Research; 1965-the introduction of the first high speed field dental unit; and,

In 1978, Title 10 of the United States Code was changed so that "The Assistant Surgeon General is Chief of the Dental Corps and is responsible for making recommendations to the Surgeon General and through the Surgeon General to the Chief of Staff on all matters concerning dentistry and the dental health of the Army". It further specified that dental functions of the Army shall be under the direction of the Chief of the Dental Corps... It also stipulated that dental personnel would be organized into dental units commanded by a Dental Corps officer who would be directly responsible to the commander of the installation...<sup>3</sup>

The Dental Corps has demonstrated a relentless desire to support the Army and a flexible capability to provide quality dental care at home and on the battlefield.

### **CURRENT SITUATION**

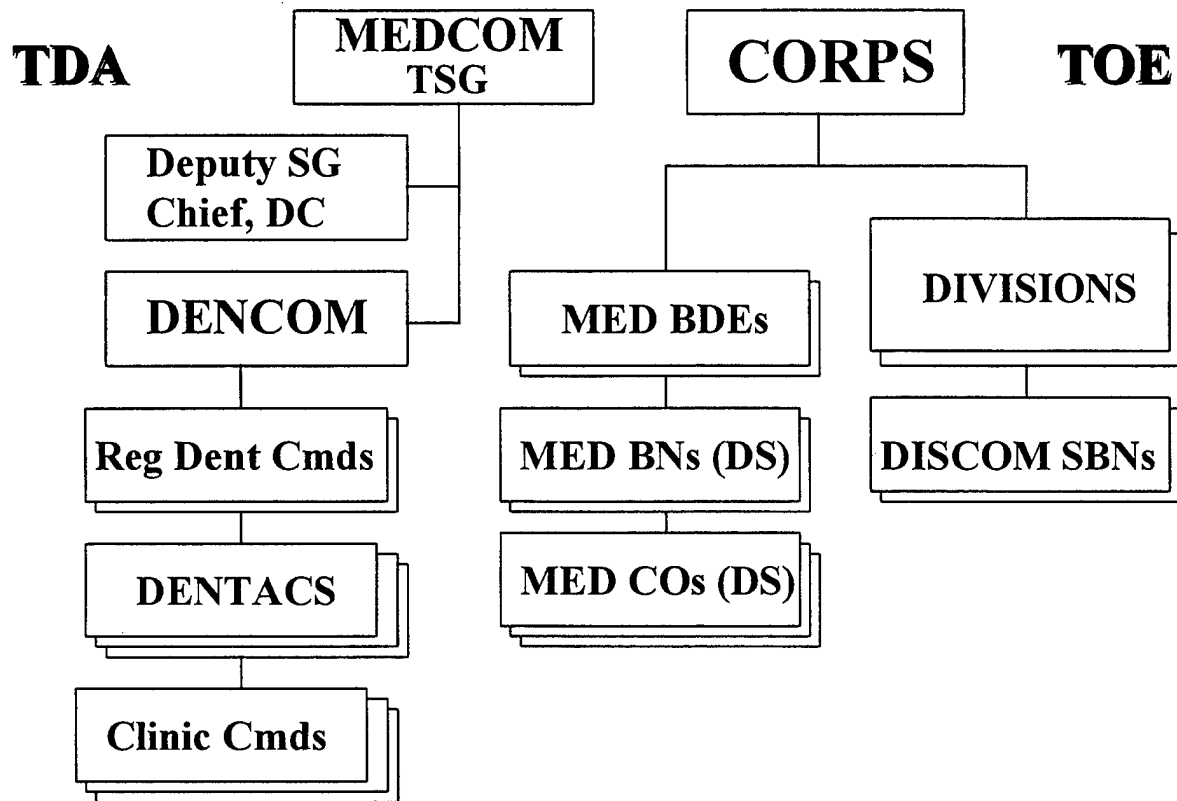
The dual mission of the Dental Corps continues to be "to promote dental health and provide quality dental care for our Army's soldiers, their families, and other entitled beneficiaries" in peacetime, and "to preserve the fighting strength" in time of war. Implicit in this mission statement are the two principles of readiness and quality. Readiness is mostly

preventive oral maintenance so soldiers are deployable with a low risk of developing dental problems in the theater of operations, but it also includes the capability of "fixing teeth" forward. Quality is protected with rigorous licensure requirements, peer review programs and outstanding graduate dental residencies.

