Sun Protection Outreach Teaching by Students

Training Manual

This program was designed to teach adolescents and medical/allied health students about early detection and prevention of skin cancer through an interactive medium of lectures, demonstrations, games, handouts, video, and individual skin analysis.

Our logo is a book with its pages fanning open like a sun. We chose this symbol to represent our goals of sun protection through community education. We hope you join us in this important goal of preventative medicine.

Program Director and Founder

Stephanie Henning Lickerman, RN
Director, Community Education, Melanoma Hope Network

Program Student Founders

Caroline Arthur
Medical Student, Washington University School of Medicine
Jason A. Brant
Medical Student, Washington University School of Medicine
Sofia Chaudhry
Medical Student, Saint Louis University School of Medicine
Sonya Jagwani
Medical Student, Saint Louis University School of Medicine

Program Faculty Leaders

Summer Youker, MD
Assistant Professor of Dermatology, Saint Louis University School of Medicine
Susie Journagan, MD
Assistant Clinical Professor of Dermatology, Saint Louis University School of Medicine
Erica J. Rogers, MD
Dermatology Resident, Barnes-Jewish Hospital, St. Louis, MO
Nancy L. Weaver, PhD
Assistant Professor, Department of Community Health, Saint Louis University

Program Review and Academic Sponsorship

Lynn Cornelius, MD
Chief, Division of Dermatology, Washington University School of Medicine
Scott Fosko, MD
Chair, Department of Dermatology, Saint Louis University School of Medicine

Survey Review and Revision

Donna B. Jeffe, PhD
Director, Health Behavior and Outreach Core, Siteman Cancer Center, Washington University School of Medicine
Frank E. Johnson, MD, and Katherine S. Virgo, PhD
Department of Surgery, Saint Louis University School of Medicine
Kathryn Trinkaus, PhD
Division of Biostatistics, Washington University School of Medicine
Nancy L. Weaver, PhD
Assistant Professor, Department of Community Health, Saint Louis University

Training Manual Review

Caroline Arthur, Summer Youker, Lynn Cornelius, Scott Fosko, Susie Journagan, Erica Rogers

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Melanoma Hope Network
1324 Clarkson Clayton Center
St. Louis, MO 63011
636.532.4298
www.melanomahopenetwork.org

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3635 Vista Avenue
St. Louis, MO 63110

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Goforth Foundation Fund
St. Louis, MO 63110
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Susan Bayliss, MD
Director, Pediatric Dermatology, St. Louis Children's Hospital
Scott Fosko, MD
Chair, Department of Dermatology, Saint Louis University School of Medicine (SLUSM)
Stephanie Lickerman, RN
Director, Community Education, Melanoma Hope Network
David H. McDaniel, MD
Photos provided courtesy of David H. McDaniel, MD, and with permission from the American Academy of Dermatology, all rights reserved
Daniel Ring, MD
Dermatologist, St. Louis, MO
David Sheinbein, MD
Assistant Professor, Division of Dermatology, Washington University School of Medicine
Summer Youker, MD
Assistant Professor of Dermatology, Saint Louis University School of Medicine

Web Design

David Lickerman, MD *www.medulogic.com*
Jason Brant *http://spots.wustl.edu*
Joel Crockett *http://dermatology.slu.edu/spots*

Logo

Brooke Macdonald *macdonald.brooke@gmail.com*

Contact

Stephanie Lickerman, RN (*itineco@charter.net),* **Lynn Cornelius, MD (***cornelil@wustl.edu),* **Scott Fosko, MD (***scott.fosko@tenethealth.com)*

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Introduction

Sun Protection Outreach Teaching by Students (SPOTS) was created by a group of medical students and faculty (dermatology, education, public health, biostatistics, surgical oncology, cancer research outcomes) from both Saint Louis University and Washington University Medical Schools under the leadership of Stephanie Lickerman, RN, Community Education Director for the Melanoma Hope Network (MHN) who originally developed the program. This program, established through a collaborative effort between the two medical institutions, a school of public health, a community non-profit organization (MHN), and the Rockwood School District, represents the first educational program of its kind that focuses on teenage skin cancer prevention taught by medical and allied health professionals in training.

This comprehensive program aims to teach adolescent students early detection and prevention measures regarding skin cancer in an effort to increase their knowledge and hopefully affect their attitudes and behaviors towards sun protection. SPOTS also aims to educate medical/allied health students in sun protection methods, teaching strategies, and the basics of cutaneous malignancies in order to better prepare them for educating and treating current and future patients.

Skin cancer is a significant and growing problem in our society that presents a major public health challenge for the medical and public health communities. Although it is largely a preventable disease, skin cancer affects more Americans than all other cancers combined and continues to increase in incidence annually. In addition to the alarming statistics, many myths persist in our society that hinder the effectiveness of sun protection methods.

The SPOTS program aims to eliminate many of these myths by teaching adolescent students the facts about sun exposure, the proper use of protective methods, and the influence of societal and peer norms on behavior. Thus, increasing knowledge and awareness to encourage lifestyle choices and behavioral changes to reduce the incidence of skin cancer in tomorrow's society. We targeted this age group because they spend considerable time exposed to ultraviolet radiation, both outdoor and indoor; there were very few available programs for teens on sun protection; and this is the point in most adolescents' lives when the foundation is laid for the development of lifelong behavior patterns.

Through the SPOTS program, medical and allied health students teach good sun protection behaviors and skin cancer detection methods to adolescents during two 50 minute classes or one 85 minute class. These time increments match the class lengths of most middle and high schools on either a regular or block schedule. Part one of the program emphasizes early detection, while part two highlights protection and prevention. The curriculum includes interactive lectures, handouts, worksheets, and educational games; a skin analyzer machine that allows students to visualize the level of their current sun damage; and a short video containing a demonstration of a punch biopsy for a changing mole removal, as well as, the stories of two teenagers who have undergone treatment for melanoma.

This program is designed to present the facts about skin cancer and sun protection to teenagers in an interesting and engaging way, allowing them to make informed choices regarding future behaviors. The SPOTS program has the potential to reduce the incidence of skin cancer in the future, increase awareness within the community about the importance of sun protection, and educate the next generation of physicians in a subject that is often not a required clinical block in U.S. medical school curricula.

SPOTS Mission, Goals and Strategies

Mission

The basic tenets of the SPOTS program are to teach early detection and prevention measures to the adolescent age group in an effort to increase their knowledge and awareness, positively affect their attitudes and behaviors towards sun protection, promote outreach education in the community by medical/allied health students, and educate medical/allied health professionals in sun protection methods, teaching strategies, and the basics of cutaneous malignancies.

Goals

- Educate adolescent students by increasing their knowledge of early detection and prevention of skin cancer.
- Educate medical/allied health students regarding skin cancer and sun protection.
- Promote change from non-sun-protective to sun-protective attitudes and behaviors in both adolescents and medical/allied health professionals in training.
- Promote outreach education in the community by students training in the medical/allied health fields (physicians, nurses, physician assistants, masters in public health students).

Strategies

- Demonstrate sun safe behaviors through teaching of protective measures to students.
- Present hands-on demonstrations of sun protective products by using students as volunteers to increase their familiarity and comfort with future selection and use of such measures.
- Discuss current societal norms regarding sun protection and their influence on teenagers.
- Utilize medical/allied health students as teachers to better connect with teens due to age proximity.[1]
- Disseminate statistics and risk factors of skin cancer through program materials.
- Teach early detection through use of mnemonics,[2] visual brochures, lecture materials, handouts, hands-on demonstrations, and games.
- Offer practical alternatives [3,4] to outdoor/indoor tanning.
- Disseminate information to parents (handouts, brochure) to increase arena of influence on teens.[5]
- Utilize a skin analyzer machine to reinforce appearance changes from sun damage.[6,7,8]
- Show a video encompassing other teens' experiences with melanoma.
- Require SPOTS teachers to complete training on cutaneous malignancies, teaching and interacting with teens, and reviewing/practicing the SPOTS program.

Educational Objectives for Adolescent and Medical/Health Students

Adolescent Student

After attending the SPOTS program, the adolescent student will be able to:

Knowledge

- Name two of the five ABC's of melanoma.
- List two risk factors for skin cancer.
- Identify the main modifiable cause of skin cancer.
- Describe four sun protection methods.

Behavior/Attitude

- Recognize the correlation between skin cancer and exposure to UVR.
- Restate why there is a need for sun protection.
- Discuss the reasons for changing non-protective sun behaviors.
- Describe risk factors for skin cancer.

Medical/Allied Health Student

After teaching the SPOTS program, the medical student will be able to:

Knowledge

- Recite current statistics on skin cancer.
- Name all five of the ABC's of melanoma.
- List the common visual identifiers for basal cell, squamous cell, and melanoma skin cancers.
- List six risk factors for skin cancer.
- Identify the main modifiable cause of skin cancer.
- Describe and teach five sun protection methods.

Behavior/Attitude

- Recognize the value of community outreach and working with other health professionals.
- Apply learned textbook/classroom knowledge regarding skin cancer and sun protection to a community cancer problem through preventative education of adolescents.
- Employ the use of layman's language in lectures, games, and hands-on demonstrations to teach secondary students about a medical topic pertinent to their age group.

  Rationale: Physicians, nurses, PA's, and public health educators are lifelong teachers of patients, other medical personnel, family members, and the community. These medical professionals need to know how to teach their technical and heavily jargonized subject by employing various means at a level receptive to a non-medical group of people.
- Recognize the importance of examining the skin during the patient history and physical.

  Rationale: No matter what their chosen specialty, all clinicians should be able to perform a basic skin exam. The skin is the body's largest organ, therefore, skin cancer recognition is the responsibility of each and every clinician. Most medical students graduate with few opportunities to observe, learn, or practice the skin cancer exam,[9,10,11] and clinical time in dermatology is generally offered only as a medical school elective.[12] SPOTS takes advantage of the fact that teaching a subject is a profound learning experience that will help these medical and allied health professionals be better able to detect skin cancers throughout their careers,[13] regardless of their specialty.

Process, Responsibilities, Policies

Sign up process for medical/allied health students

Students can participate in SPOTS in one of two ways:

- Sign up for and attend a SPOTS teaching elective; in this manner, students will receive credit for one clinical elective.
- Attend a designated SPOTS training session. Teach as a volunteer; add to your curriculum vitae.

Basic time commitment

- Elective credit: teach the number of courses listed in the elective catalog, but can teach more.
- Volunteer (no school credit): teach a minimum of two courses, but may be required to teach more.

Responsibilities

- All students (elective and volunteer) who plan to teach are required to attend the training sessions.
- Student teachers should have read the manual and have acquired a basic understanding of the curriculum.
- Student teachers should pair up and practice the lecture sections before teaching in the schools.
- If a student is ill or has a schedule conflict and is unable to teach a pre-scheduled class, it is essential that she/he find a replacement teacher, and contact the SPOTS student leaders a minimum of 24 hours in advance. Please be respectful of your commitment to teaching. The schools have allotted a specific date and time for our teaching purposes -- being punctual and committed furthers our program's goals, reflects positively on our institution, and fosters a good relationship with the schools.

Policies

- **Dress Code**: Each student teacher will receive a SPOTS t-shirt that should be worn to class when teaching the SPOTS curriculum in local schools. Try to look professional -- please wear clean jeans or pants without tears or holes. You are representing your medical/allied health school.
- **Language**: Most presentations to the public should be geared to the sixth grade level for comprehension. Although medical terms can be used when necessary, it is important to define them with common words or examples and to avoid excessive medical jargon. Asking for feedback from the students as you teach will allow you to clarify points that may have been mistranslated or misunderstood, assess what the students are actually comprehending, and create an open environment more conducive to interactive learning. Remember, teenagers respond better to people who try to communicate with them on their own level.

What to bring to a teaching session

- Map/directions to your assigned school with contact person's name and phone number.
- Skin analyzer machine
- SPOTS accordion folder (manual, lecture CD, video, handouts, brochures, ABC flashcards, games)
- SPOTS sun protection products demonstration kit
- Wear SPOTS t-shirt
- Your sense of humor
- Use the One Day Outline for teaching in the block scheduled schools (90 min class periods). The Two Day Outline is for use in schools that have a non-block schedule with 45-55 minute classes and require two days at the schools to complete program teaching.

Statistics and Facts on Skin Cancer

All statistics and numbers in the curriculum are taken from the American Cancer Society (ACS), American Academy of Dermatology (AAD), Centers for Disease Control (CDC), Surveillance Epidemiology and End Results (SEER), the Society for Investigative Dermatology and the Skin Cancer Foundation websites, unless otherwise noted.

Why is it important to get the message out about the dangers of skin cancer? More importantly, why should it matter to teenagers??? Childhood and adolescence are the *critical* times for sun protection. Early sun exposure and blistering sunburns under the age of 20 have been shown to increase the incidence of skin cancer. The skin cancers that affect adults are partially a result of the sun damage they received in childhood and adolescence, not to mention the wrinkling and aging! Regular sun protection throughout childhood can reduce the risk of skin cancer by 78%.

Many people believe that a tan is healthy and that it protects you from sun damage. In truth, a tan is a sign of skin damage which is directly linked to the development of skin cancers. A tan is your skin's defensive mechanism to prevent the absorption of ultraviolet radiation but this is limited based on skin phenotype. Persons with lighter skin, hair and eye color (lower phenotypes) have a lesser ability to natively protect their skin.

Year	Proportion of People Who Developed Melanoma
1935	One out of every 1500
1960	One out of every 800
1980	One out of every 250
2002	One out of every 67
2010	One out of every 50 (predicted)

Statistics and Facts

- More than a million people will be diagnosed with skin cancer this year.
- One in five Americans will get skin cancer in the course of a lifetime.
- One of every two new cancers will be a skin cancer.
- Skin cancer is the most common cancer in the US.
- One person in America dies from melanoma every 65 minutes.
- Between 1985-2005, there was a 103% increase in the number of pediatric melanomas (less than 18 years old). This does not include the increase in the number of basal cell carcinomas and squamous cell carcinomas. As with adults, factors found to contribute to the

development of melanoma in persons less than 20 years include increased UV exposure and fair skin.

- In the US, melanoma (the most deadly form of skin cancer) is the second most common cancer diagnosed in women aged 20-29.5 years.
- Melanoma is the most rapidly increasing cancer among young people today. If caught early, it is almost always treatable. If ignored until it is metastatic, it is almost always fatal.
- More than 90% of all skin cancers are caused by sun exposure, yet fewer than 33% of adults, adolescents, and children routinely use sun protection.
- One blistering sunburn in childhood more than doubles a person's chances of developing melanoma later in life.
- While melanoma is uncommon in African-Americans, Latinos, and Asians, it usually presents at a later stage, and therefore can be more deadly for these populations.
- Both basal cell carcinoma and squamous cell carcinoma have a better than 95 percent five-year cure rate if detected and treated early.[1]
- There are more cases of skin cancer than breast, colon, lung, prostate, and all other cancers combined.
- Are tanning beds safe? No. Tanning beds are *at least* as dangerous as radiation from the sun. Tanning device users had 2.5 times the risk of squamous cell carcinoma and 1.5 times the risk of basal cell carcinoma compared to non-users in a 2002 study by Karagas.[2] Reports suggest that tanning beds may be worse for you than sun exposure. UVB radiation is the "sunburn-causing" spectrum of light. UVA radiation is the "cancer-causing" spectrum of light. While the UVB exposure levels in tanning beds are similar to natural sunlight, the UVA ("cancer-causing") levels are 10 to 15 times higher.[3]
- In 2004, the total direct cost associated with the treatment for non-melanoma skin cancer was $1.5 billion. Of that, $1.2 billion is attributed to care received in physician offices.[4]
- From 1950 to 2001, melanoma incidence increased 690%.[4]
- SEER data analysis for women born after 1965, shows a recent (1990's onward) increase in cutaneous melanoma incidence (for both thinner and thicker lesions) specifically among young Caucasian women in the U.S.[5] Concommitantly, the use of tanning beds has increased and is prevalent among young women in the U.S.[6,7]
- SEER data shows a decline in mortality rates for both Caucasian men and women from 1981 onward that is consistent with earlier detection through increased disease surveillance.[5]

The Adolescent Brain –Learning Strategies & Teaching Tips

The adolescent brain is still developing and therefore requires different brain compatible strategies for learning. This section describes the adolescent brain, details specific learning strategies in "Things to Know 1-5" and "Brain Compatible Strategies for Increasing Learning," and offers practical tips for teaching teenagers in "Teaching Tips to Keep in Mind When Presenting."

Current research states that the brain undergoes two main periods of increased production of gray-matter: the first begins during fetal development and lasts until around 18 months of age and the second occurs during early adolescence.[1] Gray matter is responsible for the generation of nerve impulses (processing of the brain's information), while white matter is responsible for the transfer of brain information from one lobe to another and out to the spinal cord. This transmission of nerve impulses is assisted by a fatty layer that wraps around the neuron's axon called a myelin sheath. Gray matter does not have a myelin sheath, while white matter does. This myelin sheath allows impulses to travel faster and more efficiently, but isn't fully formed (through a process called myelination) until around age twenty-five,[2] with the frontal lobe being the last area of the brain to be myelinated. The incomplete myelination and rapid growth of gray matter that are characteristic of adolescent brains do not allow the same cortical connections that occur in adulthood; thus, adolescent thinking is in a realm of its own.

The frontal lobe houses the area of the brain where we process higher cortical functions like reasoning, problem solving, short term memory, planning and executing behavior, language, motor function, social mirroring, judgment, and impulse control. Until the frontal lobe has matured, other parts of the brain (temporal lobe, parietal lobe and the amygdala) are used for language development and decision making. Because of the involvement of other parts of the brain in these functions, adolescents tend to lack impulse control, demonstrate more irrational behaviors, and often make decisions based on their feelings rather than logical thought processing. All of these characteristics affect their ability to learn.

Learning is critical to both prospering and surviving. The brain's main function is to promote survival of the body. However, rather than attending to all the incoming stimuli, the brain filters out about 99% of the information coming from the senses. Two factors strongly influence whether the brain pays attention to a piece of information:

1. If the information has **meaning**.
2. If the information causes an **emotional response**.

Meaning and emotion are crucial elements to grab the brain's attention and thereby aid learning. Learning in its simplest form is a process of building neural networks in the brain. These networks are formed in three different ways – through concrete experiences, symbolic learning, and abstract learning. Think about a toddler learning about the names of animals. A concrete experience would consist of taking the child to the zoo to see, hear, smell, and touch the animals. When you return home, you read books and look at pictures of the animals for a symbolic experience. Eventually, children are ready to make generalizations about animals that they did not see at the zoo or in their books - this is abstract thinking. The brain makes the strongest connections through concrete experiences. Without concrete experiences, symbolic and abstract learning have little or no meaning. Because abstract thought processes are not well-developed until late adolescence (around age 18 to 20), the most effective teaching styles encompass methods that create concrete experiences within the boundaries of the school setting.

Learning Strategies

Thing to Know # 1: A young adolescent brain can hold seven items of information, plus or minus two items, in working memory.

- An effective strategy that allows teenagers to work with larger and larger amounts of information is to show them how the information fits together. For example- which list can you recall with more accuracy: NB CLA XC BSD VDA BC or NBC LAX CBS DVD ABC? You can recall the entire second list even though the number of letters and the letters themselves were the same and in the same order because you were able to see how the letters could fit together in a more meaningful way. NBC is now a single item of information, as is LAX and so on.
- Short-term memory stores about 7 pieces of information for about 30 seconds. If the information is not easily remembered through chunking or other strategies, it will be quickly forgotten.
- Working memory stores about 7 pieces of information for 20 to 30 minutes. If the brain does not determine the information to be meaningful, it is not stored in long-term memory and is lost.
- Use Brain Compatible Strategies such as Chunking, Storytelling, Mnemonics, and Rhythm, Rhyme, and Rap.

Thing to Know # 2: The addition of emotion can help students remember.

- Emotion drives attention and attention drives learning.
- The young adolescent brain does not have a fully developed frontal lobe (which houses higher-level thinking) so many times the thinking gets accomplished by the amygdala (which typically stores emotional memory).
- Emotion can also work against learning – no learning occurs if a student feels threatened. Something as simple as being called on to answer a question or asked to read aloud can produce a threatening situation for some students.
- Use humor not sarcasm when teaching. Be careful with humor – you do not want to offend any student. Use yourself as the "brunt of the joke."
- Use Brain Compatible Strategies such as Wait Time, Think-Pair-Share, and Reading Buddies to reduce stress.
- Use Brain Compatible Strategies such as Storytelling and Rhythm, Rhyme, and Rap to make an emotional connection.

