

Risk Factors and Management of Skin Cancer Among Active-Duty Servicemembers and Veterans

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Active-duty servicemembers of the US Military experience unique exposures that should be taken into consideration when determining their risk for melanoma and nonmelanoma skin cancer. Members of the Association of Military Dermatologists participated in a virtual roundtable discussion in April 2020. They discussed risk factors for skin cancer, diagnosis via teledermatology during the coronavirus pandemic, and surgical treatment. The roundtable proceedings are jointly published by *Cutis* and *Federal Practitioner*.

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Melanoma Risk for Servicemembers

Dr. Dunn: Active-duty jobs are quite diverse. We have had almost every civilian occupation category—everything from clerical to food service to outdoor construction workers. Federal service and active-duty military service could lead to assignments that involve high sunlight exposure and subsequently higher risk for melanoma and nonmelanoma skin cancer.

Dr. Miller: I found 2 articles on the topic. The first published in June 2018 reviewed melanoma and nonmelanoma skin cancers in the military.¹ Riemenschneider and colleagues¹ looked at 9 studies. Statistically, there was increased risk of melanoma associated with service and/or prisoner-of-war status. In World War II, they found tropical environments had the highest risk. And the highest rates were in the US Air Force.

The other article provided US Department of Defense data on skin cancer incidence rates, incidence rates of malignant melanoma in relation to years of military service overall, and the rates for differing military occupational groups.² The researchers demonstrated that fixed-wing pilots and crew members had the highest rates of developing melanoma. The general trend was that the incidence rate was exponentially higher with more missions flown in relation to years of active service, which I thought was rather interesting.

For other occupational categories, the rate increase was not as great as those involved in aviation. Yes, it's probably related to exposure. Flying at 40,000 feet on a transcontinental airplane trip is equivalent to the radiation dosage of a chest X-ray. Given all the training time and operational flying for the Air Force, it is anticipated that that mutagenic radiation would increase rates. An aircraft does not offer a lot of protection, especially in the cockpit.

We just had the anniversary of the Apollo 11 mission. Those astronauts received the equivalent of about 40 chest X-rays going to the moon and back. Exposure to UV and at higher altitudes cosmic radiation explains why we would see that more in Air Force personnel.

Dr. Bandino: At high altitude there is less ozone protecting you, although the shielding in a cockpit is better in modern aircraft. As an Air Force member, that was one of the first things I thought about was that an aviator has

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increased skin cancer risk. But it's apt to think of military service in general as an occupational risk because there are so many contingency operations and deployments. Regarding sun exposure, sunscreen is provided nowadays and there is more sun awareness, but there is still a stigma and reluctance to apply the sunscreen. It leaves people's skin feeling greasy, which is not ideal when one has to handle a firearm. It can also get in someone's eyes and affect vision and performance during combat operations. In other words, there are many reasons that would reduce the desire to wear sunscreen and therefore increase exposure to the elements.

A great current example is coronavirus disease 2019 (COVID-19) operations. Although I'm a dermatologist and typically work inside, I've been tasked to run a COVID-19 screening tent in the middle of a field in San Antonio, and thus I've got to make sure I take my sunscreen out there every day. The general population may not have that variability in their work cycle and sudden change in occupational UV exposure.

Dr. Miller: I was deployed in a combat zone for operations Desert Shield and Desert Storm. I was with the 2nd Armored Division of the US Army deployed to the desert. There really wasn't an emphasis on photoprotection. It's just the logistics. The commanders have a lot more important things to think about, and that's something, usually, that doesn't get a high priority. The US military is deploying to more places near the equator, so from an operational sense, there's probably something to brief the commanders about in terms of the long-term consequences of radiation exposure for military servicemembers.

Dr. Dunn: If you look at deployments over the past 2 decades, we have been putting tens of thousands of individuals in high UV exposure regions. Then you have to look at the long-term consequence of the increased incidence of skin cancer in those individuals. What is the cost of that when it comes to treatment of precancerous lesions and skin cancer throughout a life expectancy of 80-plus years?

Dr. Bandino: With most skin cancers there is such long lag time between exposures and development. I wish there were some better data and research out there that really showed whether military service truly is an independent risk factor or if it's just specific occupation types within the military. I have family members who both work in contracting services and had served in the military. Would their skin cancer risk be the same as others who are doing similar jobs without the military service?