The current structure and endstrength of the Army Dental Corps, with civilian augmentation, meets readiness and quality requirements. Today, the active duty component consists of 1022 dental officers and 1782 enlisted personnel. However, the total Army Dental Care System includes 165 contract dentists, 25 General Service (GS) dentists, 113 civilian hygienists, 133 laboratory technicians, and 982 dental assistants.<sup>4</sup>

The Chief of the Dental Corps is a Major General with additional duty as "Assistant Surgeon General" (Title 10). However, the present Chief of the Dental Corps, MG John J. Cuddy, is also the Deputy Surgeon General. The Dental Command (DENCOM) is commanded by a Colonel and is a major subordinate command to the Medical Command (MEDCOM). The DENCOM owns all Army dental assets, although at any one time a percentage of personnel are opcon to certain Corps/Divisions in a TOE role. See Fig 1.

The Table of Distributions and Allowances (TDA) authorizes the number and mix (general dentists versus specialists) of



**Figure 1. Current structure and location of USA Dental Corps assets**

professionals required for the peacetime dental health care mission. The DENCOM, through the 6 Regional Dental Commands (RDCs), 29 Dental Activities (DENTACS) and 25 Clinic Commands executes that mission. Because of downsizing, poor retention and lower than expected accession rates (goal is 108/year) for dental officers over the past five years (see Chart 1), active duty dental care is being augmented with personal service contract and civil service(GS) providers; dental care for other than active duty has virtually disappeared in the Continental United States (CONUS). Family members and retirees are now offered the option

of a dental insurance program, partially subsidized by the military.

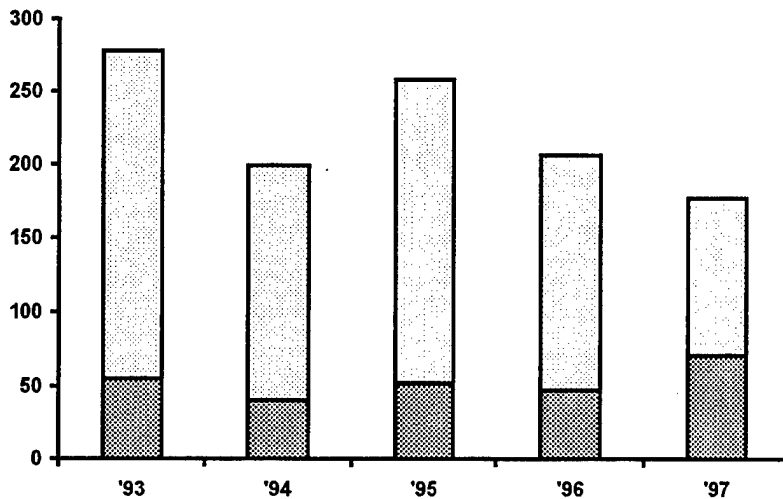


Chart 1. Losses (top) and accessions (bottom) of dental officers over the past five years.<sup>5</sup>

On the Table of Organization and Equipment (TOE) side, unit and area support is provided by active duty dental assets. "The first echelon of dental care is the division dental officer. This officer is assigned to a division where he is responsible for the emergency dental care for a brigade-sized unit".<sup>6</sup> Normally, there are 3 dentists assigned to a division; 2 General Dentists (63A), one to each Forward Support Battalion (FSB), and one Comprehensive Dentist (63B), who also serves as the Division Dental Surgeon, to the Main Support Battalion (MSB).

The Dental Battalion, with its Medical Companies (DS), is organic to a Medical Brigade, which is a Corps asset.