Thing to Know # 3: The brain is social & requires interaction in order to develop properly.

- The brain's primary function is to promote survival of the body. Hundreds of years ago, a person stood a better chance of surviving as a member of a group versus as an individual. Thus, humans have evolved into social beings and require social interaction in order to mature appropriately.
- Use Brain Compatible Strategies such as Think-Pair-Share, Simulations, and Reciprocal Teaching.

Thing to Know # 4: Practice/rehearsal is critical to learning for the long term.

- Understanding must be checked frequently to ensure that the rehearsal is correct. This can be accomplished simply by asking questions such as "What do I need to clarify?" or "What questions might you have?"
- Use of the Socratic Teaching method (asking the audience questions) will allow feedback and verification of understanding. For example, you could ask, "I just used the word "asymmetry" -- can anyone tell me what that means?"
- Use Brain Compatible Strategies such as Analogy, Metaphor and Simile, Simulations, Storytelling, and Rhythm, Rhyme, and Rap.

Thing to Know # 5: We take in more information visually than through any other sense.

- We have a tremendous capacity to store pictures in long term memory.
- Use Brain Compatible Strategies such as Visuals & Graphics, Storytelling, and Hands-on activities.

Brain Compatible Strategies for Increasing Learning

Storytelling

- Can be real or fictional.
- Should be age- and experience-appropriate.
- Makes an emotional connection to the audience.

Reciprocal Teaching – Think, Pair, Share

- Use anytime you have asked for individuals in a group to make a response, i.e. answer a question, give an opinion, etc.
    - Make your request.
    - Tell participants to think about their response.
    - Now tell them to turn to their neighbor and discuss their responses.
    - Ask for volunteers to share what they heard - they can share their own response or that of their discussion partner.
- You tend to get more students willing to respond and the responses are richer.

Metaphor, Analogy and Simile

- This makes the connection between something students are already familiar with and the new information.
- For example, when dealing with statistical information that has large numbers, try to convert those numbers into smaller more concrete statistics: "Presently, one out of five people will develop skin cancer by the age of 65. This means that at least six students in this class of 30 will have skin cancer at some point in their life."

Visuals/Graphics

- A picture is worth a thousand words.
- Have the students visualize an image and connect it to them personally: "Imagine that…", "Close your eyes and picture …", "What do you see when I say …"
- Graphics don't necessarily mean graphs - use cartoons, diagrams, simple flow charts, etc.

Mnemonics

- A good tool to help us remember seemingly disconnected items of information.
- Roy G. Biv is a mnemonic to help us remember the colors of the visible light spectrum in order – Red, Orange, Yellow, Green, Blue, Indigo, and Violet.
- ABC's of Melanoma are a mnemonic for remembering what to look for in a skin spot.
- This is more powerful if the students are the ones to create the mnemonic.

Hands-on / Simulations

- Another opportunity for visual and emotional connections.
- Be sure your instructions and expectations are clear.
- The majority of students are visual learners, a large minority are tactile/kinesthetic learners and a very small number of students are auditory learners.
- Does not need to be complex – something as simple as putting your hand into a fist to show the approximate size of your heart is a simulation.

Wait Time

- Give students time to process your question before asking for a response. Waiting between 5 and 10 seconds before calling on students will increase the number of hands-up and the quality of the answers.

Rhythm, Rhyme, and Rap

- Putting information to music or a rhyme can increase memory – how did you learn the alphabet in the right order?
- You can have these already prepared or challenge the students to do this.

Chunking

- A chunk is any coherent group of items of information that we can remember as if it were a single item. This is why a mnemonic device works. Chunking works best when information is limited to 9 pieces of information or less.
- For example, remembering the 12 cranial nerves is both difficult and longer than remembering 9 nerves. So, we use two devices: a *mnemonic* that *chunks* or separates a large amount of information into smaller phrases and arranges the information in an easy to remember sequence. "On Old Olympus Towering Top A Famous Vocal German Viewed Some Hops" lets us remember both the order and first letter of each cranial nerve. Another example is listed under Things to Know #1. By chunking the letters into phrases we remember like IBM and TWA, it is easier to remember the entire list of letters.

Much of the information for this section has been adapted with permission from:
Wolfe, Pat. Brain Matters: Translating the Research to Classroom Practice.
ASCD, Alexandria, VA, 2001: 1-207.

Teaching Tips To Keep in Mind When Presenting

Preparation
Be organized with your presentation. Keep things moving and decrease "down-time." Middle school students can find very creative ways to fill the time.

Communicate with the classroom teacher
Contact the classroom teacher before your presentation. You should expect this person to be present during your presentation and be in charge of classroom management. Share this expectation with the teacher.

Dress
As you are dressed,
So shall you be perceived;
As you are perceived,
So shall you be treated. - Harry Wong, The First Days of School

No sarcasm
Yes, middle school students can really enjoy this but only when you know them well and have established a good relationship with them. Even then, use this with great caution.

Humor
Make sure the joke is on you and not the students. This can really de-escalate a situation if used properly.

Proximity
Stand close to students – move around the room as you are presenting, but do not touch! Again, you have not established a relationship with the students to know who would respond favorably to a touch on the shoulder, pat on the back, etc.

Give directions that are clear
Remember the adolescent brain can only hold 7 pieces of information (plus or minus two). Whenever possible, give directions orally and visually – on the board, in PowerPoint, on an overhead, or on a handout. Leave these visuals displayed until the task or activity is finished.

Establish clear expectations
If you want students to move quietly into groups, say so. Give a time frame and stick to it. – "I need this task to be finished in 5 minutes." (Kitchen timers are nice tools to keep handy for this, but most schoolrooms have clocks on the wall and most students have watches or cell phones.)

You are the adult and the professional
Yes, you can be friendly and approachable, but you are not their friend. Be sincere and honest with the students. If you don't have an answer to a question, tell them so – they will respect honesty more than a made-up answer. It will also lend more credibility to the other facts you have told them. You can offer to look up the unknown answer and email it to their teacher.

Respect
Show the students the same respect you expect from them.

Fairness
Fairness is an important idea to a middle school student. They need to see that you are not playing favorites.

General Curriculum Outline - One Day Course

- **Day One (85 minutes)**
  - Introduction (2 minutes)
    - SPOTS teachers introduce themselves
    - Brief explanation of program structure and what will be covered
    - Hand out SPOTS brochure and Helpful Information about Skin Cancer
    - Give worksheet to teacher for follow-up or review
  - Game (8 minutes)
    - Risk game OR
    - Myths/Facts game (part of lecture for large classes)
    - Discuss responses
  - Teaching - Focus on Early Detection (18 minutes)
    Lecture Outline and Script: Part One
    - Why We Are Here (Statistics)
    - What is Skin Cancer?
    - What Causes Skin Cancer?
    - What Does Skin Cancer Look Like?
    - ABC's of Melanoma
    - Warning Sign Pictures of BCC and SCC
    - Who Gets Skin Cancer (Risk Factors)?
  - Video of teens with skin cancer/punch biopsy (14 minutes)
  - Game (5 minutes)
    - ABC game (part of lecture for large classes) OR
    - SPOTS Bingo game
  - Teaching with Demonstrations - Focus on Prevention (20 min)
    Lecture Outline and Script: Part Two
    - Basic Protective Measures
    - Three Types of Ultraviolet Radiation
    - How to Choose and Use a Sunscreen
    - Indoor Tanning Beds
    - Alternatives to Tanning
    - Non-Sunscreen Sun Protective Methods
    - Keeping Yourself Healthy
    - Conclusion
  - Skin Analyzer Machine (13 minutes)
  - Open Q & A/Discussion (5 minutes)

General Curriculum Outline - Two Day Course

- **Day One – Focus on Early Detection (50 min)**
  - Introduction (2 min)
    - SPOTS teachers introduce themselves
    - Brief explanation of program structure and what will be covered
  - Game (8 min)
    - Risk game OR
    - Myths/Facts game (part of lecture)
    - Discuss responses
  - Teaching (20 min)
    - Why We Are Here (Statistics)
    - What is Skin Cancer?
    - What Causes Skin Cancer?
    - What Does Skin Cancer Look Like?
    - ABC's of Melanoma
    - Warning Sign Pictures of BCC and SCC
    - Who Gets Skin Cancer (Risk Factors)?
  - Skin Analyzer Machine (15 min)
  - Open Q & A (5 min)
    - Tell them what will be covered on Day Two (Prevention)

- **Day Two – Focus on Prevention/Protection (50 min)**
  - Review ABC's Game (part of lecture) (5 min)
  - Video of teens with skin cancer and punch biopsy (14 min)
  - Teaching with Demonstrations (25 min)
    - Basic Protective Measures
    - Three Types of Ultraviolet Radiation
    - How to Choose and Use a Sunscreen
    - Indoor Tanning Beds
    - Alternatives to Tanning
    - Non-Sunscreen Sun Protective Methods
    - Keeping Yourself Healthy
    - Conclusion
  - Open Discussion (6 min)

Day/Part One Background Information for Teaching

Statistics and numbers in the curriculum are taken from the American Cancer Society (ACS), American Academy of Dermatology (AAD), Centers for Disease Control (CDC), Surveillance Epidemiology and End Results (SEER), National Cancer Institute (NCI) and the Skin Cancer Foundation websites, unless otherwise noted.

Getting to the School

Many schools have strict security and keep all doors except the main entrance locked during school hours. Park in the appropriate lot (not the bus lanes) and go to the main office. Place your signature on the sign-in sheet in the school's main office, make out a name tag, and put it on your shirt. Have the secretary contact the teacher or education administrator who will take you to the classroom, gym, or auditorium. It is a good idea to contact the teacher(s) or educational coordinator(s) the day before by email or phone to remind them you will be coming, and to let them know what equipment you will need [PowerPoint projector, laptop, screen, Smartboard, small table (for the demonstration box) and a tall cart or table with two chairs and an extension cord for the Skin Analyzer Machine (SAM)].

Setting up Presentation

It is best to arrive 10 minutes early on the first day. This will allow you time to check the equipment set-up. Some schools have a technology person who does the set-up, so teachers may be limited on their knowledge of the equipment. Others have the set-up as standard equipment in their room. Many schools use Smartboards which link a computer to a large dry-erase screen that is controlled by touch. Emailing the educators (or outside speaker coordinators) the day before will often eliminate problems and time delays. Finally, be ready to give the lecture without the CD in case of equipment failure. This is when the games and hands-on demonstrations come in very handy.

Day/Part One – Focus on Early Detection

Introduction

Class lengths generally run 55 or 90 minutes. Our curriculum runs 50 or 85 minutes. This gives you five minutes to set up while the teacher is doing initial class duties. After the first bell rings, the teacher will get all the students seated, take attendance and then introduce you as the invited speakers. Introduce yourselves by name to the class. Tell them what school you attend. This lets them know you are students, too.

Explain that you are there to speak about early detection of skin cancer and sun protection in a one or two-day program that includes short lectures, games, a video, handouts, a skin analyzer machine, and two surveys for educational purposes (if using surveys). Tell them you want to have an open discussion and encourage them to raise their hands with any questions. Try to end your class at least 3-5 minutes before the next bell to allow the students time to collect their things and get ready to walk to their next class.

Game

Break the ice by choosing one of the following, playing the game, and then discussing their responses and the correct answers.

- Risk game
- Myths/Facts game (included in lecture)

Interactive Lecture : Background Information for Teaching

**Hints for Teaching Teenagers

When instructing teenagers, it is often best to infuse your lectures with visual material, and supplement with pictures, demonstrations, and **hands-on activities.** The human brain prefers visual, rather than auditory input. The brain's visual processing center occupies approximately 30% of the cerebral cortex, whereas the auditory system is only delegated three percent. Additionally, each of the two optic nerves contains one million nerve fibers while each auditory nerve contains only 30,000 fibers, giving the human visual system 27% more brain space and 67 times the carrying capacity of the auditory system.[1]

Section four of the manual contains information about practical and easy-to-use techniques to increase adolescents' learning. Take some time to review this section before your first classroom session. It will help you understand how to better teach your teenage audience. Have the students volunteer to do some of the hands-on demonstrations of sun products. Asking questions of the student audience will help retain their attention and increase their participation, while simultaneously giving you the feedback necessary to correct any misconceptions. It also encourages debate, strengthens abstract thinking, and increases knowledge retention.

Lecture Sections

- ### Who We Are

We are students studying medicine, nursing and public health who are interested in bringing information about sun protection to young people in an effort to increase their sun protection knowledge and decrease their risk of getting skin cancer.

- ### Why We Are Here (Statistics)

Skin cancer affects more people annually than breast, lung, prostate, and colon cancer combined.[2] One out of every two newly diagnosed cancers will be a skin cancer.[2] Over one million cases of skin cancer will be diagnosed annually in the US.[2-3] Unfortunately, the incidence of skin cancer is increasing disproportionately to the rise in population: while the US population increased by 10% from 1980-2000, skin cancer in adults increased by 83%. From the years 1976-2003, in women under the age of 40 years, the incidence of basal cell and squamous cell carcinoma doubled in the U.S.[4]

In 1935, the lifetime prevalence of melanoma was one out of every 1500 people. In 1960, the prevalence was one out of every 800 people, in 1980, it was one out of every 250 people, and by the year 2002, the prevalence had increased to one out of every 67 people. It is predicted that one out of every 50 people will have melanoma by the year 2010.[5-6] One out of every five Americans and one out of every three white Americans will be diagnosed with skin cancer.[6] Caucasian melanoma incidence has more than tripled in the past twenty years.[7] Skin cancer is now twice as likely in a person under the age of 40 years as it was 30 years ago, and this is not the result of better screening or living longer. It is a substantial increase, especially in women.[4]

Disturbingly, the past 20 years have also shown an increase in the number of young adult and pediatric melanoma cases.[8-11] An analysis of SEER data for children with melanoma displayed an increase of 2.9% every year from 1973-2001.[12]

Melanoma, once a cancer of older people, has become a serious problem in American youth: it is the most rapidly increasing malignancy among young people today. If a melanoma is ignored until it reaches the metastatic stage, it is largely refractory to conventional medical treatments and survival plummets. Early detection of melanoma has survival rates in the upper 90th percentiles, but this falls to 15-65% with more advanced spread.[13] This is why SPOTS was created - to teach teenagers and medical/allied health students how to identify (early detection) and prevent (protective methods) skin cancer.

• What is Skin Cancer?

Cancer, simply defined, is a cell that divides abnormally. Cancer cells continue to multiply out of control until they form a mass of cells known as a tumor. Any cancer located anywhere in the body behaves in this way, whether it is a breast cell in breast cancer or a lung cell in lung cancer.

The skin is composed of three main layers -- epidermis, dermis and subcutaneous tissue. The most common skin cells that can become cancerous (basal cells, squamous cells, and melanocytes) reside within the top layer of the skin (epidermis). The thickness of the human epidermis ranges from 0.05mm (eyelids) to 1.5mm on the thickest surfaces (palms and soles).[14] In relation, a piece of notebook paper is 0.1mm in thickness.[15] This thin barrier of skin is all that protects people from the damaging effects of ultraviolet radiation (UVR). Once a skin cancer grows through the thin epidermal layer and reaches the dermis, it can more easily spread through the lymphatic and circulatory channels that are contained within the dermal layer. These channels are the body's "highway" system; they transport cancer cells from the primary site of origin (the skin) to a new or secondary site. This dissemination of cancer cells is known as metastatic spread.

o Skin Cancer Types

The three most common types of skin cancer are basal cell carcinoma, squamous cell carcinoma, and melanoma. These three are grouped into the non-melanoma skin cancers (NMSC) or the melanoma skin cancers. The non-melanoma skin cancers include basal cell carcinoma (BCC) and squamous cell carcinoma (SCC). Melanoma skin cancer is also called malignant melanoma (MM). Each of these skin cancers has multiple subtypes. The more common subtypes of melanoma include superficial spreading (70%), nodular (15%), lentigo maligna melanoma (5%), and acral lentiginous (2-8%).[16]

o Incidence

Schofield states that "melanoma is largely a disease of a modern lifestyle" with the rising incidence due to the way people spend their leisure time, the kind of clothes they wear, and their attitudes toward suntanning.[17] The same can be said for basal and squamous cell skin cancers. Current thoughts as to why there is an increasing annual incidence of melanoma include that there are increases in the diagnosis of thinner lesions (< 1.0 mm) and increases in intermittent

sun exposure especially among higher socioeconomic persons.[18] Behaviors, social norms, the media, and influential people (parents and peers) all contribute to the incidence of skin cancer, and they are all modifiable.

The most common skin cancer is basal cell carcinoma, composing approximately 75% of all skin cancers[19] and 33% of all cancers. Squamous cell carcinoma comprises around 20% of skin cancers,[19] melanoma constitutes around four percent, all other skin cancers comprise the remaining one percent. While melanomas constitute a small percentage, they are responsible for 74% of all deaths from skin cancer.[7] Persons who have had one basal cell carcinoma diagnosed have a 20% chance that a second one will develop within a year[20] and a 45% chance of recurrence within five years.[21] The lifetime risk of Caucasians acquiring skin cancer is 30% for basal cell carcinoma,[22] 10% for squamous cell carcinoma,[23] and 3% for malignant melanoma (including in situ cases).

In Caucasians, skin cancer occurs approximately 11 times more often than in African-Americans and Asians, and 5-6 times more often than Hispanics.[24-26] Unfortunately, in Hispanics, Blacks, and Asians, melanomas are both found by the patient and diagnosed by physicians later, have a greater mortality rate, and thus a poorer prognosis.[27] This may be due to the fact that melanomas in people of color tend to be found on non-sun exposed areas (palms, soles, subungual) and occur less frequently. Because of this, they may arouse less suspicion on the part of both patients and physicians when a new or changing lesion occurs.[28]

Location

Basal cell carcinomas are located primarily on sun-exposed areas of skin, most often the head and neck (85%) with 25-30% located on the nose.[29-30] They are also found to a lesser degree on non-sun-exposed body parts.

Squamous cell carcinomas are found not only on the skin, but also in other organs, such as the lungs, cervix, and oral cavity. Squamous cell *skin* cancer grows almost exclusively on sun exposed surfaces and is found in the largest numbers on the head and neck.

Bowen's disease is a type of *in situ* (non-invasive) squamous cell skin cancer that is often misdiagnosed as warts, psoriasis, or eczema due to both its appearance (a round, raised, rough plaque that bleeds if irritated) and because its location can be on the hands and subungual areas.[31] However, most Bowen's lesions are found on the scalp and ears in men and the lower limbs in women.[29] Invasive later stage squamous cell skin cancers can also look like warts, and they frequently bleed.

Melanoma is most commonly found on the trunk in both men (especially the upper back) and women (especially the chest).[32] This is a change in anatomic distribution for women since the 1970's when melanomas were most often found on the legs.[32] There has also been a significant increase in head and neck melanomas in the last three decades**.** However, melanoma can occur anywhere, even on non-sun-exposed areas. Less than 10% of melanomas arise in these non-sun-exposed areas (ocular-pigmented retinal areas, the mucous membranes of the oral cavity, anal canal and vulva).