Dr. Dunn: I have had county employees present for skin cancer surgery and with them comes a form that relates to disability. For groundskeepers or police, we assumed that skin cancer is occupation related due to the patient's

increased sun exposure. Their cancers may be unrelated to their actual years of service, but it seems that many light-skinned individuals in the military are going to develop basal cell and squamous cell skin cancer in the coming decades, which likely is going to be attributed to their years of federal service, even though they may have had other significant recreational exposure outside of work. So, my gut feeling is that we are going to see skin cancer as a disability tied to federal service, which is going to cost us.

Dr. Logemann: Yes, I think there are always going to be confounders—what if the servicemembers used tanning beds, or they were avid surfers? It's going to be difficult to always parse that out.

Dr. Miller: In talking about melanoma, you really have to parse out the subsets. Is it melanoma in situ, is it superficial, is it acral, is it nodular? They all have different initiation events.

Nodular melanomas probably don't need UV light to initiate a tumor. Another risk factor is having more than 100 moles or many atypical moles, which puts that person in a higher risk category. Perhaps when soldiers, airmen, and navy personnel get inducted, they should be screened for their mole population because that is a risk factor for developing melanoma, and then we can intervene a little bit and have them watch their UV exposure.

Dr. Jarell: You can't overstate the importance of how heterogeneous melanoma is as a disease. While there are clearly some types of melanoma that are caused by UV radiation, there are also many types that aren't. We don't understand why someone gets melanoma on the inner thigh, bottom of the foot, top of the sole, inside the mouth, or in the genital region—these aren't places of high sun exposure.

Lentigo maligna, as an example, is clearly caused by UV radiation in most cases. But there are so many other different types of melanoma that you can't just attribute to UV radiation, and so you get into this whole other discussion as to why people are getting melanoma—military or not.

Dr. Bandino: When volunteering for military service, there's the DoDMERB (Department of Defense Medical Examination Review Board) system that screens individuals for medical issues incompatible with military service such as severe psoriasis or atopic dermatitis. But to my knowledge, the DoDMERB process focuses more on current or past issues and does little to investigate for future risk of disease. A cutaneous example would be assessing quantity of dysplastic nevi, Fitzpatrick scale 1 phenotype, and family history of melanoma to determine risk of developing melanoma in someone who may have more UV exposure during their military service than a civilian. This dermatological future risk assessment was certainly

not something I was trained to do as a flight surgeon when performing basic trainee flight physicals prior to becoming a dermatologist.

Dr. Jarell: I am a little bit hard-pressed to generalize the military as high occupational risk for melanoma. There are clearly other professions—landscapers, fishermen—that are probably at much higher risk than, say, your general military all-comers. Us physicians in the military were probably not at increased risk compared to other physicians in the United States. We have to be careful not to go down a slippery slope and designate all MOSs (military occupational specialties) as at increased risk for skin cancer, in particular melanoma. Nonmelanoma skin cancer, such as basal cell and squamous cell carcinoma, is clearly related to the proportional amount of UV exposure. But melanoma is quite a diverse cancer that has many, many disparate etiologies.

Dr. Dunn: The entry physical into the military is an opportunity to make an impact on the number of nonmelanoma skin cancers that would arise in that population. There is an educational opportunity to tell inductees that nonmelanoma skin cancer is going to occur on convex surfaces of the sun-exposed skin—nose, ears, forehead, chin, tops of the shoulders. If offered sun protection for those areas and you stretch the potential impact of that information over tens of thousands of military members over decades, you might actually come up with a big number of people that not only decreases their morbidity but also dramatically decreased the cost to the system as a whole.

Dr. Jarell: You also have to factor in ethnicity and the role it plays in someone's likelihood to get skin cancer—melanoma or nonmelanoma skin cancer. Darker-skinned people are at certainly decreased risk for different types of skin cancers.

Dr. Dunn: Yes, that would have to be part of the education and should be. If you have light skin and freckles, then you're at much higher risk for nonmelanoma skin cancer and need to know the high-risk areas that can be protected by sunblock and clothing.

Dr. Logemann: One thing that might be a little bit unique in the military is that you're living in San Antonio one minute, and then the next minute you're over in Afghanistan with a different climate and different environment. When you're deployed overseas, you might have a little bit less control over your situation; you might not have a lot of sunscreen in a field hospital in Afghanistan. Whereas if you were just living in San Antonio, you could go down to the store and buy it.

Dr. Miller: Is sunblock now encouraged or available to individuals in deployment situations or training situations where they're going to have prolonged sun exposure

every day? Is it part of the regimen, just like carrying extra water because of the risk for dehydration?

Dr. Logemann: To the best of my knowledge, it is not always included in your normal rations or uniform and it may be up to the servicemember to procure sunscreen.