The Medical Company (Dental Service) provides area dental support and is allocated on the basis one per 20,000 soldiers. This unit is comprised of 11 General Dentists (63A), 2 Comprehensive Dentists (63B), 1 Prosthodontist (63F), and a Commander (63R) who is assisted by a Medical Field Assistant (67B)...Command and control of the Medical Companies (DS) is provided by the Dental Battalion.<sup>7</sup>

In addition to the above structure, a TOE hospital is authorized one Oral and Maxillofacial Surgeon (63N), and one Comprehensive Dentist. Finally, many dental officers are Professional Fillers (PROFIS) to TOE units as required under the TDA augmentation program.

To ensure that the quality of care part of the mission remains robust, the graduate dental education opportunities are fully utilized. Training is the foundation upon which career paths, professional satisfaction, and ultimately quality of care are based. Today, the Dental Corps offers American Dental Association (ADA) accredited training in all of the specialties, including a one year General Practice Residency to selected officers (32/year) entering directly from dental school. Of the 1022 dental officers presently on active duty, 707 have completed residency training, and 65% of those are board certified in their specialties.<sup>8</sup>

### **ARMY AFTER NEXT**

The Army of the future will likely maintain "World's Best Army" status in 2020 and beyond. As MG Scales said in his presentation to the Army War College Class of '98 on AAN, "We

have no near peer competitors (militarily) in the world today, and it is unlikely that one will appear anytime soon." Our future Army will be different organizationally and technologically. Emphasis, more than ever, will be on agility and knowledge.

Structurally, the Army After Next will likely be organized into combat brigades. Each brigade, of approximately 5000 soldiers, would be trained, equipped and manned to operate as a brigade or as dispersed combat cells of 10-20 soldiers each. Some experts think that this type of structure is ready now to replace the division as the basic combined arms organization. "New weapons provide increased lethality and range for all parties to a future conflict, making it desirable to reduce the size and increase the flexibility of fighting formations."<sup>9</sup>

The Army of 2020 may have fewer personnel but through technology, each soldier's combat lethality will be multiplied by an unimaginable magnitude. This incredible capability will manifest itself with theater wide situation understanding (even at the individual soldier level) through sensors and instant/interactive communication, new weapons systems, (to include effective remote fires to support widely dispersed fighting positions and a variety of targets), and extremely rapid deployment to the area of operations (with just as rapid redeployment at mission endpoint). "The robust wide band

communication networks and enhanced situation understanding offer the potential for both more centralized control (the CINC can see "everything") and more decentralized empowerment (the combat cell commander can see what the CINC sees)."<sup>10</sup>

While this futuristic view of the battlefield, with brigade size leading edge strike forces divided into multiple combat cells doing most of the initial fight, has merit, most experts acknowledge the continued need for conventional forces. In an exercise conducted by Army Training and Doctrine Command's Analysis Center (TRAC) at Fort Leavenworth, Kansas, the Army validated the multiple combat cell concept as a capable, early-entry force. TRAC further observed that..."conventional follow-on forces are required to conduct extensive offensive operations, dominate the enemy, sustain battlefield victory, etc...."<sup>11</sup> Clearly, the AAN is not an entity that will form *de novo* in 2015, but rather it will evolve into a hybrid Army containing both conventional and new elements.

Force stationing in 2020 continues to be perplexing. While AAN relies heavily on a CONUS basing strategy, experts are cautious. "Because future national interests will be so varied, our military capabilities must be particularly robust, the basing of forces must be geographically diverse, but we must achieve a balance between basing at home and abroad."<sup>12</sup> The question of how much overseas presence is enough will likely be determined by fiscal and political constraints.

The location of these forward based forces is the rest of the issue. For the Winter War Games, an AAN exercise circa 2020, conducted at the US Army War College, Carlisle, Pennsylvania, in 1997, ... "Army forces were stationed in Korea, Germany, Czech Republic, Hawaii, Israel, and Ukraine, and a Marine Expeditionary Force (MEF) was stationed in Japan. Our long standing relationship in NATO will probably assure a continued presence in Europe..."<sup>13</sup> It was clear from the exercise that a strictly CONUS based AAN was not a viable option; .... "our interests span the globe. Our force stationing strategy must lay the foundation for global maneuver."<sup>14</sup>

Regardless of how the new Army will be configured, dental support will be required in the high speed brigades, the forward based forces, and the conventional follow-on forces.