In African-Americans and Asians, melanoma usually occurs on the acral surfaces[24] (palms of the hands, soles of the feet), subungual areas (nailbeds) and the mucosal surfaces (inside the mouth).[25] Its appearance is typically a brown-black lesion with irregular borders. Although melanoma is not common in African-Americans and Asians, the prognosis is worse when it does occur because it is usually detected at a later stage.[26, 28]

Metastatic Rates of Non Melanoma Skin Cancer (NMSC)

Basal cell carcinomas (BCC) rarely metastasize before they are discovered and removed (cited metastatic rates run from 0.0028-0.1%).[33] However, tissue destruction can be large and the risk of having another BCC arise is 45% in the five years following diagnosis.[34] Squamous cell carcinomas arising from actinic keratoses (pre-cancerous lesions) have a slightly higher overall rate of metastasis (0.5-3.7%).[34] This rate can exceed 20% in certain patients, depending on the location and subtype of the cancer, and host immunosuppression. There is one NMSC (Merkel cell carcinoma) which is highly and rapidly metastatic. Fortunately, it is also very rare (1.4/100,000 US Caucasians).[35]

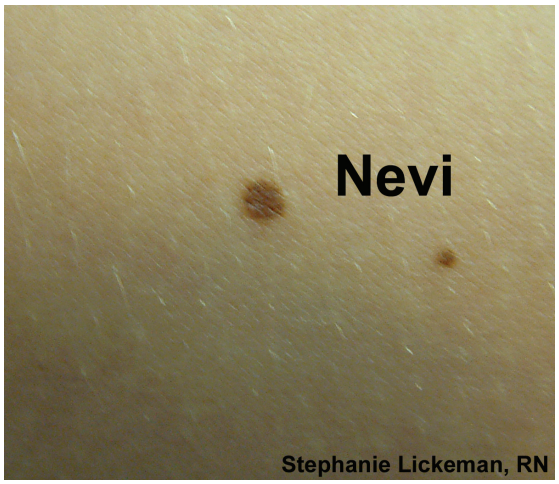
Metastatic Rates of Malignant Melanoma (MM)

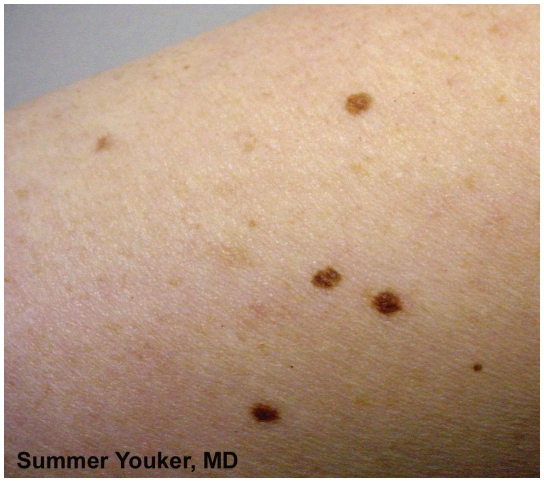
Rates of metastasis for malignant melanoma vary with the different subtypes. Superficial spreading and lentigo maligna melanoma both have *in situ* phases and spread horizontally first, making them slower growing. In contrast, nodular and desmoplastic melanomas have no *in situ* phase, have a rapid vertical growth phase, and are therefore usually diagnosed at a later stage. Acral lentiginous melanomas are of a moderate growth rate, but have a worse prognosis often due to late detection. Prognosis in melanoma is predominantly based on the stage of tumor at diagnosis, subtype, presence of ulceration, and thickness of lesion as determined by Breslow's Criteria.[36] Advanced stage (stages III and IV), ulcerated, and thick tumors have a poorer prognosis.

Skin Cancer and Sun Exposure

Squamous cell skin cancer is caused by chronic UVR exposure and is almost always found on sun-exposed surfaces. Basal cell carcinoma and melanoma are the result of intermittent or cumulative UVR exposure and can be found on both sun-exposed and non-sun-exposed areas. Sun exposure during childhood and the teenage years (15-19 years) is a major risk factor for development of basal cell carcinoma.[37] Parental protection of children is paramount. Less than half the parents in one study reported regular use of sunscreen on their children and even fewer used other means of protection (hats, shade, clothing). Their primary reason for using sunscreen was to prevent sunburn, not decrease sun exposure.[38]

Nevus or Mole





Nevus and mole are different names for the same lesion. A nevus is a cluster of melanocytes or pigment cells. Nevi (plural of nevus) are either congenital (present at birth) or acquired (appearing after 6 months of age and increasing in size and number through the third and fourth decades of life). Acquired nevi tend to be less than 6mm, flat (junctional) or slightly raised (dermal), evenly pigmented (light brown, brown-black, flesh-colored), symmetric in shape (round, oval) and have well-circumscribed borders. They are named based on the location of the melanocytic nests.[39] Junctional nevi have nests of melanocytes at the dermoepidermal junction. Compound nevi have melanocytic nests that have also migrated to the dermis so they are a combination of dermoepidermal and dermal nests. Intradermal nevi have melanocytic nests completely within the dermis and no junctional component.

Studies have shown that nevi increase in size and number during childhood and adolescence and these changes correlate with increased sun exposure,[40-41] number of severe sunburns, and tendency of the skin to burn.[42] Broad-spectrum sunscreen (SPF 30) use[43] and coverage with clothing[44] in white, freckled childen has been shown to attenuate the number of nevi developed. Congenital nevi tend to be of greater diameters (1.5 to over 20 cm),[45] are of lighter color (early in life) often changing to a darker pigmentation and developing hair outgrowths, and when large (>20 cm) have an increased risk of melanoma. It is common for most Caucausian adults to have about 30 nevi.[17]

Atypical (Dysplasic) Nevi

The presence of large numbers of nevi (>100), and atypical nevi (irregular borders/shapes), larger size (5-15 mm), and variation in color (shades from tan to dark brown to pink) increase the risk of melanoma in one's lifetime to approximately ten percent.[46] Large numbers of atypical nevi tend to run in certain families, are an inherited trait, and comprise a syndrome known as atypical mole syndrome or dysplastic nevus syndrome.[47] The three classic presentations of atypical mole syndrome are: 50-100 or more melanocytic nevi, one or more melanocytic nevi with a diameter of 8mm or greater, and one or more melanocytic nevi with atypical ABCD features.[48-49] Familial atypical mole malignant melanoma syndrome (FAMM) adds a first degree

relative with melanoma to the previous criteria. Research has shown that dysplastic nevus cells exposed to UVR have a greater sensitivity and tendency to mutation.[50] People with atypical nevus syndrome or FAMM have a greater incidence of multiple primary melanomas.[51]

Most adolescent students are not familiar with dermatologic medical terminology (lesions, moles, and nevi). Explain that you will be using the term "spots" to define the circular skin colorations. Most of the spots on their bodies are the result of sun exposure and can be affected by UVR. Students in this age group often don't know that freckles are a result of sun damage or that nevi can be changed by UVR exposure. Many teenagers consider a mole different than a nevus, although the two are actually synonymous. They think of a mole as a very large, ugly, raised bump similar to the ones on the noses of Halloween witches. They don't even know the word nevus. It would be difficult, time-consuming, and unnecessary for you to define nevus, so resist the urge to use the medical term. Show them a typical nevus (mole) on your arm and explain that this is the "spot" we will be concentrating on.

Freckles

You may receive some questions regarding freckles. Freckles are skin spots that are caused by sun exposure and first appear in early childhood. They may initially come and go (present during periods of more intense UVR exposure in the summer and then fade in the winter) when young and may become permanent with age or continued exposure. Freckles tend to be flat, approximately the size of a nail head, irregularly shaped, and have a transparent color quality (red or light tan). They are known medically as an ephelis. Several studies have shown a correlation between increased numbers of nevi and freckles, lower/fairer skin types, and greater sun exposure in children and young adults.[52-54]

Lentigines

Lentigines (plural of lentigo) tend to be darker in color (tan, brown or black) than ephelides (freckles) and do not fade in the winter. They appear with increasing age and are the result of cumulative sun damage.[54] The bottom line is that all spots on their skin, even freckles, can be affected by UVR. The more UVR exposure they receive, the greater the number of spots. Any spot on their skin that changes shape, grows vertically or horizontally, has an unusual color, is 6mm or larger, doesn't heal, or consistently feels different (burns, bleeds, itches, is rough to touch, sandpapery, or tender) should be checked by a medical professional.

What Causes Skin Cancer?

The main cause of skin cancer is exposure to UVR. UVR can come from either natural outdoor sunlight or artificial radiation from indoor tanning beds. UVR damages the DNA of skin cells. Long-term UVR exposure is the cause of squamous cell skin cancer, whereas both melanoma and basal cell carcinoma can be the result of cumulative and/or intermittent UVR. Ultraviolet radiation is believed to contribute to the development of approximately 65-90% of melanomas.[55-56]

A family history of skin cancer is another risk factor. Genetic syndromes that are linked to skin cancer development include basal cell nevus syndrome and xeroderma pigmentosa. Heredity is what you are genetically composed of -- half of your mother's and half of your father's DNA. If a person's parents have a hereditary disease, such as heart disease, hypertension, or cancer, that person may have inherited the ability to contract the same condition later in life because they are comprised of the same genetic material. Thus, a family history of skin cancer raises the odds of occurence. People only have control of one of the two possible causes of skin cancer: you can't change your genes, but you can modify your exposure to UVR.

Warning Lesions

Squamous cell skin cancers tend to have "early warning spots" that present as an *in situ* or precursor lesion known as an actinic keratosis. These are easily treated with cryotherapy (liquid nitrogen), medicated creams (5-FU, imiquimod), or photodynamic therapy in an office or clinic setting. Neither basal cell carcinomas or melanomas have warning lesions with the exception of the subtype lentigo maligna (*in situ*), which is a precursor lesion to lentigo maligna melanoma (invasive). The good news is that most NMSC's are generally slow-growing, visible to the naked eye, easy to surgically excise, and 90-95% curable.[57-58] The most common subtype of cutaneous melanoma is the superficial spreading type. It also tends to enlarge slowly due to its horizontal growth pattern and is easily identified and removed. In the majority of cases, skin cancer is one of the few cancers that can actually be seen by the naked eye. Exceptions include ocular melanomas (non-cutaneous) and vaginal melanoma tumors. Increasing public awareness of detectable changes or warning signs, therefore, should become a teaching priority.

Genetic Mutations

If you are teaching in an advanced science class, the students may have more detailed questions about genetic mutations. A concise, but direct answer is best. There are many genetic factors that are still being researched, but we do know that two genes are commonly mutated in melanoma: CDKN2A and CDK4. CDKN2A is a tumor suppressor gene that normally prevents cells from becoming cancerous, but is inactivated in melanoma. CDK4 is a proto-oncogene which, when mutated, becomes an oncogene (a gene that causes cancer). Melanocortin-1 receptor gene variations (related to skin type) also increase the risk of melanoma (low penetrance) as do p53 gene mutations (in certain genetic syndromes).[59]

What Does Skin Cancer Look Like?

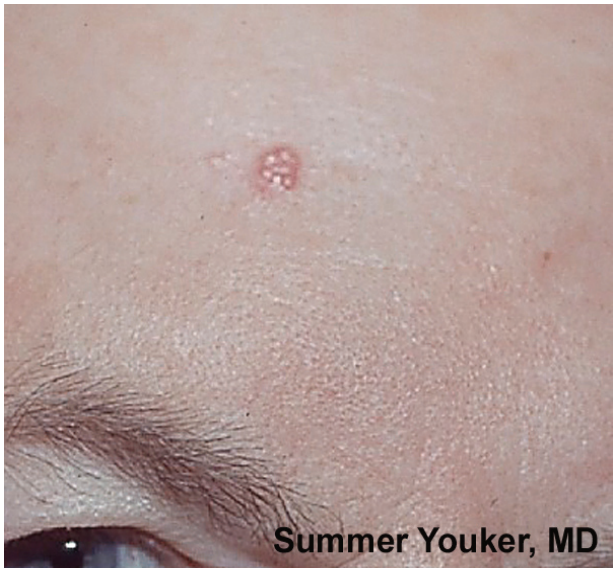
Warning Signs of Basal Cell Carcinoma

Basal cell carcinoma is often ignored by the patient because it frequently does not look like a cancer to the lay person.* In addition, these skin cancers are common in the elderly who already have many skin changes (wrinkles, loss of elasticity, scars, discolorations). Therefore, skin cancer may not make a strong enough impression on the patient for them to feel the need to have it checked until the spot grows to a more advanced stage. Any skin spot that changes in size, shape, color or feel (scaliness, oozing, bleeding, persistent itching or burning) should be examined by a physician or nurse.

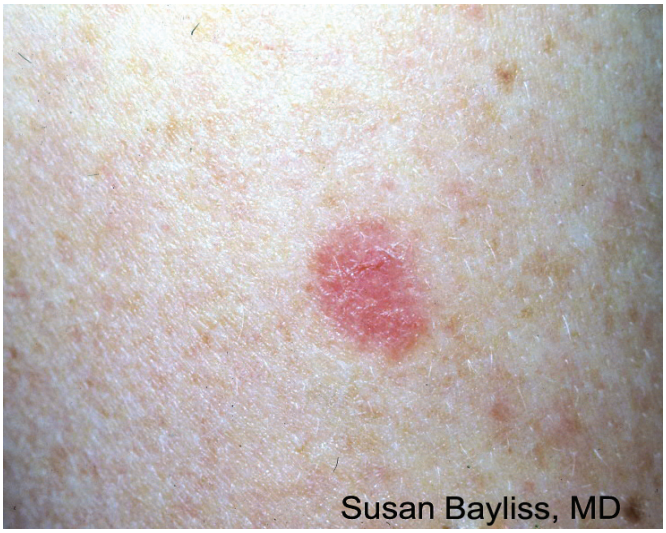
The common warning signs of basal cell skin cancer are:

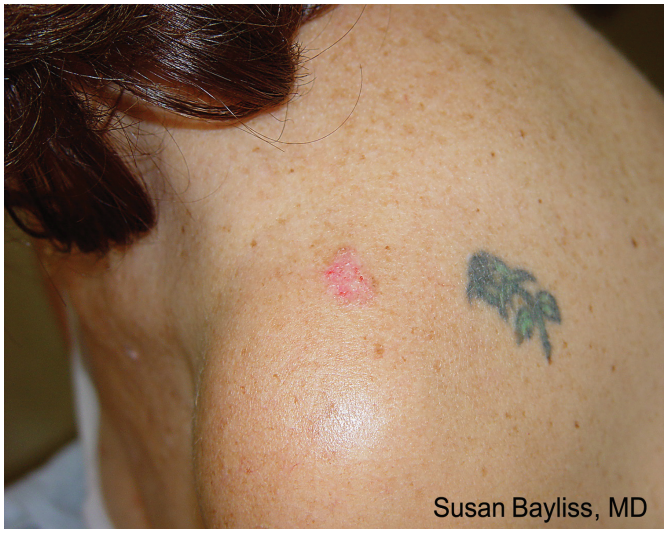
- **A reddish patch that can be slightly raised, itchy or non-itchy**
- **A shiny bump that is pearly in appearance**
- **A pink bump with an elevated rolled border and a depressed center**
- **A pink bump with small red blood vessels (telangiectasias) on the surface**
- **A scar-like area with poorly defined borders**
- **A persistent non-healing sore**

* **Many** young people have thought their basal cell carcinoma was a pimple that did not heal. Any "pimples" or bumps that persist for longer than 3 weeks should be checked by a medical professional.

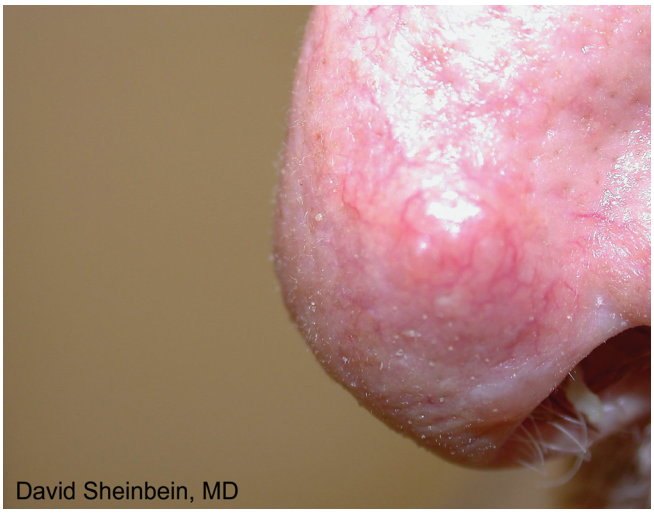


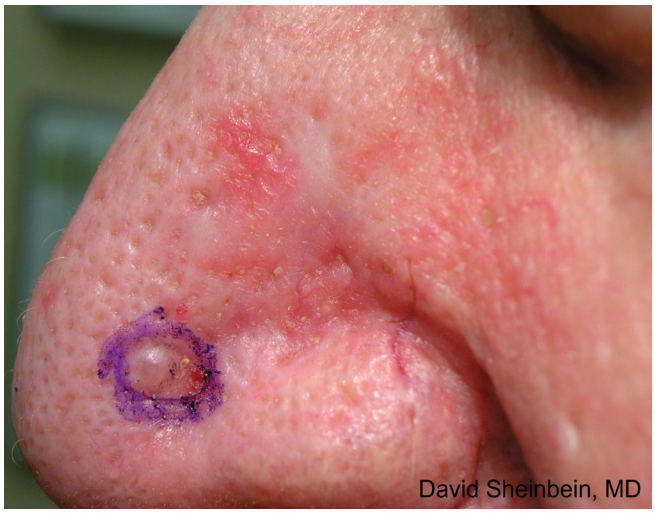
♦A reddish patch that can be slightly raised, itchy or non-itchy



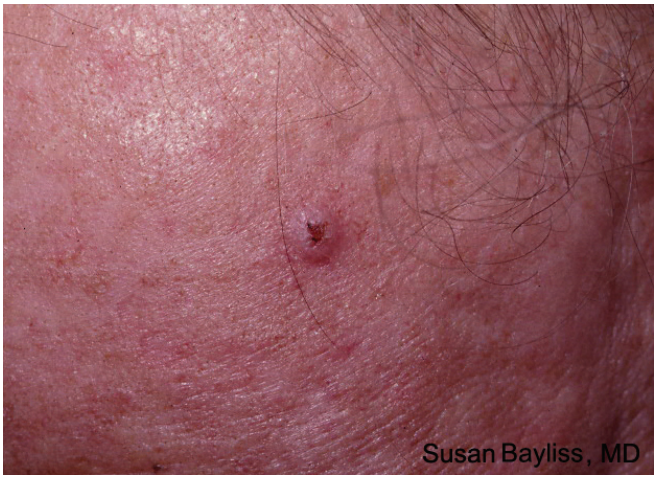


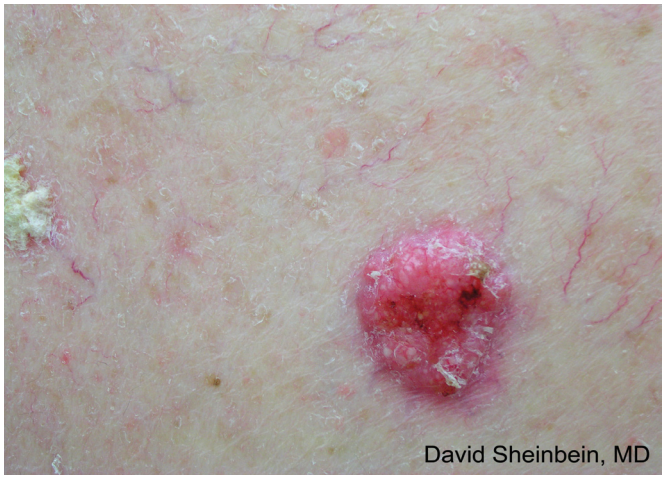
♦A shiny bump that is pearly in appearance



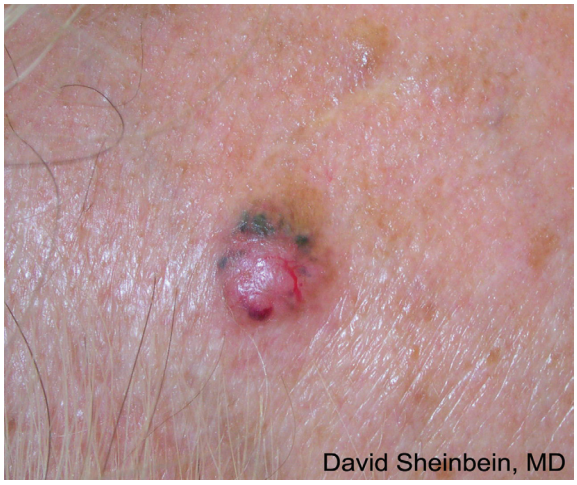


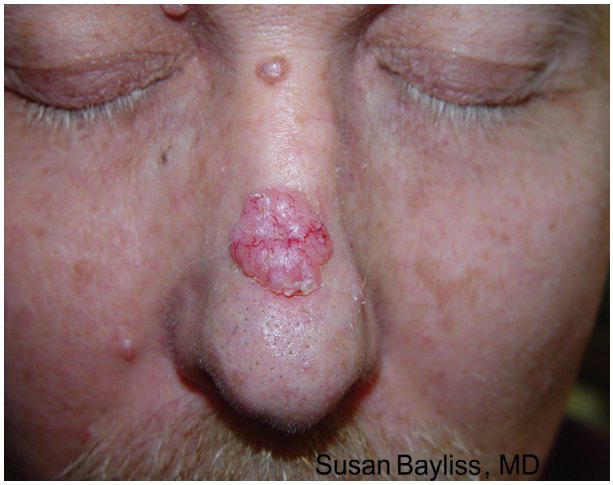
♦A pink bump with an elevated rolled border and a depressed center