Dr. Bandino: There have been improvements, and usually you at least have access to sunscreen. In many deployed locations, for example, you have the equivalent of a small PX (post exchange) or BX (base exchange), where they have a variety of products for sale from toothbrushes to flip-flops, and now also sunscreen. Of course, the type and quality of the sunscreen may not be that great. It's likely going to be basic SPF (sun protection factor) 15 or 30 in small tubes. As a recent example, I participated in a humanitarian medical exercise in South America last summer and was actually issued sunscreen combined with DEET, which is great but it was only SPF 30. The combination product is a good idea for tropical locations, but in addition to people just not wanting to wear it, the DEET combination tends to burn and sting a little bit more; you can get a heat sensation from the DEET; and the DEET can damage plastic surfaces, which may not be ideal for deployed equipment.

The other problem is quantity. We all learned in residency the appropriate sunscreen quantity of at least 1 fl oz for the average adult body, and that's what we counsel our patients on, but what they issued me was 1 small 2- to 3-fl oz tube. It fit in the palm of my hand, and that was my sunscreen for the trip.

So, I do think, even though there have been some improvements, much of sun protection will still fall on the individual servicemember. And, as mentioned, depending on your ethnicity, some people may need it more than others. But it is an area where there probably could be continued improvements.

Dr. Logemann: In addition to sunscreen, I think that maybe we should be taking into consideration some simple measures. For example, is it necessary for people to stand out in formation at 2 PM on a blistering hot day, or could that function be performed at an earlier or later time? If people are needing to be out in formation in bright sunlight, could they maybe wear their boonie covers and not the caps that don't provide any circumferential protection to the sun? Do they have sleeves down? Do they have sleeves up? I think commanders do take these things into consideration, but potentially there might be some additional measures that could be taken besides sunscreen in terms of just culture and practices.

Dr. Dunn: I think we all kind of agree that the military service is diverse and that many of the subcategories of occupations within the military lead to increased sun exposure by mandate. We advise sun protection by physical barriers and sunblock.

Diagnosis of Skin Cancer Via Telemedicine

Dr. Dunn: I have friends who remain in the VA (US Department of Veterans Affairs) system, and they are involved with telemedicine in dermatology, which can reduce waiting time and increase the number of patients seen by the dermatologist. In-person and teledermatology visits now are available to servicemembers on active duty and retirees.

Dr. Bandino: At our residency program (San Antonio Uniformed Services Health Education Consortium), we've had asynchronous teledermatology for over a decade, even before I was a resident. We provide it primarily as a service for patients at small bases without access to dermatology. Some bases also use it as part of their prescreening process prior to authorizing an in-person dermatology consultation.

Certainly, with the coronavirus pandemic, civilian dermatology is seeing a boom in the teledermatology world that had been slowly increasing in popularity for the last few years. In our residency program, teledermatology has traditionally been just for active-duty servicemembers or their dependents, but now due to the coronavirus pandemic, our teledermatology services have significantly expanded to include adding synchronous capability. We have patients take pictures before their virtual appointment and/or FaceTime during the appointment. Even after the pandemic, there will likely be more integration of synchronous teledermatology going forward as we're seeing some of the value. Of course, I'm sure we would all agree that accurate diagnosis of pigmented lesions can be very challenging with teledermatology, not to mention other diagnostic limitations. But I think there is still utility and it should only get better with time as technology improves. So, I'm hopeful that we can incorporate more of it in the military.

Dr. Logemann: I'm definitely aware that we have different telehealth opportunities available, even using some newer modalities that are command approved in recent weeks. My experience has been for more complicated dermatology, so people are in remote locations, and they're being seen by a nondermatologist, and they have questions about how to approach management. But I'm not aware of telemedicine as a screening tool for skin cancer in the military or among my civilian colleagues. I would hope that it could be someday because we're developing these total-body photography machines as well. It could be a way for a nondermatologist who identifies a lesion to have it triaged by a dermatologist. To say, "Oh yeah, that looks like a melanoma. They need to get in sooner vs later," but not on a large-scale sort of screening modality.

Dr. Bandino: In my recent experience, it has definitely been a helpful triage tool. In the military, this form of triage can be particularly helpful if someone is overseas to

determine whether he/she needs to be evacuated and evaluated in-person right away.