### **REVOLUTION IN DENTAL AFFAIRS (RDA)**

A true revolution in dental affairs occurred with the advent of the modern high speed handpiece which allowed dentists for the first time to efficiently excavate decay (caries) and prepare teeth for crowns and other prosthodontic replacements. Moreover, deployable dental units first received high speed dental units in 1965. Furthermore, technological advances in dentistry, as in other disciplines, continue to be rampant and promise to revolutionize dental practice once again. Research to improve dental care in the military setting is ongoing in areas of

electric handpieces, drug delivery, lasers, teledentistry, miniaturization, data storage, prevention and treatment.<sup>15</sup>

An electric field dental treatment unit, which is equal to or superior to the present compressed air driven system, is under development. The prototype unit weighs just 30 pounds and has a maximum power requirement of 400 watts. The present air turbine system requires a 5 kilowatt generator, a 95 pound compressor, and a 55 pound operating unit.

When this unit replaces the current air turbine field dental treatment unit, the forward dental treatment teams could operate on a 2 kilowatt diesel generator instead of the current 5 KW generator; this substitution will result in a treatment team that would be 2700 pounds lighter and one trailer smaller.

A Digital Dental Radiography System (DDRS) is ready to be fielded. The present field dental x-ray system weighs 390 pounds and consists of a 30x18x16 inch supply chest and a 42x18x18 inch x-ray unit. The DDRS weighs 45 pounds and is less than one cubic foot in size. Digital systems will capture, process, store, and permit the viewing of dental x-ray images without the use of conventional film processing and will allow the transfer to and viewing of dental x-ray images at remote locations (teledentistry).

A tremendous amount of work is being done on sustained releasing drug formulations for the battlefield. The objectives are to provide expedient, single-dose formulations for

antibiotics, analgesics, anesthetics, and vaccines to forward deployed caregivers to reduce medical logistic demands and hasten the return of soldiers to duty. Using an Army-owned proprietary technology, drugs and vaccines are microencapsulated in biocompatible and biodegradable polymers. The polymer matrix allows for the controlled diffusion of drug for periods of hours to months depending on the formulation. The effect is to efficiently deliver efficacious doses of drug locally to the injured site rather than relying on multiple, systemic doses used in traditional practice.

For the treatment of wound infection, efforts continue for the microencapsulation of cefazolin and metronidazole. These antibiotics would be suitable as treatments for osteomyelitis, oral maxillofacial injuries, gingivitis, and periodontitis.

Long lasting anesthetic and analgesic formulations are needed for the treatment of pain resulting from surgical procedures or traumatic injury. Localized treatment of pain is a major advantage versus systemic opioid medication such as morphine. By avoiding the untoward effects of drowsiness and incapacitation, soldiers are better able to return to duty following a single, sustained releasing dose of microencapsulated analgesics.

An anti-caries vaccine is under development. Deployed forces have increased rates of dental emergencies due to poor oral hygiene in the field. The use of anti-caries vaccines or

oral rinses packaged in MREs could prevent the adhesion of pathogenic bacteria to soldiers' teeth reducing the risk of developing dental problems.

Lasers are currently being used in some soft tissue procedures, e.g. gingivectomies, and in selected hard tissue cases requiring minimal cavity preparation. Most laser treatments are performed without anesthesia. Other laser applications include detoxifying root surfaces of endotoxin, sterilizing root canal preparations, bleaching vital teeth, and with the blue-green argon laser, curing composites is extremely rapid and efficient. Future uses for lasers may include "melting" low fusing porcelain into pits and fissures of teeth which would become a "permanent sealant", or arresting tooth bud formation in the posterior mandible to prevent third molars from forming.<sup>16</sup>

### **STAFFING MODELS**

The number of dentists required to support the force is tied to end strength. The Department of Defense (DOD) uses a triservice accepted sizing model, as developed by the Army Medical Department Personnel Proponency Directorate (APPD), to determine medical force requirements to support the services. A certain set of facts and assumptions accompany the implementation of the Sizing Model:

Fact- The Total Army Analysis (TAA) is a valid process for determining force requirements to accomplish National Military Strategy.