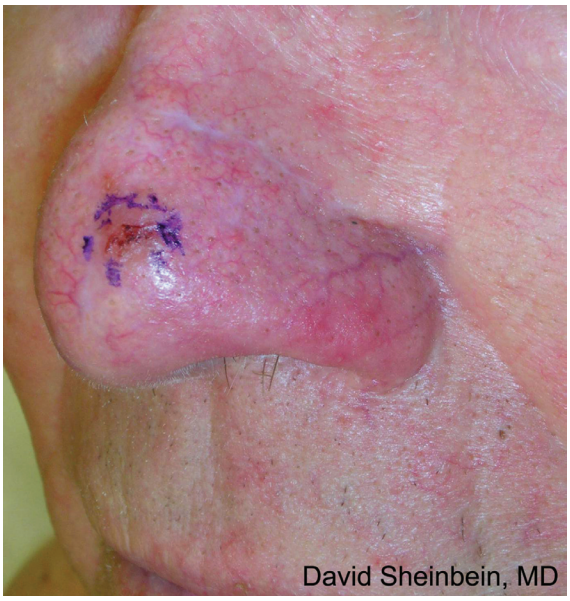


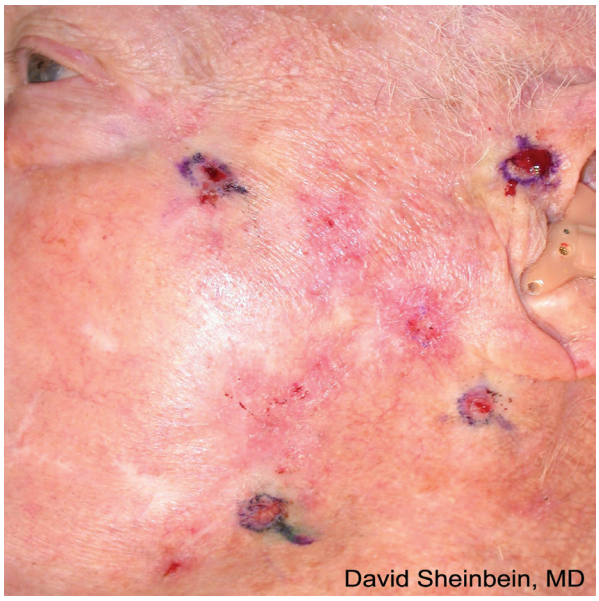
♦A pink bump with small red blood vessels (telangiectasias) on the surface



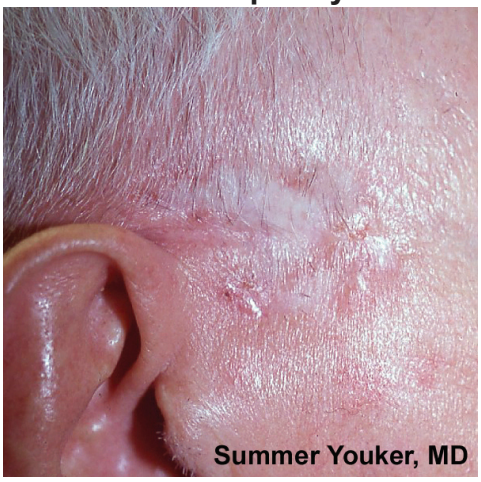


♦A persistent non-healing sore





♦A scar-like area with poorly defined borders



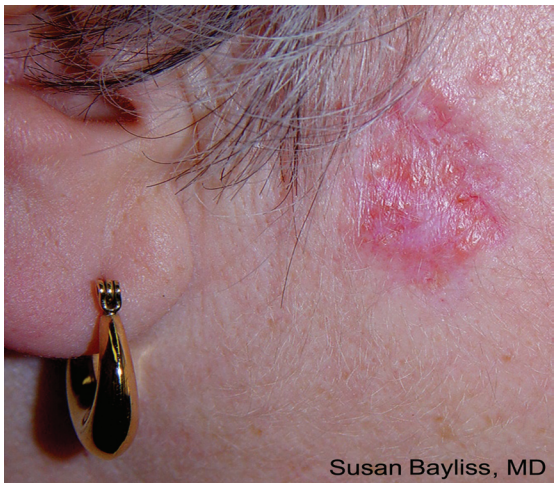
Warning Signs of Squamous Cell Carcinoma

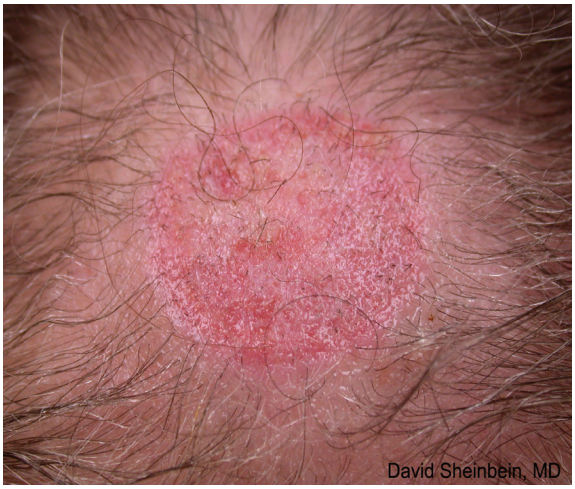
Squamous cell carcinoma tends to grow more rapidly and is often more raised and tender to the touch than basal cell carcinoma. These lesions *look* more like cancer -- they are often ugly and they stand out. The common appearance is an elevated reddened growth with a central depression that bleeds.

The warning signs of squamous cell skin cancer are:

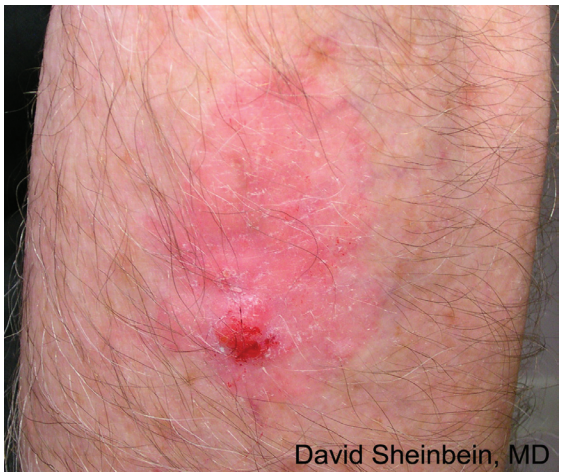
- **♦Scaly red patches that are tender, itch or bleed**
- **♦Open sores that don't heal within three weeks**
- **♦Wart-like growths that appear raw, red, and may bleed**
- **♦Elevated growth with a central depression that may crust and bleed**
- **♦Sores within old scars**

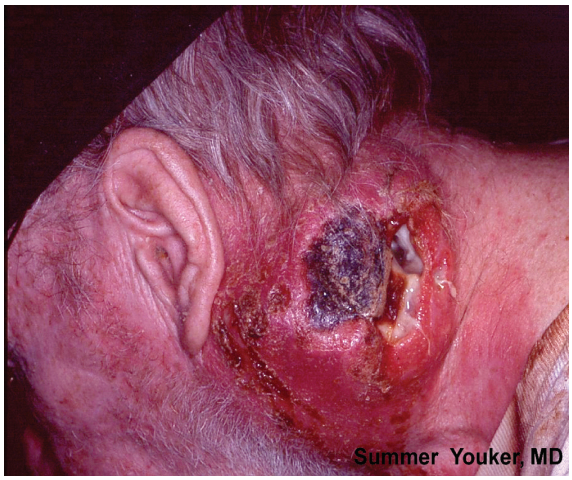
♦Scaly red patches that are tender, itch or bleed



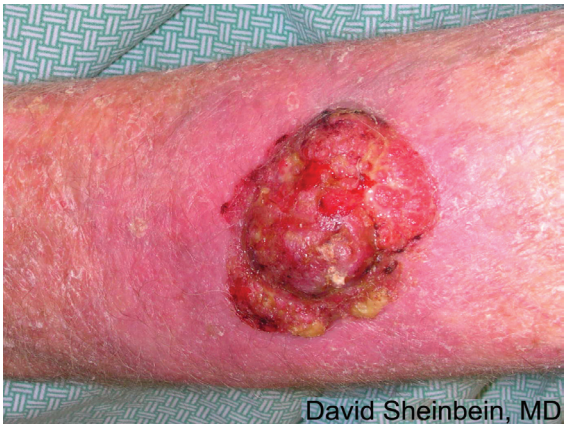


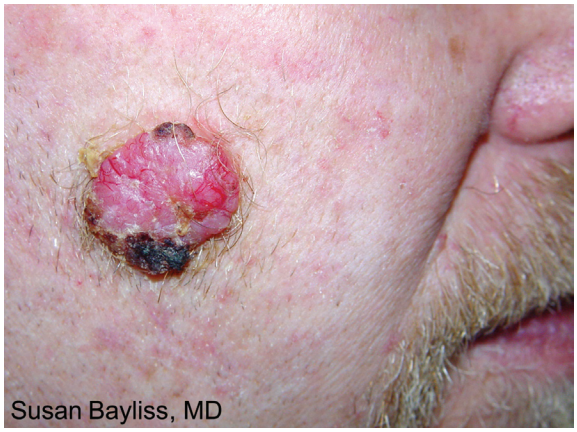
♦Open sores that don't heal within three weeks



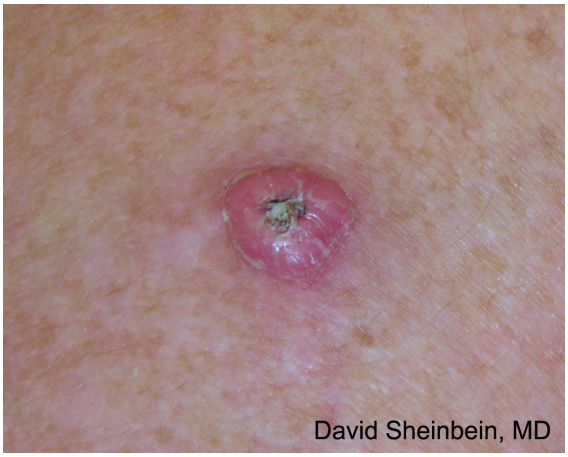


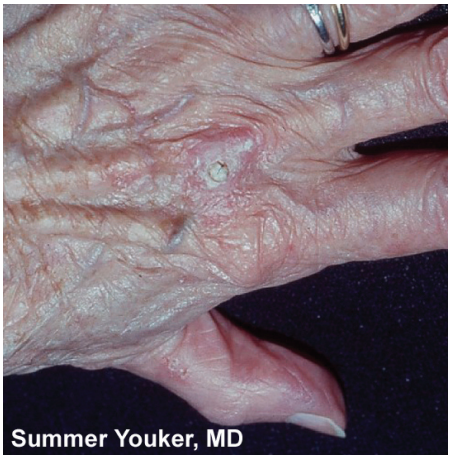
♦Wart-like growths that appear raw, red, and bleed



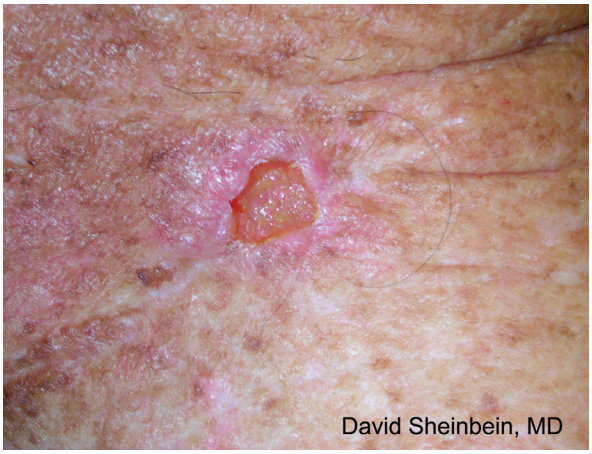


♦Elevated growth with a central depression that may crust and bleed





♦Sores within old scars

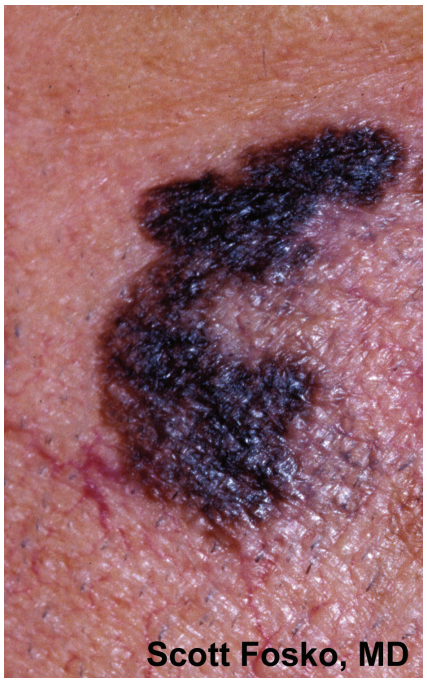


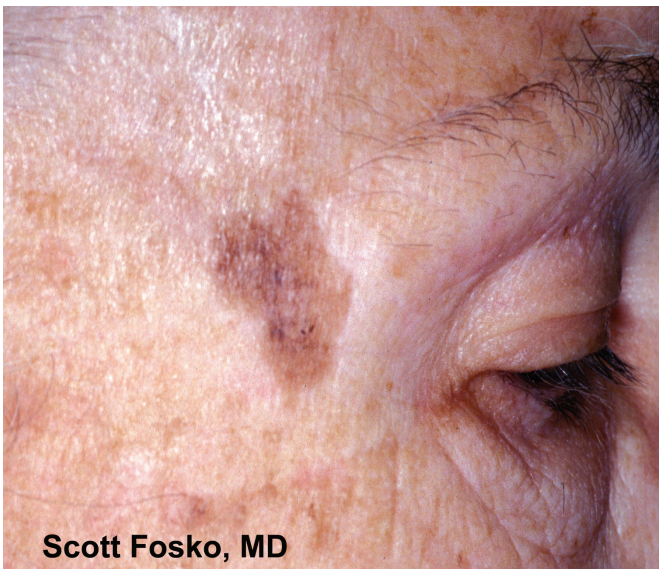
ABC's of Melanoma

In melanoma, a mnemonic is used to remember what to look for in a changing spot. This mnemonic consists of the ABC's of melanoma. Each slide will have both a normal and abnormal spot to show the students the difference and help define the ABC's. You may also want to explain that the black ring or purple markings they may notice around some of the spots has been drawn with a marker by the doctor or nurse to delineate the lesions that need to be checked. Some students have thought that the inked circular rings are a sign of skin cancer because they see them in a lot of skin cancer pictures. If any spot has one or more of the ABC's, it should be examined by a medical professional. Studies have demonstrated that teaching lay people the ABC's of melanoma helped them in their discrimination of suspicious lesions[60] especially when paired with photographs,[116] and may present the best opportunity for patients to find changing lesions during a skin self-exam, especially those with a family history of melanoma.[58] Men were found to be better at detecting irregularities in border and women in finding color changes.[58]

- **"A" stands for Asymmetry**

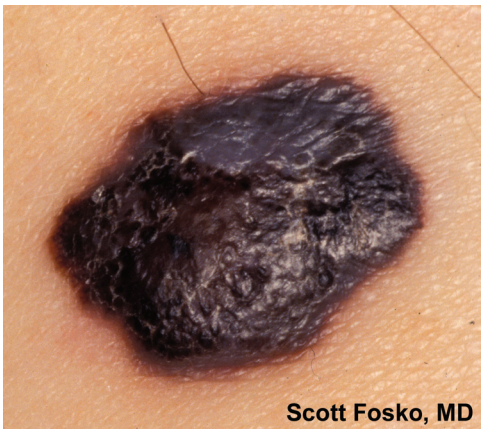
  If you draw a line down the middle of the spot, one half will not equal the other half in size or shape. Most middle schoolers know that the word "symmetry" means same, but may not be familiar with the word "asymmetry." Most high schoolers will be taking the college entrance exams (ACT, SAT) in which vocabulary is paramount. Sometimes it's good to remind them that putting an "a" before a word means "not," so if symmetry means same, then asymmetry means not the same.

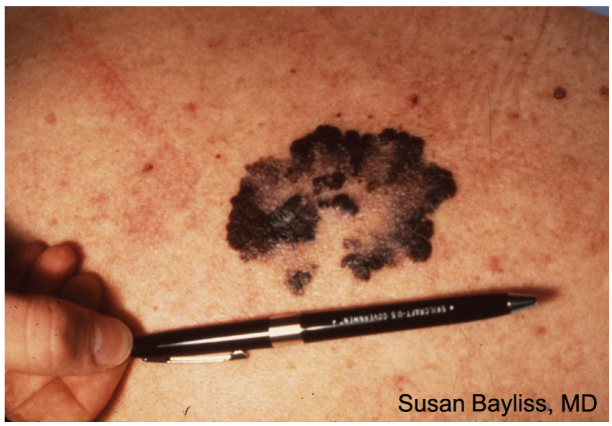




- **"B" stands for Border**

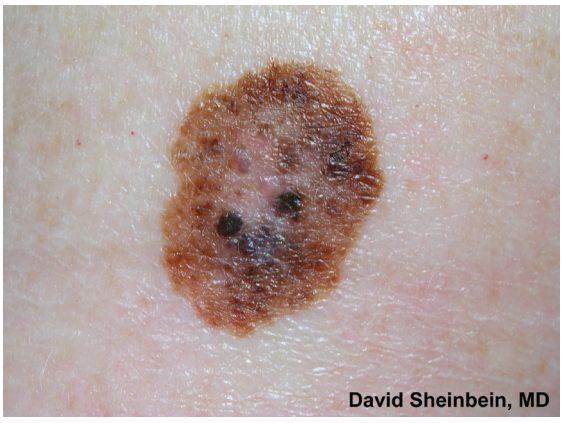
  Border is the outer edge or circumference of the spot. Circumference is a term they should know well from math classes. Explain that an abnormal edge or border is irregular, notched (bumpy), or scalloped (like a seashell). It is not smooth like the border of normal spots.

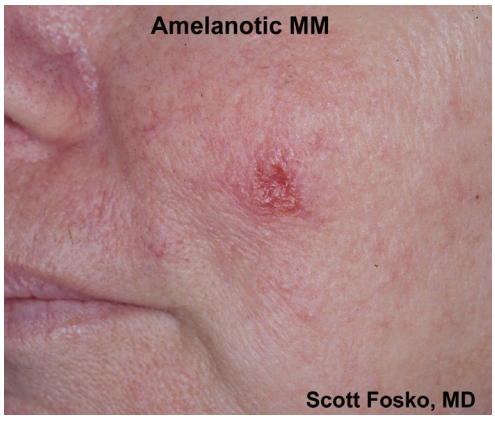




- **"C" stands for Color**

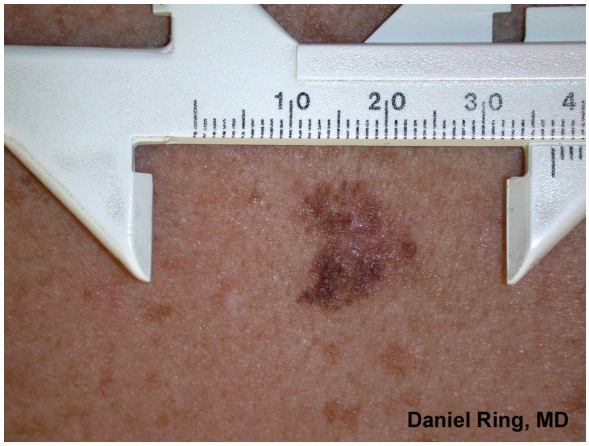
  Ask the students to look at their arms and tell you the color of their spots - most of them will be brown. Brown is a normal color for spots for most skin types. Redheads may have a reddish brown or paler tint to their spots, which is also normal. Abnormal colors are red (although this can be normal if the entire spot is red, as in a cherry angioma), blue, black, blue-black, gray, or white (amelanotic or depigmented). A spot is also abnormal if it contains more than one color or shade.