Dr. Jarell: It's been useful in looking at benign things. People have shown me in the past few weeks a lot of seborrheic keratoses and a lot of benign dermal nevus-type things, and I say, "Don't worry about that." And you can tell if the resolution is good enough. But a lot of people have shown me things in the past few weeks that have clearly been basal cell carcinoma, which we can probably let that ride out for a few more weeks, but I'm not sure if maybe somebody has an amelanotic melanoma. Maybe you need to come in and get that biopsied ASAP. Or something that looks like a melanoma. The patient should probably come in and get that biopsied.

Dr. Miller: I think we can rely on teledermatology. It's all predicated on the resolution because we're all trained in pattern recognition. I think it's very useful to screen for things that look clinically benign. We have to understand that most dermatology is practiced by nondermatologists in the United States, and many studies show that their diagnostic accuracy is 20%, at best maybe 50%. So, they do need to reach out to a dermatologist and perhaps get some guidance on what to do. I think it could be a very useful tool if used appropriately.

Dr. Dunn: If used appropriately, teledermatology could function in a couple of ways. One, it could allow us to declare lesions to be wholly benign, and only should a lesion change would it need attention. The second is that it would allow us to accelerate the process of getting a patient to us—physically in front of us—for a biopsy if a suspicious lesion is seen. A by-product of that process would be that if patients who have wholly benign, nonworrisome lesions could be screened by telemedicine, then physical appointments where a patient is in front of the doctor would be more open. In other words, let's say if 25% of all lesional visits could be declared benign via telemedicine that would allow dermatology to preserve its face-to-face appointments for patients who are more likely to have cancer and require procedures like skin biopsy.

Love it or hate it, I think we're getting it no matter what now. Telemedicine crept along forever and within 6 weeks it's become ubiquitous. It's phenomenal how fast we had to adapt to a system or perish in private practice. Sometimes these episodes that we go through have good consequences as well as bad consequences. Telemedicine probably has been needed for a long time and the insurers were not covering it very well, but suddenly a stay-at-home mandate has unveiled valuable technology—something that we probably should have been able to use more and be adequately reimbursed.

Surgical Treatment of Skin Cancer

Dr. Dunn: Treatment historically has been surgical for nonmelanoma and melanoma skin cancers. Some

radiation devices have gained popularity again in the past decade or so, but excisional surgery remains the standard treatment for skin cancer. Nonmelanoma skin cancers almost all are probably treated surgically still, with a small percentage treated with superficial radiation.

Access to care is important to discuss. Are Mohs surgeons readily available, or are plastic surgeons, general surgeons, or vascular surgeons in the federal system contributing to the care of skin cancer? Are they doing excisional surgery after biopsies are done? Are they doing excisional biopsies with the intent of cure?

Dr. Logemann: For active duty, I don't see any issues getting access to the medical center for Mohs micrographic surgery. Sometimes, if we have a lot of volume, some patients may get deferred to the network, but in my experience, it would not typically be an active-duty servicemember. An active-duty servicemember would get care rendered at one of the medical centers for Mohs surgery. Typically the active-duty-aged population isn't getting much skin cancer. It certainly does happen, but most of the skin cancers frequently that are treated at medical centers are not infrequently retirees.

Dr. Bandino: Because of our residency program, we are required to have Mohs surgery capability to be ACGME (Accreditation Council for Graduate Medical Education) accredited. We typically have 3 Mohs surgeons, so we never have a problem with access.

In the military, I just refer cases to our Mohs surgeons and everything is taken care of in-house. In fact, this is an area where we may even have better access than the civilian world because there are no insurance hurdles or significant delay in care since our Mohs surgeons aren't typically booked up for 3 to 4 months like many civilian Mohs

surgeons. This is especially true for complex cases since we provide hospital-based care with all specialty services under the same umbrella. So, for example, if the Mohs surgeons have an extensive and complex case requiring multidisciplinary care such as ENT (ear, nose, and throat), facial plastics, or radiation-oncology, they're all in-house with no insurance issues to navigate. This of course is not usual for most military bases and is only capable at bases attached to a large medical center. There are some similar scenarios in the civilian world with university medical centers and managed care organizations, but we may still have a slight advantage in accessibility and cost.

Dr. Dunn: There are guidelines from the National Comprehensive Cancer Network as to how to treat nonmelanoma and melanoma skin cancer. Almost all of them are surgical and almost all of them are safe, outpatient, local anesthetic procedures with a high cure rate. The vast majority of melanoma and nonmelanoma skin cancers can be handled safely and effectively with minimal morbidity and almost no known mortalities from the treatments themselves. Some of the cancers have been identified as high risk for metastasis and mortality, but they're relatively uncommon still. The good news about skin cancer is that the risk of death remains very small.

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