Assumption: That the TAA will continue to be accepted as "the tool" to size the Armed Forces.

Fact- The ratio of Compo 1 (AC) to Compo 3 (RC) dental units as resourced in TAA05 with provision for the Medical Reengineering Initiative (MRI) is 6:11.

Assumption: That Compo 1 dental units will continue to be resourced at the present level as a percentage of the medical force.

Fact- Population to be treated (workload based) is an accurate means of justifying numbers of dentists to serve a given patient pool.

Assumption: Regardless of dental unit structure, the ratio of dentists per supported population remains relatively constant.

Fact- Over the last 4 years, percentages of dental specialists in the Army Dental Corps have remained relatively constant.

Assumption: Regardless of size of patient population, the percentages by Area of Concentration (AOC) of dental specialists will continue to remain constant.<sup>17</sup>

Running the sizing model for the current end strength of the Army (about 480K), yields a dental officer (AC) requirement of 851. This number is composed of the wartime piece of 377 plus the day to day operational demand of 178 and the sustainment portion at 296. The operational number reflects the overseas (OCONUS) staffing needs and the non patient care slots for certain staff and command positions. The sustainment number includes military professional education and graduate dental training. The 851 represents the total readiness requirement.

Graduate Dental Education (GDE) is crucial for maintaining quality (in both clinical treatment and in teaching situations), providing incentive for retention, and offering career

opportunities for both junior and senior officers (students and mentors). Table 1 shows the distribution of dental specialists serving in the Corps today. GDE is the center of gravity for the Dental Corps; without it, the Corps, as we know it, would cease to exist and specialty care for soldiers would only be available in the civilian sector.

AOC	DESCRIPTION	QUANTITY	% of TOTAL
63A	General Dentist	331	39%
63B	Comprehensive Dentist	178	21%
63D	Periodontist	36	4%
63E	Endodontist	33	4%
63F	Prosthodontist	56	7%
63H	Public Health Dentist	8	1%
63K	Pediatric Dentist	27	3%
63M	Orthodontist	29	3%
63N	Oral Surgeon	94	11%
63P	Oral Pathologist	11	1%
63R	Commander	48	6%
Total		851	100%

Table 1. Distribution of dental specialists to support clinical and GDE requirements.

In addition to the 851, the model calls for 271 dentists to provide the 100% peacetime health care mission for a grand total of 1122, (Table 2).

Wartime	Day to Day Operational Requirements	Operational Readiness Requirements	Sustainment	Total Readiness Requirement
377	178	555	296	851
"100% Make Peacetime Health Care Additional Requirements			Total Healthcare Requirements	
271			1122	

Table 2. Plan 851 supports 10 division, 480K force under TAA05 with MRI.

The additional peacetime health care requirement is closely tied to readiness. The dental readiness system used in the military is based on a classification system of 1-4:

Class 1 - No treatment required; good for 12 months

Class 2 - Routine dentistry is being accomplished

Class 3 - Urgent care required; dental emergency highly likely in the next 12 months

Class 4 - Status unknown; requires exam

The goal in the military is to have 95% of soldiers in Class 1 and 2. This high standard of readiness can only be achieved with the 271 additional providers.

The Full Time Equivalent (FTE) staffing model argues that 271 is too conservative and 900 more closely approximates the treatment requirements. The FTE paradigm assumes that the

majority of soldiers should be in Class 1 rather than Class 2, which would require a substantially greater dental professional force to accomplish.<sup>18</sup>

No matter what the end strength of the Army After Next will be, the Dental Corps, through the triservice sizing model(s), can and will adjust with a dental force package that will best serve the soldiers and the nation.