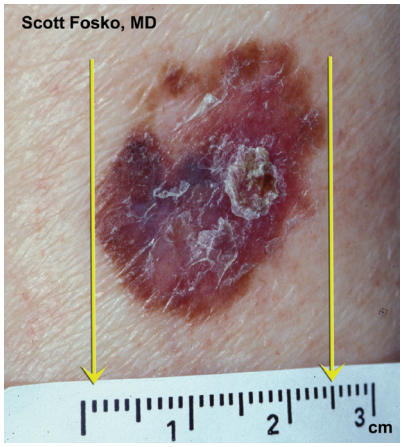




- **"D" stands for Diameter**

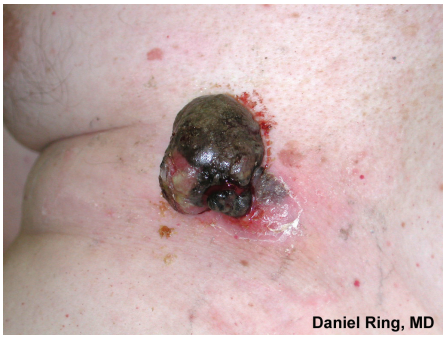
Diameter always needs to be defined. While the younger students seem to remember what a circumference is, the word diameter often throws them for a loop. They may confuse it with the term radius. Explain that while the border is the outer edge or ring of the circle, the diameter is a straight line across that circle. It is a measurement of the spot's size at its widest. Any spot with a diameter of six millimeters or greater may be abnormal. Any spot the same size as, or larger than, the size of a pencil eraser is equivalent to 6mm. Take out a pencil and place the eraser on a skin spot on your body to demonstrate this concept to them. It should be noted that lesions can be smaller in diameter than 6mm and still be abnormal, especially in the case of nodular melanomas and early (*in situ*) lesions. Not all melanomas are large in diameter.

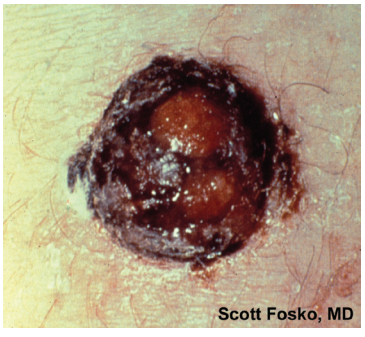




- **"E"stands for Evolving/Elevation**

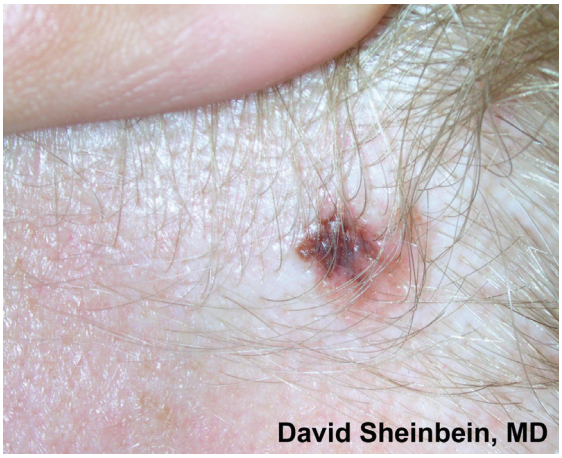
This is a new member of the ABC group advocated by many in the dermatology profession.[61-64] Evolving refers to any spot that is changing in size, shape or color. Elevation refers to a spot that is growing in height (vertically). While the majority of melanomas go through a slower, horizontal growth pattern (Enlarging), the nodular subtype has a rapid vertical growth phase (Elevation) which allows it to metastasize in a shorter time period and thus makes it more dangerous. Liu suggests that change in color and size are the best criteria for lay people to differentiate between melanomas and benign skin lesions.[65] Guibert backs this up with his study of occupational physicians who found the criteria most often selected for lesion evaluations were variations in color and enlarged diameter (> 6mm).[66]





Other melanoma warning signs are:

- A sore that does not heal
- A new growth
- Spread of pigment from the border of a spot to the surrounding skin
- Redness or a new swelling beyond the border
- Change in sensation – itchiness, tenderness, or pain
- Change in the surface of a mole – scaliness, oozing, bleeding, or the appearance of a bump or nodule



Spread of pigment from the border of a spot to surrounding skin

Signs of Nodular Melanoma

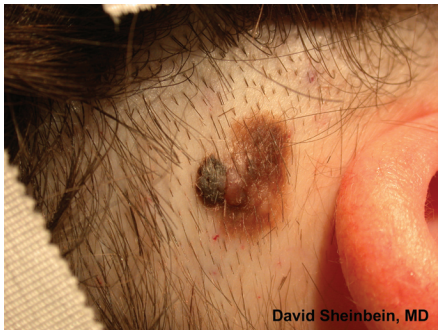
Nodular melanoma is the second most common subtype of melanoma following superficial spreading melanoma. It is mentioned here because early nodular melanoma often does not follow the standard ABC's. It can be symmetric in shape, regular in border, symptomatic, small in diameter (< 5mm), and even in color or amelanotic.[67-68] Chamberlain found that nodular melanomas were mostly symmetric (80%), elevated (90%), and have one color (78.1%) often red or pink.[69] Dr. John Kelly, Head of the Dermatology Unit, Victorian Melanoma Service, AU, suggests that early nodular melanoma follows the EFG's instead.

- **EFG's of Nodular Melanoma[70]**

  - E -- Elevated (rapid vertical growth phase, quicker to metastasize)
  - F -- Firm to touch or palpation
  - G -- Growing progressively for greater than a month (short history of change)
  - S -- Small diameter, symmetrical, raised, even color (often red or pink)

• Who Gets Skin Cancer? [Risk Factors]

Risk factors are things that increase one's chances of getting a disease, infection, cancer, etc. They are not causal agents. They are variables associated with, and correlating to, an increased risk. Studies have shown that personalizing the risks of UV exposure[71] and educating individuals on risk information will improve sun protective behaviors.[72] In addition to being educated in how to acquire healthy attitudes toward sun protection, teens and adults may be more apt to avoid risky behaviors if they are presented with the benefits rather than the negative consequences or when they feel better able to control the level of risk of a certain behavior.[73]



Change in an existing mole

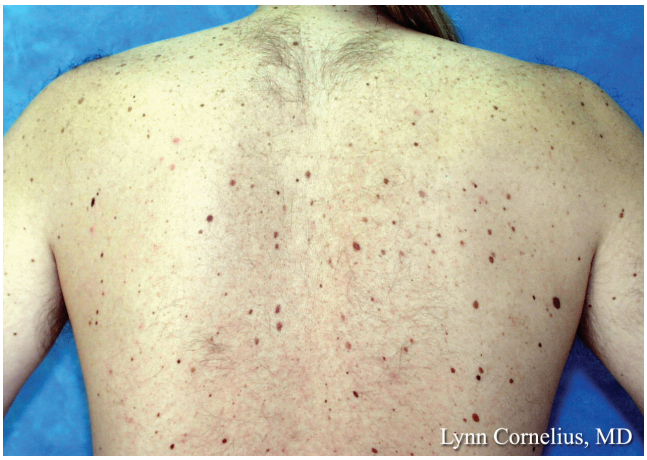
The number one risk factor for melanoma is **change in an existing mole**. Change includes itching, crusting, bleeding, growth in size, or change in shape or color. This risk factor is associated with an estimated relative risk of greater than 400% association with the development of melanoma.[74]

Low (fairer) skin type is another risk factor. Skin types are classified into six levels (Fitzpatrick skin phenotypes) with Skin Type 1 being the most susceptible to skin cancer and Skin Type VI being the least susceptible. This will be further defined when we discuss prevention. People with low phenotype or Skin Type I (**very fair white skin, freckling, white-blond or red hair, blue eyes**) have a higher incidence of skin cancer compared to the general population[75] and tend to burn and freckle easily. **Redheads** are a Skin Type I and they produce a type of melanin (the pigment that colors your skin brown or tan) called *pheo*melanin (pheo is Greek for false) instead of eumelanin (found in greater quantities in Skin Types III and IV). Because of this, redheads never tan, they always freckle and burn. Pheomelanins also produce free radicals which are phototoxic. Conversely, eumelanin scavenges these reactive oxygen species and is photoprotective.[76] White-blonds and redheads have two to four times the incidence of melanoma as the general population.

Conversely, the darker a person's skin, the lower their chance of getting skin cancer. African-Americans and Asians have a much lower incidence of skin cancer than Caucasians, while the rate of skin cancer for Hispanics lies in the intermediate range. This is due to the increased size and number of melanosomes, and thus more protective skin of darker races. Studies have shown that lighter skinned Hispanics[77] and lighter-skinned African-Americans have increased rates of skin cancer. Squamous cell carcinoma is the most prevalent skin cancer in African-Americans, but is usually found on non-sun-exposed areas, whereas in Caucasians, it is found on sun-exposed body parts. Overall, melanoma in Asians, African-Americans, and Hispanics generally presents as the subtype acral lentiginous (found on the soles of the feet, palms of the hands, and nail beds), is often detected late in the course of the disease, and therefore carries a worse prognosis with higher mortality rates.[26, 28] Melanoma in Caucasians is of the superficial spreading subtype about 70% of the time, is detected earlier, and

carries a better prognosis. So, while darker skinned races develop skin cancer at a much lower rate than lighter skinned peoples, when they do get skin cancer, it is typically diagnosed at a later stage and therefore carries a worse prognosis, underscoring the need for sun protection teaching in all races.

Atypical Nevi



Frequency refers to having a large number of nevi on your body. Studies have shown that having a high number of nevi (moles) tends to run in families. Risk factors include both a high number of normal nevi and a certain number of atypical (or dysplastic) nevi.[40-41]

A **family history of skin cancer** is another risk factor. Having a primary relative (parents or sibling) with melanoma increases your risk 8-12 fold for developing the disease.[78]

Ultraviolet radiation exposure under the age of 18 years is a critical risk factor in the development of melanoma.[79-81] Young people spend more time outdoors in long stretches (3-4 hours) during the summer,[82] don't heed sun protective measures, and frequent tanning beds. Research has shown that two additional risk factors in this category are **sunburns under 18 years**[83-84] and **three or more outdoor summer jobs during the teenage years.**[85] While not an immediate health risk factor, Warthan estimated the yearly economic impact of sunburn in the US to be around 10 million dollars due to lost work and treatment costs.[86]

Use of indoor tanning beds has been linked to an increase in all skin cancers.[87-94] Veierod studied over 100,000 Norweigian women followed over eight years and found that women who used a tanning bed only twice a month had a 55% increase in skin cancer.[95] Tanning beds have a very high level of UVA radiation that penetrates deeply into the lower layers of the skin (dermis) and causes wrinkling, loss of collagen, and skin cancer.

Squamous cell skin cancer is the most common cancer in patients who have received solid **organ transplants and immunosuppressive drugs**.[96] Prednisone and cyclosporine (immunosuppressive drugs) are linked to a greater than 50% increase in squamous cell skin cancer risk.[97] Duration and intensity of immunosuppression also increase percentage of risk. In rare cases, patients have developed melanoma after receiving an organ from a donor diagnosed with melanoma.

Environmental risk factors also play a role in skin cancer development. Because of the growing hole in the ozone layer, there is a decreasing amount of atmospheric ozone to filter ultraviolet rays. Therefore, the amount of UVR that reaches the Earth's surface is higher today than 50 years ago. Additional factors like **living at high altitude**[76] (places a person closer to the sun with fewer atmospheres to protect them from UVR) or **low latitude** (places a person closer to the equator and increases the level of direct UVR) can contribute to the development of skin cancer.[9, 98] UVR increases by 8-10% for every 1000 feet increase in elevation.[99-101] This means that at most ski resorts (5000-7000 feet elevation), UVR is increased by 40-70 percent. At the top of the ski mountain (10,000 feet elevation), this number increases to 80-100% over sea level.

Studies on **professional alpine skiers and cylists** have shown the amount of UVB they receive exceeds the international UV exposure limits by 10 and 30 fold, respectively.[101] **High intensity marathon runners** (run > 70 km/week) have been found to have a higher incidence of NMSC and MM due to a lack of protective coverage from clothing, minimal use of sunscreen, extended hours outdoors, and suppressed immune function.[102] **Airline pilots and flight crews** have been shown to have a higher incidence of skin and breast cancer[103-105] with those flying longer flights and for greater than five years having the highest incidence.[106]

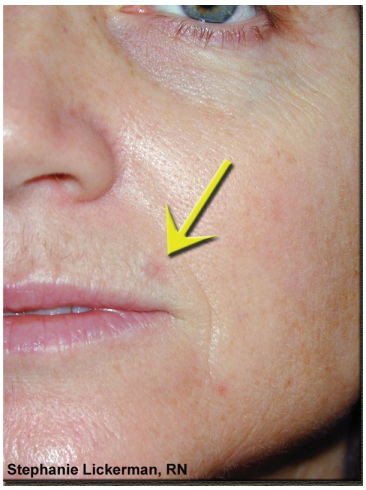
Occupational risk factors include being exposed to large amounts of arsenic (miners, sheep shearers, and farmers), industrial tar, coal, paraffin, soot, radium, and certain types of oil. Exposure to these items may lead to an increased risk of squamous cell skin cancer. Arsenic-contaminated drinking water can also lead to skin malignancies.[107]

Ionizing radiation treatments for other types of cancer can lead to the occurence of basal cell carcinomas (most often) and squamous cell skin cancers primarily in the area irradiated.[108] Young patients who are treated for another cancer with radiation also tend to develop secondary skin cancers at an earlier age.[109]

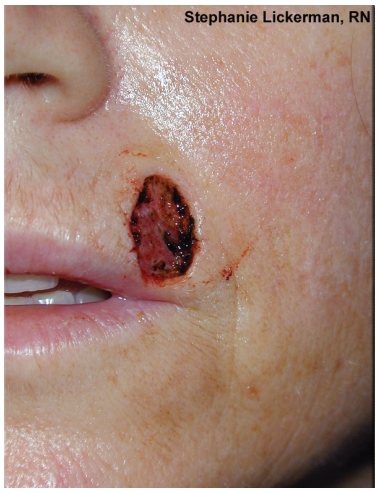
Other diseases such as **systemic lupus erythematous (SLE), rheumatoid arthritis (RA), and human immunodeficiency virus (HIV)** all have increased rates of skin cancer. **Xeroderma pigmentosum and basal cell nevus syndrome** are inherited skin disorders with high rates of skin cancer in affected persons.[110-111]

A final risk factor is **age.** About half of all melanomas occur in persons aged 50 or older with the percentages increasing rapidly after age 39 and affecting men more than women.[112] Sun damage is cumulative. Starting sun protection early in life is vital to preventing skin cancer.

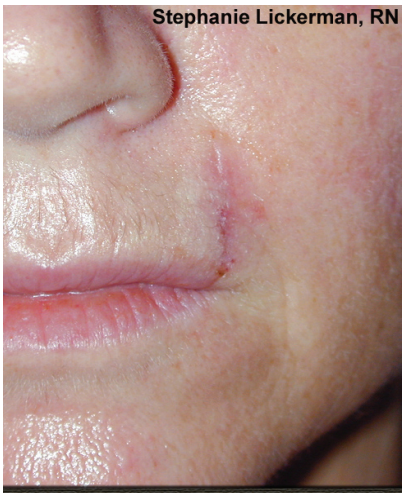
A melanoma risk tool designed by the National Cancer Institute is available for use by health professionals. It is designed for people who have not been diagnosed with skin cancer and is available at www.cancer.gov/melanomarisktool/.



Basal Cell Cancer
Size 0.4 x 0.4 cm



Post-Mohs surgery (4 stages)
Size 1.4 x 1.2 cm



Eight days post-op

Treatment of Non-Melanoma Skin Cancer

Since this program is written for teenagers and is primarily about early detection and prevention, the section on treatment is abbreviated. Treatment of basal and squamous cell skin cancers is based upon extent of disease, location, and subtype. Standard treatments for non-melanoma skin cancer include local excision, Mohs micrographic surgery (high risk areas: face, ears, genital), cryosurgery, laser surgery, and application of topical agents (ie., 5-FU, imiquimod, retinoids). Other treatments include electrodessication and curettage, photodynamic therapy, radiation therapy, and clinical trials. Clinical trials are the use of experimental treatments under the guidance of medical professionals.

Treatment of Cutaneous Malignant Melanoma

Treatment of cutaneous melanoma is primarily based upon the tumor stage. Staging is based on thickness of tumor (Breslow's Criteria) and presence of nodal involvement, distant metastasis, or ulceration. Stages 0-I also use depth of invasion (Clark's Level). Staging is classified as Stages 0-IV (0 = best prognosis, IV = worst prognosis) using the TNM classification system. The TNM (tumor, node, metastasis) classification is further subdivided based on the thickness of the **T**umor and presence of ulceration, how many and what lymph **N**odes are affected, and if the melanoma has **M**etastasized or spread. TNM, clinical, and pathological staging is described in greater detail by the National Cancer Institute at http://www.cancer.gov.

Standard treatments include surgical excision, chemotherapy, immunotherapy, and radiation therapy. Additional treatments include chemoimmunotherapy (a combination of chemotherapy and immunotherapy) and other clinical trials.

Good News, Bad News

The good news is that most skin cancers are 90-95% curable if found and treated early.[59] It is also one of the few cancers you can see with the naked eye, making knowledge of lesion changes (ABC's of melanoma) important. The bad news is that it often grows on the face in **high risk anatomical areas**, including the nose, eyes, mouth, and ears. Primary treatment for skin cancer is to surgically

excise or cut it out. Facial areas often require extensive repairs to restore normal appearance due to high reconstructive needs.

Additionally, basal cell skin cancer tends to have an **iceberg effect.** The iceberg effect occurs because the basal cells are the *basal* or basement layer of the epidermis and can grow extensively in a horizontal direction before they change their surface presentation enough to warrant a trip to the doctor's office. Tissue damage underneath the surface of the skin can be extensive depending on the subtype and the area involved (location).

There are two lessons to be learned here. One is if you do nothing else, protect your head and neck, especially your face. The majority of skin cancers (basal and squamous cell) occur on the head and neck. The second lesson is that it is much easier to prevent than to treat skin cancer. In the next section we will discuss prevention and protection.

Skin Analyzer Machine

The skin analyzer machine is an important component of your teaching. It lends credibility to the program -- seeing is believing. Most teens don't realize how much damage they have already sustained from tanning. Studies using UV photography and scanners have demonstrated that they motivate students to use positive sun protection behaviors.[115-117]

Instructions:
Turn the machine on. Show them the outside and inside (pull back the curtain) of the machine.

Talk with the class teacher. Discuss how she would like to have the students use the machine. Some will have the students form two lines. Others will have the students come up by table, row, or in pairs to maintain some semblance of order in the classroom. One student will look through the view finder on the back of the machine and can see the student inside of the machine. The other student will place their head inside the machine, aligning their chin just above the circular mirror, far enough in so that they can see their face in the mirror, but that it doesn't touch the light bulbs. Once they have viewed their own face or seen another person's face they can switch positions.

Color	What it means
Blue-purple	Hydrated healthy skin
Brown-purple spots (look like freckles)	Sun damaged areas
White	Dead skin, scars, clogged pores, teeth, lint
Yellow or orange	Oily skin, make-up, sunscreen
Red-pink	Dehydrated skin, thin skin

Skin analyzer machine colors and what they represent

Explain what they will see when they place their head in the machine (refer to the below box). Sunscreen and most make-up will block the effects of the machine.

Respect their privacy. Some students will not want others looking through the view finder at their skin. If this is the case, place your hand over the view finder until that student is finished. Other students may not want to use the machine at all. However, we have found that most students are very enthusiastic about using the SAM and remark about how they need to better care for their skin after using the machine.

Be sure to state that this is meant to educate them about their current level of sun damage, not to scare them. If they are upset about how much damage they have, reinforce the need for sun protection, and the methods they can employ to prevent further damage.

Once again, you are not there to diagnose skin lesions. If a student or teacher asks you to look at a spot on their skin, politely explain you are still a student and suggest they visit their physician.

Open Questions & Answers/Next Session Briefing

Open the question and answer session by first thanking the students for listening and participating. Then ask them a question. What was new to them? Was anything confusing? What did they like the most? What made the biggest impression?

If you are presenting a two day program, briefly tell them what will be covered on Day Two: a quick review of the ABC's of melanoma, a video of two teenagers with skin cancer, and a combined lecture/demonstration of sun protective measures (sunscreens, hats, surf shirts, sunglasses, shade), alternatives to tanning (self-tanner and powdered bronzer applications), and other protective measures, followed by open discussion.

Lecture Outline and Script: Day One or Part One

Early Detection

[Non-italicized text is what appears on the slide. *Italicized text are statements that should be made, additional background information, easy ways to explain slide points and tips on getting student participation.*]

- **Slide 1 -- SPOTS Title Slide**

- **Slide 2 -- Who We Are**
  - Students studying in the medical field
  - Interested in teaching you about sun protection *and decreasing your risk of skin cancer*
  - Program: Part 1 -- early detection
    Part 2 -- prevention/protection

    ***We have games, demonstrations, and a skin analyzer for you to experience.*

    ***Explain that this is an easy-going talk and encourage students to ask questions by raising their hands. When astute questions are asked, compliment the student by saying, "That's a good question." This will encourage abstract thinking, question asking, and participation by the students.*

- **Slide 3 -- Myth or Fact? Title Slide for Myth/Fact Game**

  - **Slide 4**
    - Laying out in the sun will clear up my acne and fade scars
    - MYTH!
    - Tanning may improve acne at first, but within hrs, it causes your skin to produce more oil due to its drying effects . . .which makes your skin break out MORE!!
    - It can also cause your scars to stand out against your other skin!
      ***If exposed to UVR, scars on white skin often turn a darker pink or purple. Scars on black or brown skin often keloid or rise up from the skin's surface and turn a lighter color of pink-brown or white.*

  - **Slide 5**
    - 1 out of every 2 new cancers will be a skin cancer
    - FACT!
    - Skin cancer affects more people in the US than ALL other cancers combined[1,2]

- **Slide 6**
  - Won't a "healthy" tan protect my skin?
  - MYTH!
  - A tan: is your skin's defensive reaction to radiation
    -means that your skin has been damaged and is trying to protect itself with melanin (*the pigment that turns you brown)*
    -is limited based on the color of your skin, hair and eyes (lighter=less protected)

- **Slide 7**
  - You develop a skin rash shortly after visiting a tanning salon. You most likely have:
    A. AIDS
    B. Herpes
    C. A rash from the cleaning chemicals
    D. An STI
    E. None of the above
  - C. You cannot catch AIDS, herpes or sexually transmitted infections (STI) from tanning beds. Most rashes are from the cleansers used to clean the acrylic bed surface or your skin's reactions to the high dose of UVR combined with acne medications.

    ***Antibiotics, non-steroidal anti-inflammatory drugs (Advil), birth control pills, acne meds (adapalene, isotretinoin, salicylic acid, benzyol peroxide), antidepressants, oral antidiabetics, tranquilizers, diuretics and antiarrhythmics can cause photosenstivity, skin rashes, hyperpigmentation, and other reactions when exposed to UVR.*[3]

- **Slide 8**
  - Tanning beds can give off radiation up to 10-15X the noon day sun[4,5,6,7]
  - FACT!

- **Slide 9**
  - Getting a base tan will prevent a person from getting a sunburn.
  - MYTH!
  - A base tan is = SPF of 2 for a Skin Type 2 [8,9]
    ***Most Caucasians in the room will fall under the Skin Type 2-3 category. Darker skin types (types 4-6) will have a slightly higher protection with a base tan, but the bottom line is that a tan reflects damage to the skin and does little to protect you from further damage.*

- **Slide 10**
  - Indoor tanning is safer because I spend less time in the sun.
  - MYTH!
  - Tanning bed lightbulbs emit a radiation (UVA) that penetrates deeper into the skin and does not give a warning sign of too much UVR -- a sunburn! [10,11]
    ***The difference between UVA and UVB wavelengths are explained in further detail later.*

- **Slide 11**
  - If caught early, skin cancer is 90-95% curable!
  - FACT!
  - That's why it is important to learn the ABC's of melanoma
    ***Knowing what to look for in a changing lesion allows for earlier detection and treatment, and thus a better prognosis.*[12,13]

- **Slide 12**
  - Wearing a white T-shirt in the pool is a good way to protect yourself from the sun.
  - MYTH!
  - White T-shirt SPF: Dry = 7; Wet = 2
    ***The weight of the water stretches the fabric and allows the pore space to increase plus the water magnifies the sunlight, thus letting in more UVR.*[14]

- **Slide 13**
  - If I apply sunscreen once I can stay at the pool/beach all day.
  - MYTH!
  - There is no such thing as an all-day or 8 hour sunscreen even if the bottle says so. You must reapply sunscreen every 2 hours. Wear a hat and sunglasses, seek shade.[51]
    ***Most sunscreens begin to photodegrade when exposed to sunlight. They are not made to last longer than about two hours outdoors.*

- **Slide 14**
  - You should wear sunscreen in the winter and on cloudy days.
  - FACT!
  - 32% UVR still reaches earth
    UVA is present all year long and can penetrate clouds and glass.[15]

- **Slide 15**
  - In order for sunlight to cause skin cancer you must get a sunburn.
  - MYTH!
  - Exposure to ultraviolet radiation causes changes in the skin's DNA which can lead to cancer.[16-18] A sunburn isn't required to start those changes, but the more burns you have (especially under 18 years), the greater your chances of developing skin cancer.[19-22]
    ***Sunburns acquired under age 18 pose an added risk.*

- **Slide 16**
  - If you put on a sunscreen with an SPF of 15 and another one with an SPF of 30, you'll have an SPF of 45.
  - MYTH!
  - The highest SPF you apply is the highest SPF you get. In this case, SPF 30.

- **Slide 17 -- Why We Are Here - Title Slide - "Skin Cancer Statistics"**

  - **Slide 18**
    - Lifetime prevalence of melanoma
      - 1935: 1/1500 people
      - 1960: 1/800 people
      - 1980: 1/250 people
      - 2002: 1/67 people
      - 2010: predicted to be 1/50[23]
      - Increasing by 3-4% every year[24]
      - This is over a 2000% increase in less than 70 years

  - **Slide 19**
    In the US, 1 out of 5 people have skin cancer. *In the US, 1 out of every 3 Caucasians have skin cancer.*
    Incidence of skin cancer surpasses all other cancers
    Melanoma is the
    - Most rapidly increasing cancer in US young people[25-30]
    - Tanning bed use before age 35 increases melanoma risk *by* 75%[58]

    ***Ask them how many of them have relatives with skin cancer? How many of their moms have had a skin cancer removed?*

  - **Slide 20**
    - 90-95% of all skin cancers are curable if recognized and treated early
    - It's one of the few cancers you can see
    - Early detection and prevention is the key!

- **Slide 21 -- Early Detection - Title Slide**

- **Slide 22 -- What is Skin Cancer?**
    - It is a growth of skin cells that divides abnormally.
    - *State: Skin is composed of two layers: epidermis (top layer) and dermis (bottom layer).*
    - 3 types of cells mutate (basal, squamous, melanocytes). *Epidermis contains the three cells that most commonly change into skin cancer.* [31]
    - Epidermis is only 0.1mm thick = *thickness of a piece of notebook paper*[31.32]
    ***Ask them how thick they think the top protective layer of their skin is. Then place a piece of notebook paper flat on your forearm and show them.*

    ***Paint a picture for them. Ask them to think about a cancer that is not very large, that has grown through the top layer of thin skin and down into the second layer of skin. Then briefly explain to them that the dermis is where the bloodstream and lymphatic channels are located; these are the highways to other areas of the body. Have them*

postulate on how skin cancer can spread or metastasize from the skin to the brain, lungs, GI tract.

- **Slide 23 -- What Causes It?**
  - UVR penetrates the skin, enters the skin cell and damages the nucleus. It turns off protective mechanisms and turns on damaging ones. This allows the spot's cells to grow out of control and form a skin cancer.

  - Exposure to 1) ultraviolet radiation (UVR) = sunlight and indoor tanning
    2) heredity

  - *Say: Heredity = genes you get from both parents*
    - *For example, you are made of half of your mom's genes and half of your dad's genes so if your parents have high blood pressure or heart disease, you have a greater chance of having these conditions. The same is true for skin cancer. Heredity is a factor in skin cancer development, not necessarily a cause.*

    ***If you are teaching a more advanced science class, they may want more information. A concise answer is that there are many genetic factors we are still researching but we do know that two genes mutate in familial melanoma: CDKN2A and CDK4. CDKN2A is a tumor suppressor gene that prevents cells from becoming cancerous. In melanoma it is inactivated. CDK4 is a proto-oncogene which when mutated becomes an oncogene, a gene that causes cancer.*[33,34]

- **Slide 24 -- What Does It Look Like?**

  Warning Signs
  - 3 types of skin cancer
    - Basal cell carcinoma
    - Squamous cell carcinoma
    - Melanoma -- ABC's

    ***This is an introductory slide. State these are the 3 most common types of skin cancer and you will now review the visual warning signs.*

  - **Slide 25**
    - Basal Cell Skin Cancer Warning Signs
      - Doesn't look like a cancer
      - Most common skin cancer
      - 33% off all cancers are basal cell skin cancers
      - Tends to grow slowly
      - Found on sun-exposed areas

  - **Slide 26**
    - Basal Cell Skin Cancer Warning Signs
      - Many young women have mistaken their basal cell skin cancer for a pimple
      - Any pimples that persist for longer than 3-4 weeks should be seen by a doctor

***Many young women seek medical help because they have a "pimple that doesn't heal" for a long period of time. Additionally, in this age group (teen), sores that don't heal are more likely to be due to an infection than skin cancer especially with the rising incidence of methicillin-resistant staph aureus (MRSA) among young athletes.*

- **Slide 27**
  - Basal Cell Skin Cancer Warning Signs
    - A reddish patch that can be slightly raised, scaly and itchy

- **Slide 28**
  - Basal Cell Skin Cancer Warning Signs
    - A shiny bump that is pearly in appearance

    ***Explain that the purple or black rings around the lesions are from a marking pen to delineate the spots that necessitate further review; they are not part of the skin cancer.*

- **Slide 29**
  - Basal Cell Skin Cancer Warning Signs
    - A pink bump with an elevated rolled border and a depressed center

- **Slide 30**
  - Basal Cell Skin Cancer Warning Signs
    - A scar-like area with poorly defined borders

    ***This is an infiltrative basal cell carcinoma. These tend to be locally aggressive and recurrence rates are high. Any scar-like area that develops where there has been no injury or trauma should be examined by a physician.*

- **Slide 31**
  - Basal Cell Skin Cancer Warning Signs
    - A pink bump with small red blood vessels (telangiectasias) on the surface

- **Slide 32**
  - Basal Cell Skin Cancer Warning Signs
    - A persistent non-healing sore

    ***This is the "universal" sign of skin cancer and it should be stressed that if they remember nothing else, to remember this one warning sign.*

    ***Once again, note the purple markings from a pen.*

- **Slide 33**
  - **Squamous Cell Skin Cancer Warning Signs**
    - Tends to grow more rapidly than basal cell skin cancer
    - Looks more like a cancer (ugly, stands out)
    - Raised and tender to touch
    - Sometimes confused for a wart especially if on hands
    - Found on sun-exposed areas
    - Many of these warning signs are very similar to basal cell skin cancer

- **Slide 34**
  - Squamous Cell Skin Cancer Warning Signs
    - Scaly red patches that are tender, itch or bleed

- **Slide 35**
  - Squamous Cell Skin Cancer Warning Signs
    - Open sores that do not heal within 3-4 weeks

- **Slide 36**
  - Squamous Cell Skin Cancer Warning Signs
    - Wart-like growths that appear raw, red and bleed

    ***Many students in this age group have had or will have warts. You need to explain how warts are different from skin cancer. Warts usually don't bleed and tend to look like a callous (white and hardened skin). Warts commonly form in groups of more than one. However, they can grow singularly. Warts occur more often on the palmar surfaces of the hands and fingers, and on the soles of the feet. Squamous cell skin cancer looks like a heavily crusted sore, tends to bleed, grows singularly, and occurs more often on the backs of hands, not the palms. It is also most common on the face and neck.*

- **Slide 37**
  - Squamous Cell Skin Cancer Warning Signs
    - Elevated growth with a central depression that may crust and bleed

- **Slide 38**
  - Squamous Cell Skin Cancer Warning Signs
    - Sores within old scars

- **Slide 39**
  - **Melanoma Warning Signs**
    - Found on sun-exposed and non-sun-exposed areas
    - 74% of skin cancer deaths are melanomas[35,36]
    - ABC Method -- *There is a mnemonic called "the ABC's of melanoma" that teaches us what changes to look for in melanoma skin cancers.*
    - Normal v Abnormal Spot -- *Each slide will have a normal spot and an abnormal spot to show you the difference in the ABC we are discussing.*

- **Slide 40**
  - A stands for asymmetry

    ***Ask if anyone can tell you what asymmetry means.*
  - A 1/2 does not equal other 1/2 in size or shape
    - *If you draw a line down the center of the spot, and one-half does not equal the other half in size or shape, it is abnormal.*

- **Slide 41**
  - B stands for border
    - *Border is the edge or the circumference of the spot.*

***Draw a ring around the abnormal spot with your finger or a laser pointer. Students this age often confuse circumference with diameter, so it is best to begin the visual explanation here, as diameter will be coming in two slides.*

- Edges are irregular, scalloped, not round
  - *An abnormal border is one that is scalloped like a seashell, notched, or irregular, not round like full moon.*

- **Slide 42**
  - C stands for color
  - More than 1 color. Presence of blue, red, black, gray, white

    ***Ask the students to look at their arms and tell you the color of their spots. Most will say, "brown." Tell them this is a normal color. Redheads will have reddish-brown spots, brunettes will have tan to brown spots, and darker races will have dark brown spots.*
    - *Now tell them that two shades of brown in one spot or the colors white, gray, red, blue-black or black are abnormal.*

- **Slide 43**
  - D stands for diameter
  - >size of pencil eraser (6mm)
    - *Circumference is the border around the spot, diameter is the line across the center of the spot.*
    - *An abnormal diameter is greater than 6 mm (one-fourth inch) or the size of a pencil eraser.*

      ***Take out a pencil with an eraser tip and place the eraser on a spot that you have on your arm. A spot that is the size of the eraser or larger should be checked out. This will demonstrate the easiest way to measure an abnormal spot.*

- **Slide 44**
  - E stands for Evolving/Elevation
  - Change, especially height
    - *Elevation is when the spot becomes very raised or grows vertically.*
    - *Evolving is when the spot changes in any way – size, shape, color.*

    ***Ask the students if a spot is growing vertically on the skin's surface, what is it doing under the surface? Growing deeper. Remind them that the top layer of skin is paper-thin and once the cancer grows into the second skin layer where the blood vessels/lynphatic channels are, it can spread throughout the body. These pictures are of a subtype of melanoma (nodular) that has a rapid vertical growth phase and thus metastasizes more easily and quickly than other subtypes.*

- **Slide 45**
  - Skin Cancer in Blacks, Asians, Hispanics, Native Americans
    - Found on soles of feet, palms of hands, fingers, toes, within nailbeds[37,38]
    - Presentation: brown-black spot with irregular border
    - Diagnosed at a later stage[39] *because they often occur in areas not regularly*

checked; this population is not always educated about the dangers of new or changing skin lesions because skin cancer incidence is low, so they often don't seek medical attention until the lesion is large, unsightly or symptomatic. Additionally, it tends to be a more aggressive subtype (acral lentiginous)[40-42] than the more common superficial spreading melanoma.

- Incidence[40]: Occurs 11X more often in Whites than Blacks/Asians
  Occurs 5-6X more often in Whites than Hispanics

- **Slide 46 -- Who Gets Skin Cancer? Risk Factors -- Title Slide**
  ***Ask the students to tell you what a risk factor is.*
  - *Risk factors are things that increase your chances of getting skin cancer*

  - **Slide 47**
    - #1 risk factor = change in an existing mole
      - Associated with a 400% increased risk[43]
      - Change = grows, bleeds, scabs over, itches, burns, changes color or shape

  - **Slide 48**
    - Fair-skinned, blond hair, blue eyes, redheads especially
    - Redheads have pheo-melanin (pheo=false)
      - Little protection from melanin
      - UVR exposure: leads to *release of* free radicals - may increase cancer risk[44-47]

    ***There are six skin types (Type 1 = light skin, hair and eyes; easily sun damaged. Type 6 = dark skin, hair and eyes; most protected).*

    ***Explain that you will go into more detail on the different skin types when discussing prevention and protection.*

    ***For your information, not the students' (this falls into the "too much information" category for teens) -- There are 2 types of melanin: black eumelanin (mainly Skin Types 3-6, there is some in Skin Types 1-2) and red pheomelanin (redheads). Increased production of pheomelanin is associated with more gene mutations and may add to UVR-induced damage by releasing free radicals upon contact with UVR. Pheomelanin has little or no photoprotective activity. True redheads never tan, they freckle and burn. Eumelanin is photoprotective to a point based on your skin type -- the darker you are, the more natural protection. One study of African-Americans found that the black epidermis had an average SPF of 13.4.[38]*

  - **Slide 49**
    - Lots of spots, especially the upper back *(large number of dark spots or moles on your body)*
    - Entire body -- 100 spots or more > 18 yrs[48, 49]
    - Family history of skin cancer (8-12-fold increase over general population)[50]
      ***This is often seen in young males on the upper back due to sun exposure. High*

numbers of these dark spots or moles tends to run in families.
***Many students think that nevi and moles are different. They picture a mole like the one on a witch's nose – huge and ugly. They may confuse freckles for dark spots or nevi. Explain that moles are not freckles: they are dark and singular spots, usually slightly raised, whereas freckles are lighter, somewhat transparent, and often grouped together. However, freckles are still a sign of sun damage.*

- **Slide 50**
  - Sun exposure under the age of 18 *years*
  - In summer, youth spend 2.5-3 hrs in sun and may receive 3 X the annual UVB *dose* of adults.[26]
  - Estimated that regular sun protection until the age of 18 can reduce skin cancers by up to 78%.[52]

- **Slide 51**
  - 2-6 severe sunburns under the age of 18 years doubles/triples risk of melanoma[19, 20-22]

- **Slide 52**
  - Three or more outdoor jobs in the summer as a teenager[53]
    ***At this point, ask the students WHY so many of these risk factors have to do with those under the age of 18. Answer: young people spend more time outdoors in long stretches[54] don't heed sun protective measures, and frequent indoor tanning salons.*

- **Slide 53**
  - Use of indoor tanning beds
  - Norwegian study, October 2003[55]
    - 106,379 women studied *over 8 years*
    - Used tanning bed twice a month
    - 55% increase in skin cancer

    ***This is a very credible study having been conducted on such a large number of women and spanning eight years. Norway is the "Land of the Midnight Sun," so there is a high use of indoor tanning. Tanning beds use lights that are primarily UVA radiation which penetrates deeper and causes damage that can lead to both skin cancer and aging (wrinkling, discoloration, sagging skin).*

- **Slide 54**
  - 1 Day Program -- show video
  - 2 Day Program -- advance to slide 100

For the one-day 85 minute course:

- End the slide lecture here and show the SPOTS video.
- After the video is completed, show the second part of the slide lecture on Prevention and Protection (Section 6) beginning with Slide 55 (ABC game).

For the two-day 50 minute course:

- On day one, advance the slides in the lecture to #100; show 100-107. Script follows on the next two pages. After Slide 107, have the students use the skin analyzer machine.
- On day two, you will show the second part of the slide lecture on Prevention and Protection (Section 6) beginning with Slide 55 (ABC Game) through Slide 99.

- **Slide 100**
  - There is good news and bad news with skin cancer
  - The Bad News
    - It often has an iceberg effect
    - Grows in high risk anatomical areas

- **Slide 101**
  - Iceberg Effect
  - Often by the time the cancer is visible *(particularly around the eyes, nose, ears)*, it has spread in a larger area under the surface skin
    ***Basal cell skin cancers rarely spread to other sites in the body, but often create considerable tissue damage before they are detected. Mohs surgery is a tissue sparing treatment that removes layers of skin (one level at a time) that are stained and differentiated under the microscope. A map is then drawn, quadranting the lesion site to identify areas of cancerous and normal cells. Only the cancerous sections are then removed. This process is repeated until all tissue samples are normal. Mohs surgery has the highest cure rate (99%) for basal and squamous cell cancers.*[56] *There is controversy over its use in melanoma, but it shows promise for use in lentigo maligna melanomas (in situ melanomas).*[57]

- **Slide 102**
  - High risk anatomical areas
    - Nose, Mouth, Eyes, Ears
    - Most skin cancers appear on the head and neck, may leave a large *surgical* wound *after removal,*and may take several surgeries to reconstruct *facial features like noses, ears, eyes and lips.*
    - Protect Your Face!