### **DENTAL CORPS AFTER NEXT**

The future Dental Corps will be technologically robust. Advances in prevention, laser technology, teledentistry, interactive CD-Rom for treating emergencies, microencapsulation technology and adhesive dentistry, may allow fewer dental professionals to efficiently maintain dental readiness and provide quality care. Bourgeoning technology will require a quality Graduate Dental Education Program.

The future Corps will likely be smaller, more competitive, have a higher perstempo, contain less C2, and contain more civilians. The size of the Dental Corps to support the AAN will be, as has been the case throughout history, tied to end strength. Leveraging of technology could reduce the present dentist/patient ratio of 1/565. For example, medics deployed with the combat cells, through CD-ROM and teledentistry could treat/stabilize a soldier on the battlefield without the physical presence of a dental officer. However, a substantial amount of

the forces would be forward based and conventional follow-on, both of which would require "hands-on" treatment in the long term.

A high personnel tempo would be the norm in a smaller Dental Corps. Dental officers will have to PCS more often to fill vacancies overseas and will participate often in deployments. This aggressive pace will likely result in more bonus dollars paid to dental officers to sustain retention.

The Corps will consolidate many commands and reduce the command and control structure. The AMEDD is currently experimenting with branch immaterial commands at the Colonel and General Officer levels. The Dental Corps is maintaining that DENTACS and RDCs are best commanded by dentists, but is playing the branch immaterial game at the GO level, with BG Sculley commanding the Center for Health Promotion and Preventive Medicine (CHPPM). The branch immaterial command trend will likely continue in the AMEDD and the Dental Corps after Next will probably be a player.

The future Dental Corps will probably be supplemented with a significant number of civilian dentists. These providers will continue to plus up the shortfall in the 100% peacetime dental care requirement. The civilian professional will probably not deploy and will usually not serve overseas.

The Dental Corps after Next will continue to make readiness and quality the top priorities. The future readiness target will

be to shift the majority of soldiers from Class 2 to Class 1. Quality will be ensured by maintaining the foundation of dual trained (military and dental), active duty dentists. Outsourcing will continue to complement the shortfall in dental officers, but most contract dentists simply cannot compete with the level of training of most military dentists. The best possible support for AAN is an intact Dental Corps, with a robust GDE and viable career opportunities for young dental officers who wish to serve. As always, the Corps' size will be tied to force end strength.

#### CONCLUSIONS/RECOMMENDATIONS

The AAN will be a great Army but it will be different. AAN will be mostly a projection based force with the majority of soldiers being stationed in CONUS. However, forward based forces and the need for conventional follow-on forces will continue to exist. Deployments will be many but will be of short duration. Operations and Personnel Tempos will be demanding. Technical expertise at all ranks will be an absolute requirement.

With a high speed Army, readiness will continue to be the priority. The Dental Corps is committed to readiness. It dedicates military dentists to deployments for direct (fix forward) dental support. It provides peacetime dental care to soldiers in garrisons meeting the 95% Class 1 and 2 readiness requirement.

The Dental Corps is committed to quality. Most dental officers receive post graduate training and 65% attain board

certification in their specialties (versus 15% for their civilian counterparts).<sup>19</sup> Dental officers are a special breed of professionals interested in selfless military service and providing the best dental treatment plan (to include no treatment) regardless of the patient's/soldier's financial status. The ideal professionals to provide dental care to soldiers are soldier dentists.

The new vision of the Corps is farsighted: "We will be the Army's dental care system of choice, focused on readiness and health promotion, continuously striving to exceed our customers' expectations on quality, cost, and use of their time." This vision defines the future direction of the Corps, emphasizing, "...readiness, health promotion, continuous improvement, and customer focus. It recognizes that we are now and will be in an environment of intense competition for resources and choice of provider for dental care services."<sup>20</sup> Ultimately, the dental support for the Army After Next will be a function of political and economic variables.

Word Count 4938

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<sup>3</sup> Shipley, Richard, D., "Dental Corps Structure: Past, Present, and Future", SRP USAWC, 1993, 7.

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