- **Slide 103**
  - The Good News
    - If found early, skin cancer is 90-95% curable[56]
    - It's one of the few cancers you can see

  ***That is why it is important to know what to look for in lesion changes like the ABC's of melanoma.*

  For two day course only: *Today we have concentrated on early detection and what to look for in skin cancers. Tomorrow we will talk about prevention or the different methods of sun protection. In a few minutes we are going to use the skin analyzer machine so let's look at what you'll be looking for in the SAM.*

- **Slide 104**
  - Female, age 17 years
    - *Left – a color photograph taken with a standard camera*
    - *Middle – a black and white photo taken with a standard camera*
    - *Right – a photo taken with an ultraviolet camera that illuminates sun damage in the upper layer of the skin*

    ***Note the dark spots across the nose, upper lip, chin and forehead. The UV camera photo shows sun damage in a way we cannot see with the naked eye. Note in the far left photo that you can barely see even a freckle on the girl's face, but in the far right photo there is sun damage (spots) across her nose, under her eyes, on the top of her forehead, and on her chin.*

- **Slide 105**
  - Female, age 64 years
    - *Left – a color photograph taken with a standard camera*
    - *Middle – a standard black and white photo*
    - *Right – a photo taken with an ultraviolet camera that illuminates sun damage in the upper layer of the skin.*

    ***Note the skin damage visible in the far left photo and the increase in spots in the far right photo. Sun damage is cumulative and causes not only skin cancer, but also wrinkles, sagging skin, and pigment discolorations. Many of the signs of aging skin are due to UVR.*

- **Slide 106**
  - Skin Analyzer Machine (SAM)

    ***Explain that this is the machine they will be putting their heads in.*

- **Slide 107**
  - *Normal digital photo (left) and photo using skin analyzer machine (right)*
  - SAM -- What the colors mean

    Blue purple = hydrated skin
    Brown-purple spots (look like freckles) = sun damaged areas
    White = Dead skin, scars, clogged pores, teeth, lint
    Yellow or orange = oily skin, make-up, sunscreen
    Red-pink = dehydrated skin, thin skin

- **Hands On Demonstration with the Skin Analyzer**
  - **Give the following verbal instructions:**

    "The skin analyzer box that we will be using in a few minutes does the same thing as the UV camera in the previous slides. [Open the SAM and pull back the metallic curtains to show them the inside of the SAM as you talk.] *It is a box with a round mirror and several black lights. The light bulbs inside illuminate the skin layer in a way not visible to the naked eye. This shows sun damaged skin."*

    "Place your chin close to, but not on, the bottom mirror and look down at your own face. Do not place your face close to or on the lights. You can wear eyeglasses in the

SAM. There is a slight plastic smell. If you have recently had eye surgery, you should not use the SAM."

"There is a viewing port on the back of the machine through which another student can see the student inside the SAM. If you do not want your classmates viewing your skin, we can place our hand over the viewport."

"This is not meant to scare anyone. This is meant to show you your current level of sun damage and encourage you to use sun protection. Damage you see today can be further prevented and improved if you use preventative methods."

Explain the colors of normal and sun damaged skin. Redheads are the skin type that show the most damage in the SAM. Be cognizent of student's feelings and their privacy.

Ask the teacher how he/she would like to move the students through the SAM. Some teachers will want students to go up in pairs, others will move students by rows or tables.

Be careful of the electric cord. Students also tend to get excited using the SAM and may pull the lid down upon their head by pulling on the drapes that shield the outside light. It is a good idea to put one hand on the top of the SAM holding it at the handle while the students use the machine. This will keep it from being tipped over, pulled off the table due to someone catching the electric cord, and also allow you to cover the viewport if needed.

***Background information on the SAM (for SPOTS teachers only, not teen students)**: The SAM utilizes long-wave UVA light (325 nm) that is emitted from lightbulbs within a curtained box. UV light from the SAM penetrates predominantly in the stratum corneum and the epidermis where melnanin is distributed. Light penetration is up to 2mm and illuminates different areas in various fluorescent colors. Hyperpigmentation (melanin accumulation) appears as dark spots on a background of skin. Normal hydrated skin appears blue, oily skin appears yellow to pink, and dry skin appears purple. Damaged hyperpigmented skin appears as dark "freckles", dead or very dried skin appears white, and heavy make-up or sunscreen will block the effect of the SAM's lights. It is similar to the Wood's Lamp (365 nm) used in dermatology offices to diagnose and treat skin diseases.*[59]

- **While one SPOTS teacher is running the SAM, the other SPOTS teacher can tell the students this begins the short question and answer period.**

***Ask them questions if they don't ask you. This will break the ice and encourage participation. What was new to them? Was anything confusing? What did they like the most (made the biggest impression)? Thank the students for their time and attention. If you're doing a two-day course, then give them a short preview of what will be covered during the next session.*

PROTECTING YOURSELF FROM UV RAYS

- ***WEAR SUNSCREEN!***
- ***STAY OUT OF THE SUN FROM 10am-2pm***
- ***WEAR PROTECTIVE CLOTHING, HAT & SUNGLASSES***
- ***DON'T TAN IN A TANNING BED!***
- ***CHECK YOUR SKIN FOR SPOTS ON A REGULAR BASIS***

SKIN CANCER RESOURCES

Melanoma Hope Network
www.melanomahopenetwork.org
636-532-4298

The Skin Cancer Foundation
www.skincancer.org
1-800-SKIN-490

American Academy of Dermatology
www.aad.org
(866)503-SKIN

CDC EXCITE Program
www.cdc.gov/excite/skincancer/index.htm

American Cancer Society
1-800-ACS-2345
www.cancer.org

NCI/NIH
www.cancer.gov/cancertopics/types/melanoma

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THE DARK SIDE OF TANNING

Things to know about skin cancer and sun protection brought to you by

S.P.O.T.S.

Sun Protection Outreach Teaching by Students

SAINT LOUIS UNIVERSITY

Washington University in St. Louis
School of Medicine

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ALWAYS REMEMBER THAT UNPROTECTED SUN EXPOSURE MAY LEAD TO SKIN CANCER!

INFORMATION ABOUT SKIN CANCER

Three Kinds

1. Basal Cell
2. Squamous Cell
3. Melanoma

Two Causes

1. Exposure to UV radiation
2. Heredity

Risk Factors

1. Change in existing spot
2. Fair Hair/Light Skin
3. Large number of spots
4. Use of tanning beds
5. Relative with skin cancer
6. History of blistering sunburns

THE ABC'S OF MELANOMA

A = ASYMMETRY
Do the two sides of the spot look different?

B = BORDER
Is the outside edge of the spot irregular or bumpy?

C = COLOR
Is the spot red, blue, blue-black, white, or does it have more than one color?

D = DIAMETER
Is the spot larger than 6mm in diameter (the size of a pencil eraser)?

E = EVOLVING
Does the spot grow or change?

A spot with any of the ABC's might be melanoma and should be seen by a doctor!

S.P.O.T.S.

Sun Protection Outreach Teaching by Students

TO REACH SPOTS:
Saint Louis University School of Medicine
SPOTS c/o Dr James Swierkosz
swierkoszje@slu.edu
314-977-9827

Washington University School of Medicine
SPOTS c/o Diane Smith
Office of Student Affairs
Administrative Coordinator
dianesmith@wustl.edu
314-362-8541

SPOTS ABC Game

Instructions

- Align picture cards so they are face up
  - Answers for abnormal cards are on back and should be face up (Note: each abnormal picture has one or more of the ABC's)
  - Normal cards do not have anything written on the back

- Divide the students into two groups
  - If there are more than two instructors, divide the students into as many groups as there are instructors

- The instructor lays out one normal picture and one abnormal picture

- Ask the students which picture is normal and which is abnormal
  - Discuss what looks wrong with the abnormal picture according to the ABC's of melanoma
    - Asymmetry
    - Border
    - Color
    - Diameter
    - Evolving/Elevation
  - Ask them to then pick the most prominent ABC as each abnormal picture has several ABC's

- Turn over the card to see what is the main ABC

- Continue this process until you have gone through all five of the ABC's twice

- The ABC game is also incorporated into the lecture (slides 55-65) allowing the entire class to play together

The SPOTS BINGO Game

Instructions: Give everyone a bingo card. Read the questions below. Students are to cover the appropriate square that matches the correct answer to the question. Squares can be covered (with small pieces of torn notebook paper or pennies) or use a pencil to X out the square. All students should cover "Free Space" at the start of the game. The first one to cover all squares in a row horizontally, vertically, or diagonally, calls "BINGO." The winner's squares should then be discussed verbally with the class and matched for the correct answers.

Questions

Q: What does A stand for in the ABCs of melanoma?
A: Asymmetry

Q: What does B stand for in the ABCs of melanoma?
A: Border

Q: What does C stand for in the ABCs of melanoma?
A: Color

Q: What does D stand for in the ABCs of melanoma?
A: Diameter

Q: What does E stand for in the ABCs of melanoma?
A: Evolving

Q: Which of the three skin cancers is the most fatal?
A: Melanoma

Q: Which of the three skin cancers is the most common?
A: Basal Cell

Q: What fraction of new cancers will be skin cancer?
A: 1/2

Q: Which skin type is at the highest risk for skin cancer?
A: Type 1 (fair skin/blonde or red hair/blue eyes)

Q: Who finds the most skin cancers?
A: Me

Q: About how many blistering sunburns under the age of 18 will increase your risk of skin cancer?
A: 3-6

Q: Using tanning beds is not a risk for skin cancer?
A: False

Q: What is the top layer of skin called?
A: Epidermis

Q: What is the number one risk factor for getting melanoma?
A: Change in an existing mole

Q: If they are caught early, what percentage of skin cancers are curable?
A: 90-95%

Q: The top layer of skin is the same thickness as a _____.
A: Piece of notebook paper

Q: What are the two main factors in the development of skin cancer?
A: Exposure to UV radiation and heredity

Q: An abnormal diameter in a skin cancer spot is generally the size of _____.
A: A pencil eraser

Q: If a person puts on a layer of sunscreen with SPF 20 and another layer of sunscreen with SPF 25, what is their total SPF?
A: SPF 25

Q: Indoor tanning beds use lights that are primarily ultraviolet A radiation which penetrates deeper than ultraviolet B radiation. True or False?
A: True

Q: It is important to protect high risk anatomical areas. Name three such areas on the face.
A: Nose, eyes, mouth

Q: Skin cancer currently affects one out of every 25 Americans. True or False?
A: False

Q: How long should you wait before entering the water after applying sunscreen?
A: 20-30 minutes

Q: How often should sunscreen be reapplied?
A: Every 1-2 hours

Sample SPOTS BINGO Card #1

Note: To make more cards, just shift an answer or two.

B	I	N	G	O
20-30 minutes	False	False	1/2	Nose, eyes mouth
Epidermis	Border	SPF 25	Every 1-2 hours	Type 1
Piece of notebook paper	Color	FREE SPACE	Basal Cell	Evolving
Diameter	A pencil eraser	True	Melanoma	Me
Change in an existing mole	90-95%	UV exposure and heredity	3-6	Asymmetry

The Myth/Fact Game

Instructions: Tell the students you will be reading from a list of myths about skin cancer and a list of facts about skin cancer. You will read out loud a myth or fact and ask them to tell you which one it is and why. Discuss both the correct and incorrect answers.

MYTHS ABOUT SKIN CANCER

1. Indoor tanning beds can help clear up acne and make scars fade.
2. Tanning at an indoor tanning bed is safe.
3. The tanning accelerator lotions that are sold at tanning salons protect people from UV radiation.
4. Children and teenagers cannot get skin cancer.
5. It is recommended to put chemical sunscreens on infants (6 months and younger).
6. African Americans and people who tan very easily don't get skin cancer.
7. Having a healthy tan will protect a person's skin.
8. You don't have to wear sunscreen while you're in the car.
9. People don't need to wear sunscreen in the winter or on cloudy days.
10. If a person wears sunscreen, they can stay in the sun as long as they want.
11. Getting a base tan will prevent a person from getting a sunburn.
12. If a person puts on SPF 20 sunscreen and puts on SPF 25 sunscreen an hour later, they will get a total SPF of 45.
13. Wearing a T-shirt in the pool or beach is a good way to protect yourself from the sun.
14. If a person doesn't get a lot of sun exposure, they won't get enough Vitamin D.
15. In order for sunlight to cause skin cancer, you must get a sunburn.

FACTS ABOUT SKIN CANCER

1. Exposure to UV radiation and heredity are the two main causes of skin cancer.
2. The number one risk factor for melanoma is change in an existing mole or spot.
3. Indoor tanning beds cause wrinkling, sagging, brown spots and skin cancer.
4. One out of every two new cancers will be a skin cancer.
5. Skin cancer affects more people than all other cancers combined.
6. Early sun exposure and blistering sunburns under age 20 increase your risk of skin cancer.
7. One ounce of sunscreen to cover the entire body is the proper amount for a person who is 5'4", 150 pounds, with a waist of 32 inches. Larger adults should use 1-2 ounces. Smaller adults or children should use slightly less than 1 ounce.
8. Rubbing, sweating, and swimming remove sunscreen.
9. People with fair skin, blue eyes, and blonde or red hair are at the highest risk for skin cancer.
10. Five or more blistering sunburns before age 18 is a risk factor for skin cancer.
11. If caught early, most skin cancers are 90-95% curable.
12. You should see a doctor if a mole is asymmetric, has irregular borders, or is changing.
13. If a family member has had skin cancer, you should be especially careful about protecting your own skin.
14. Vitamin D supplementation via foods and a daily multivitamin is a good idea.
15. Sunscreen is only part of a good sun protective program. You should also wear protective clothing, hats, sunglasses and seek shade.

This game is incorporated into the lecture for larger classes.

The Risk Game

Materials

- Laminated cards with behaviors or characteristics (see below). If lamination isn't available, just print out the 8.5" x 11" pages (available on website) and use as is.
- Chalkboard

In this game, students are presented with several behaviors or characteristics that can be categorized from risky to safe.

Instructions

Teachers should go to the board, make four vertical columns and write the four category headings:
Definitely Risky(DR) Probably Risky(PR) Probably Safe(PS) Definitely Safe(DS)

Disperse behavior/characteristic cards among the students. One at a time, have students come to the board and place their cards under the column heading to which they think it belongs. Other students may offer suggestions from their seats. After the class has decided on the placement of each card, share the correct answer and discuss reasons for this choice.

Behavior/characteristic cards (and answers) include the following:

- Having 6 or more blistering sunburns under age 18: DR
- Three or more summers having an outdoor job as a teenager: DR
- Having a noticeably enlarging mole: DR
- Being a fair-skinned, blue-eyed, redhead: DR
- Applying sunscreen once while outside for 4 hours: DR
- Having more than 50 moles on your body under the age of 18: DR
- Using indoor tanning beds: DR
- Going outside at noon without sun protection: DR
- Walking outside in the winter without sunscreen: PR
- Swimming while wearing a t-shirt and no sunscreen: PR
- Wearing a baseball cap in the sun: PR
- Using sunscreen with SPF 30 or higher: PS (depends on reapplication, amount applied, other sun protective methods used, amount of time outdoors, etc.)
- Going outside after 5 PM without sun protection: PS
- Having dark black skin, black hair, black eyes: PS
- Using self tanner (dihydroxyacetone): DS
- Using bronzer makeup: DS
- Wearing wraparound, 100% UV protected sunglasses outside: DS
- Reapplying sunscreen every 1-2 hours: DS

Game idea adapted from STATS risk game

Day/Part Two Background Information for Teaching

Statistics and numbers in the curriculum are taken from the American Cancer Society (ACS), American Academy of Dermatology (AAD), Centers for Disease Control (CDC), Surveillance Epidemiology and End Results (SEER), National Cancer Institute (NCI) and the Skin Cancer Foundation websites, unless otherwise noted.

Day/Part Two – Focus on Prevention/Protection

Review ABC's, Causes, and Risk Factor

One Day Course: Give the worksheet to the teacher -- they can use it for review, a follow-up quiz, or to maintain attention by having their students fill it in during the program lecture.

Two Day Course: Use this time period to ask the students what they remember from the first session. Start by saying you will be reviewing the ABC's of melanoma, the causes of skin cancer, and its associated risk factors. Pass out the Helpful Information about Skin Cancer handout and the SPOTS Worksheet -- have the students fill in the blanks as you read the questions and wait for their answers. Generate discussion by asking who can describe what asymmetry means, who can recite the two causes of skin cancer, etc. Ask how many of the risk factors they have. Make the review interactive, talkative, and personal. If class size is large, use the ABC game in the lecture for review. If class size is small, use the hands-on game cards.

Video - Teens with Melanoma/Demonstration of a Punch Biopsy

Explain to the students they will be viewing a video that includes two teens with melanoma telling their stories and a demonstration of a typical mole removal. When the video is finished, ask if there are any questions.

Interactive Lecture
Teaching with demonstrations

Protecting yourself from ultraviolet radiation (UVR) is the primary modifiable method of preventing skin cancer. Tell the students that on Day One you discussed the early detection of skin cancer – what it is, what causes it, how to identify it and associated risk factors. Today, you will be talking about how they can protect themselves from UVR. While you are introducing yourself, have one student or the teacher pass out the handouts.

Adolescence is a time of establishing independence, identity and social competence.[1] Keep this in mind as you are explaining the topics on the CD slides: stop intermittently and show the students *what* you are teaching them about (various sunscreens, hats, glasses, and clothing). **Make your teaching interactive**. Allow them to smell the sunscreen and have one or two students volunteer to try on different types of sunscreen so they can experience the difference in viscosity, coverage, and feel. Have a student read the label and tell you how many ounces are in that particular bottle of sunscreen. Then point out that a four ounce bottle is only four applications for one person. Next, ask how many of them use the same bottle all summer and how many more share the bottle with family or friends. Ask them what SPF stands for. When explaining the difference between chemical and physical sunscreens, have a student read the active ingredients on the label. Encourage them to ask and answer questions while you are teaching them, but maintain discipline by setting limits such as raising their hands. If you make a student wait until the end of your talk to ask a question, they will often either forget their question or lose interest. Allow them to ask questions as the come up.

Why Teach Teens?

Adolescents are an important group to educate about sun protection because this is the time when lifelong behaviors are developing,[2] early UVR exposure[3, 4] and damage from sunburns are critical,[5-11] and peer pressure is heavy. Additionally, indoor tanning begins and increases throughout the teen years,[12-13] vanity rules,[14] risk taking is high,[2, 15-16] and concern for sun protection is low.[17] Presently, there are few programs in existence in the U.S. for teens.[18-19] Teenagers tend to live in the here and now, weighing current benefits higher than future risks[2] so societal norms and adolescent perceptions of wanting the bronzed look need to be discussed.[20-21] Spend some time talking about the media's effect[22] on how the students *think* they should look. Around the age of 14-15 years, teens change from a low comprehension of understanding later consequences of current behaviors to a fuller comprehension[23] making this a critical time for educational interventions.

Instilling knowledge about skin cancer recognition and protective methods should be coupled with the realization that changing behaviors is a complex entity influenced by many issues. Adolescents are heavily affected by societal influences (having friends who tan, parents who condone and even pay for their tanning, other family members who tan),[14] vanity (they like the tanned look - makes them feel better, healthier, more attractive),[13] the tanning industry's marketing (ads in high school newspapers,[24] ads for free tanning, sponsoring high school events, false information that indoor tanning is safe), and unrealistic messages that they can ignore (stay out of the sun between 10-4 is all day to them).[25] Emphasizing positive alternatives and delineating the negative consequences of tanning on appearance are important techniques to use with teens. Asking questions and generating dialogue takes a bit of practice, so give yourself some credit and relax a little. It also allows you to receive immediate feedback on the students' translation of what you have taught. The idea is to have fun while instilling knowledge.

Lecture Sections

- ## Basic Protective Measures

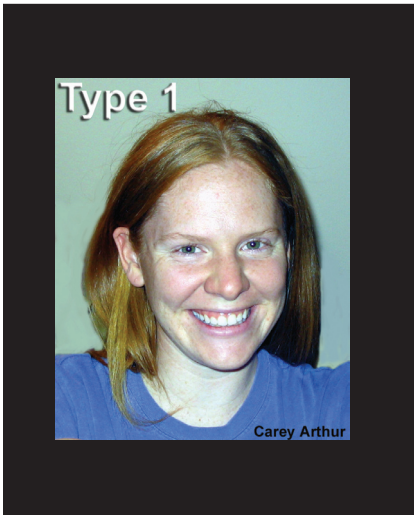
  - ### Know Your Skin Type

    The first thing you should know is your skin type. Skin types (Fitzpatrick Phototypes) are divided into six levels. Skin Type I is the least naturally resistant to sun damage and Skin Type VI is the most resistant. The skin types are based on natural skin color without a tan, natural hair color without dye, and natural eye color without contacts. The skin type table on the following page was developed by Fitzpatrick in the 1970's and adapted from Diffey, Citek, and the Skin Cancer Foundation.[26 -28]

    Two other issues to keep in mind when discussing skin types are: different body areas are more sensitive and prone to burning (face, neck and trunk are 2-4 times more erythemally sensitive than the arms and legs)[29] and horizontal body surfaces (such as the shoulders) receive up to 75% of the ambient UVR whereas vertical surfaces (upper arm) receive only about fifty percent.[26]

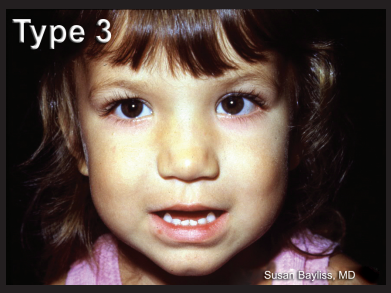
Skin Type	Skin Color (Natural -no tan/ makeup)	Hair Color (Natural - no dye)	Eye Color (Natural - no color contacts)	Tanning Ability
Type I	Very white, freckled	Blond, red	Blue, green	Always burns
Type II	White	Sandy blond, red, brown	Blue, hazel, brown	Usually burns, tans a little
Type III	Medium white	Dark blond to brown	Grey to brown	Sometimes burns, tans gradually
Type IV	Olive to light brown	Brown	Brown	Rarely burns, tans well
Type V	Dark brown	Dark Brown or black	Dark brown	Very rarely burns, tans darkly
Type VI	Dark brown to black	Black	Dark brown	Never burns, tans darkly

Table references [26-28]



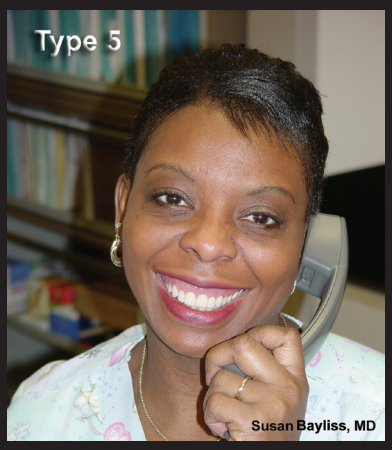
Skin Type I is a person who has natural white blond or red hair, blue or green eyes, and extremely fair white skin that freckles easily. Rather than producing eumelanin, which pigments the skin of most everyone else, they produce pheomelanin. In Greek, *pheo* means false. Because of this, they always burn, never tan, heavily freckle, and are more susceptible to skin cancer. Those of Norwegian or Celtic ancestry fall into this category.

A person with Skin Type II has natural sandy blond to brown hair, green or brown eyes, and fair white skin that usually burns, but occasionally tans. Northern European and Scandanavian ancestry.

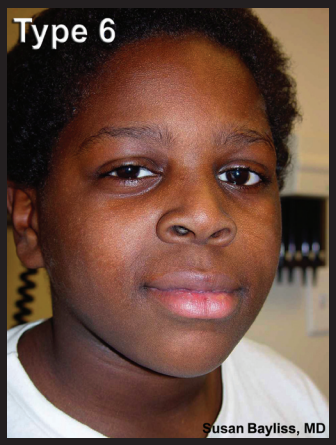


Skin Type III people have dark blond to brown hair, grey to brown eyes, and medium white skin that often tans, but sometimes burns. Average Caucasian, lighter Mediterranean, lighter Asian and lighter Hispanic descent.

Skin Type IV has dark brown hair, brown eyes, and olive to light brown skin that always tans, but rarely burns. Middle Eastern, darker Asian, darker Hispanic, and darker Mediterranean descent.



Skin Type V has dark brown-black hair, brown eyes, and dark brown skin that very rarely burns and tans well. American Indians, darker Middle Eastern, darker Latinos, lighter-skinned African Americans.



Skin Type VI has natural black hair, black eyes, and black-brown skin that never burns and tans darkly because it is so heavily pigmented. African American descent.

People with dark-colored skin are more naturally protected because they have larger, more evenly dispersed melanosomes that filter twice as much UVB as they do in Caucasians. The epidermis of darker-skinned persons also transmits 7.4% of UVB and 17.5% of UVA radiation compared with 24% and 55% in the epidermis of Caucasians.[30] To produce a minimally perceptible erythema, it has been estimated to require a dose of UVR 6-33 times higher in blacks than in whites.[30]

Note: Due to ethnic/racial intermarriage and variability within races it is often difficult to isolate one ethnic background or race into a particular skin type. The previous designations are listed as a generalized reference of skin phototypes.

Several studies have shown that when teenagers and college age students are allowed to choose their own skin type they consistently over estimate their level.[31] For example, people who are actually Types I or II will assess themselves as Types III or IV. Chan found that the lighter the skin color, the greater this discrepancy.[32]

Have the students look at their coloring and tell you what they think is their skin type. Remind them that skin types reflect the response of their skin to UVR in the absence of sunscreen or other protective measures. Some may claim that they are a Type III because they often tan and sometimes burn, but their response to sun exposure without sunscreen indicates they are a Type II.

o Know the Daily Ultraviolet (UV) Index

The daily UV index is an estimated measurement of UV radiation risk calculated using forecasted global ozone levels compared to incoming ground level radiation, forecasted cloud cover and local elevation.[33] Simply put, it is the estimated amount of UV radiation that reaches the earth's surface expressed as a risk scale from zero to 11 with zero being the least amount of UVR and 11 being the greatest.[34] Naturally, it follows that in the summer, the UV index is at its peak and in the winter, it is at its ebb. The UV index can be found online, in the newspaper or on the televised news during the weather section.[35]

Why is this important? If you know your skin type and the UV index, you will have a good idea of how much sun protection you will need on any given day. The higher the UV index, the more sun protection one needs. For example, in the summer months, a Skin Type III (average Caucasian) will burn within 20-30 minutes when outside without protection.[28]

UV Index	Description	Color	Recommended Protection
0-2	Low risk	Green	Minimal protection required for normal activity. Wear sunglasses and sunscreen if outside for 1 hour or more.*
3-5	Moderate risk	Yellow	As above, plus avoid mid-day sun; cover body with clothing and a hat; wear sunscreen if outside for 30 minutes or more.*
6-7	High risk	Orange	As above, plus reduce sun exposure from 11am-4pm
8-10	Very high risk	Red	As above, plus take extra care to avoid sun exposure between 11am and 4pm; unprotected skin burns quickly
11+	Extreme risk	Violet	As above, plus avoid any unnecessary sun exposure. Unprotected skin burns in minutes.

*Wearing sunscreen is recommended every day all year

Ultraviolet Index

○ Wear Sunscreen Daily

For the purposes of this program, we will use the term "sunscreen" to apply to all sunscreens, including sunblocks. Tanning accelerators (lotions applied prior to indoor tanning) are not included in this definition as they rarely contain sunscreen. Sunscreen should be applied daily, all year long, to exposed skin surfaces. In the winter, when your clothing covers most of the exposed skin, make sure you coat your face, neck and hands with sunscreen. Keeping sunscreen near your toothpaste can remind you to apply it every morning. In the summer, sunscreen application is a bigger job.

• Three Types of Ultraviolet Radiation

Ultraviolet radiation is commonly divided into three wavelengths: UVA (320-400nm), UVB (280-320nm),[36] and UVC (100-280nm) radiation. Note: some literature lists the UVB range beginning at 290nm.[36]

○ UVA

Ultraviolet A wavelengths are the longest at 320-400 nanometers (nm). A nanometer equals 0.000001 millimeter or one-millionth of a millimeter. UVA is further divided into: UVA I = 340-400 nm and UVA II = 320-340 nm. These waves penetrate deeper into the skin (dermis layer) than UVB rays, therefore greater numbers of cells may be affected.[37] Nearly 50% of UVA rays reach the dermis.[38] UVA rays can pass through glass (car windows) and

water (clouds, haze), and are responsible for aging skin (loss of elasticity, discolorations, wrinkling, sagging) and skin cancer. UVA is present all year in nearly equal percentages (annual UVA dose is 48% in the summer and 52% the rest of the year).[39]

Ultraviolet A waves are not blocked by the stratosphere so about 20 times the amount of UVA reaches the earth's surface as UVB radiation. Approximately 90-95% of the UV radiation that reaches the earth's surface is in the form of UVA.[40] Remember A for aging.

UVB

Ultraviolet B waves are mostly blocked by the stratosphere, have a wavelength range of 280-320 nm, penetrate only the top layer of skin (epidermis) and are responsible for sunburns, skin cancer, and signs of skin aging. UVB is present in greater quantities in the summer (annual UVB dose is 72% in the summer and 28% in the winter).[39] Approximately 5-10% of the UV radiation that reaches the earth's surface is in the form of UVB. Remember B for burn.

UVC

Ultraviolet C waves are blocked by the stratospheric ozone layer and currently don't reach the earth's surface.[41] This is important because the shorter UV wavelengths (UVC) are actually the most powerful of the UV waves; UVC range is 100-280/290nm.[42]

Type of UV radiation	Wavelength Range	Characteristics
UVA	320-400 nm	Not absorbed by ozone; penetrates deeply into skin; penetrates glass
UVB	280-320 nm	More energy than UVA; partially absorbed by ozone layer; mostly responsible for sunburn
UVC	100-280 nm	Absorbed by ozone layer

UV Rays and Cancer

Studies have shown epidemiological links between UVA and melanoma including multiple DNA aberrations, melanocyte proliferation, and gene expression modifications.[43-45] UVB studies have linked this wavelength to all forms of skin cancer. We have known for a long time of the photoaging and DNA damaging effects of UVB, but more studies are now demonstrating the link between UVA and skin cancer. Many of these studies involve the use of indoor tanning beds, [46] which use lamps that emit primarily UVA radiation.[45, 47]

• How to Choose and Use a Sunscreen

o Check the SPF

▪ Calculating the SPF (UVB rating)

The Sun Protection Factor or SPF is a number on the outside of the sunscreen bottle that describes the percentage of protection provided from UVB radiation only. The SPF (Sun Protection Factor) number is meant to reflect how many minutes you can stay in the sun. The relationship between the SPF and the percentage of UVB radiation absorbed or blocked is given in the following formula:

%UVB absorbed or blocked = [(SPF – 1)/SPF] X 100

For example, for an SPF of 2: [(2-1)/2] x 100 = protection from 50% of the UV rays. Notice that there is not much difference in percentage of protection once you use an SPF of 30. Amount applied and reapplication of sunscreen are paramount.

SPF	Percentage of UVB absorbed or blocked
2	50%
15	93.3%
30	96.7%
45	97.7%
50	98%
70	98.5%

▪ Guideline Number

The SPF can also be used to determine how many minutes you can stay in the sun with that particular sunscreen before you will begin to burn. This relationship is given in the following formula:

Time to burn with sunscreen =
SPF x Time to burn without sunscreen

For example, if you burn in 10 minutes without sunscreen and you apply an SPF of 15, you should be able to multiply 15 (SPF) by 10 (number of minutes until you burn without sunscreen on) and stay in the sun for 150 minutes without burning.[48]

Unfortunately, this doesn't reflect the reality of the situation. For example, a person with skin type 1 can stay in the sun for about 10 minutes without sunscreen before they begin to burn. If that person applies a sunscreen with an SPF of 15, they should be able

to stay in the sun for 150 minutes without burning (10 x 15). However, this equation suggests that a Skin Type I (most susceptible to skin cancer: fair skin, blond/red hair, blue eyes) can stay in the sun for 150 min if using an SPF of 15. That's longer than the 1-2 hours in which sunscreen should be reapplied and greater than the longest lasting sunscreens.

The SPF number is also based on applying at least a full ounce to the average adult body (5'4", 150#, waist 32"),[49] which the rare person does. In addition, the SPF is calculated in labs under solar simulators that use mostly UVB light and little or no UVA light. About 20 times the amount of UVA light reaches the earth's surface as UVB, so natural sunlight has a lot more UVA compared to a laboratory solar simulator that uses mostly UVB light.[50-51] Additionally, solar simulators vary in their range of predicting accurate SPF values.[52] Another study showed there was a difference in the labeled SPF versus the actual SPF[53] which helps to explain why some higher SPF sunscreens often don't protect as well as those with lower sun protection factors.

Most people don't apply enough sunscreen to attain the SPF number on the label. Typical applications run about one-fourth the amount of sunscreen (0.5 mg/cm2) required to achieve the SPF.[54] Putting on one half the appropriate amount of sunscreen decreases the protection not by two-fold but by four-fold.[37] Thus, sunscreen protection does not decrease in a linear fashion.[55-56] Additionally, the different types of sunscreen adhere and apply in different amounts based on their viscosity and spreadability[53] (lotions cover best because they spread easily; sticks are best for small areas – lips, tip of nose, ears but spread poorly due to their wax matrix; gels spread easily and cover well but are full of alcohol and if used on the face burn the eyes so people often put on less; sprays/mists can have less coverage due to the fact that much of it may be lost on other surfaces). Therefore, the SPF is a guideline number, not a failsafe.

- **UVA Ratings of Sunscreen in the United States (U.S.)**

  In the U.S., most sunscreens contain both UVA and UVB protection. However, unlike Europe and Japan, there has been no U.S. rating for the amount of UVA protection on the label. Thus, the percentage of UVA protection can vary widely amongst sunscreens. In August 2007, the FDA proposed a new regulation for UVA labeling and testing.[57] Two tests are conducted. One is an in-vitro test to determine a sunscreen's ability to reduce the amount of UVA radiation that passes through it and the second test is an in-vivo test done on humans to determine a sunscreen's ability to prevent a darkening or tanning of the skin. UVA causes a pigment darkening to occur over several hours. An immediate pigment darkening (IPD) occurs first, followed by a persistent pigment darkening (PPD).

  The combined results of the two tests are then used to classify the UVA protection from "low to highest" using a four star system. One star equals low UVA protection, two stars equals medium, three stars equals high, and four stars equals the highest protection.[57] This UVA star rating will be placed on the label along with the SPF number (UVB rating) in 2008-2009.

- **UV Ratings Outside the US**

In Europe, Australia and South America, most sunscreens have both an SPF number for the UVB protection rating and an IPD (immediate pigment darkening) and PPD (persistent pigment darkening) number for the UVA protection rating. Of these two, the PPD is the better index of sun protection from UVA rays because the color darkening remains stable over time and is reproducible. There is also a method called PFA (Protection Factor A) to determine UVA protection in sunscreens. It is similar to the SPF method, but is for rating UVA rather than UVB.

Japan uses a PA (Protection grade of UVA) system for UVA rating.[56] PA+ offers some UVA protective effect correlating with a PPD of 2-4, PA++ offers moderate UVA protection correlating with a PPD of 4-8, and PA+++ offers good UVA protection correlating with a PPD of 8+.

Most of Europe and the United Kingdom uses the Boots PLC Star UVA/UVB radiation coefficient. This is a number ranging from 0 to 0.9+. It is a ratio of the mean UVA absorption to the mean UVB absorption. This coefficient number is then translated into a star rating system with 1 star equaling minimal UVA protection and 5 signifying UVA protection of at least 90% of the UVB protection.[58]

Boots (UK) UVA Rating System		
1 star	> 0.2	Minimal protection from UVA
2 stars	> 0.4	Moderate protection from UVA
3 stars	> 0.6	Good protection
4 stars	> 0.8	Superior protection
5 stars	> 0.9	Maximum protection

Table reference[167]

Check the Ingredients

Sun-protective lotions are commonly divided into two categories: chemical "sunscreens" and physical "sunblocks."

- **Chemical Sunscreens**

Sunscreens contain active ingredients like octyl salicylate, octyl methoxycinnamate, octyl dimethyl paba, octocrylene, oxybenzone, avobenzone (Parsol 1789), and others. These are all chemical sunscreens that work by absorbing the UV rays. They are clear in color and cosmetically attractive. However, they take 20-30 minutes to bind with the skin cells and therefore must be applied in advance before going outside or entering the water.

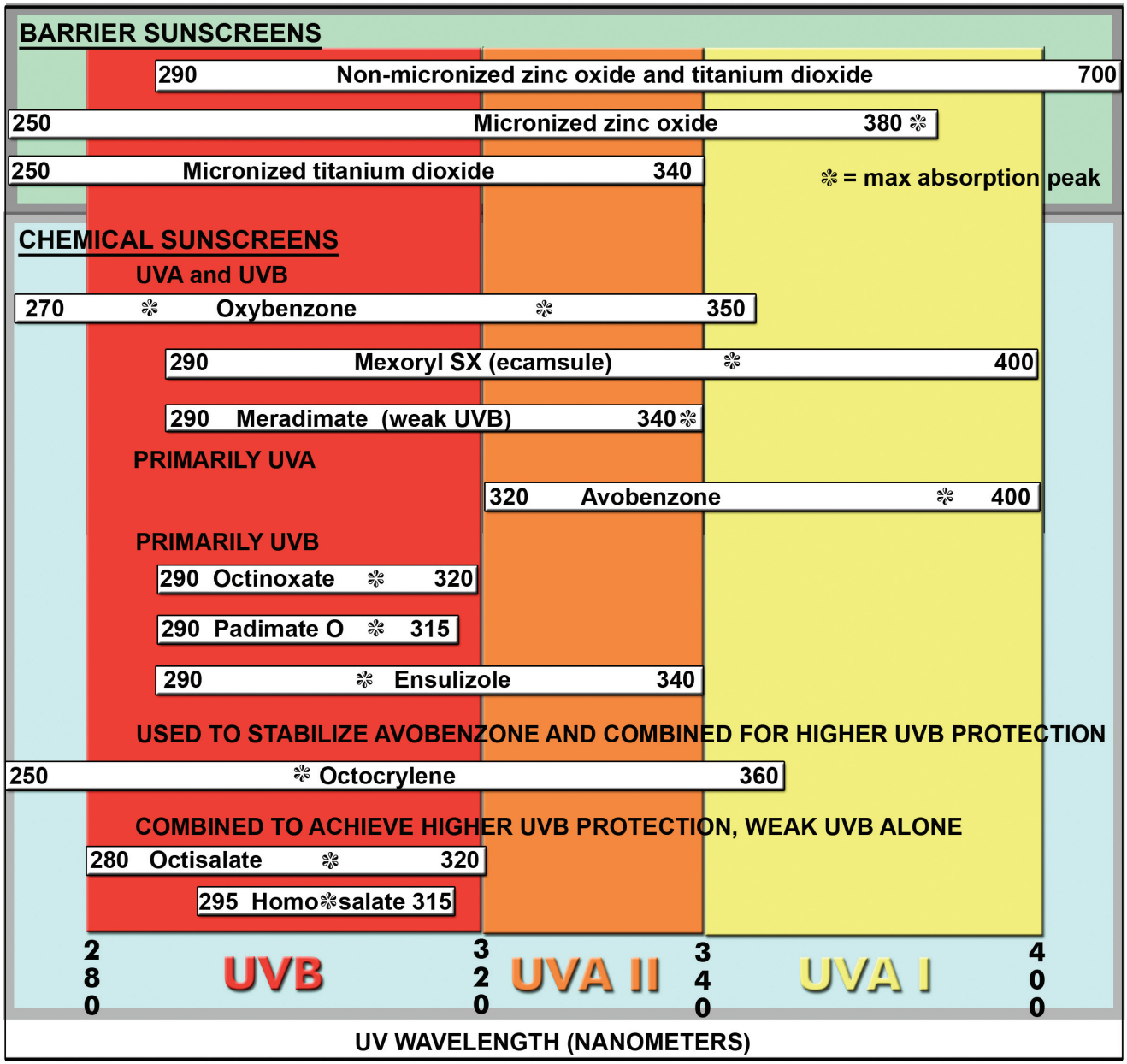


Table references [59-62]

- **Physical Sunscreens**

  Zinc oxide and titanium dioxide are physical sunblocks that reflect/absorb sunlight by forming a physical barrier (block) to the skin. They are the heavier "white stuff" and thus may not be as cosmetically attractive when applied. However, most of the zinc oxides and titanium dioxides are now micronized, allowing them to blend into your skin color more naturally. The physical blocks cause less skin/allergic reactions and therefore are more suitable for children, sensitive skin, people on photosensitizing medications, patients with photodermatoses (polymorphous light eruption being the most common)[63] and patients post-cosmetic surgery (laser, chemical peels, and dermabrasion). Sunscreens that contain only physical sunblockers (zinc oxide, titanium dioxide)

are called sunblocks or barrier blocks by many dermatologists and plastic surgeons. Physical sunblocks can be applied while outdoors as their protection is immediate. Note, however, that most sunscreens are a combination of both chemical and physical sunscreens[64] so they should be applied 20-30 minutes before sun exposure. Finally, since no current sunscreen totally blocks all UVR, the use of the term "sunscreen" is preferred over "sunblock."

An Easy Way to Remember What Covers What		
Ultraviolet light	**Abbreviation**	**Chemical names**
UVA	"-zones"	Avobenzone, oxybenzone, mexoryl
UVB	"-ates"	Cinnamates, salicylates, padimate-O
UVA and UVB	"-xides"	Zinc oxide, titanium dioxide

- **Sensitive Skin**

  Some skin [very fair skin; sensitive skin; skin after facial treatments (laser treatments, chemical peels); skin on medications (ie: antibiotics)] may react to the chemicals in sunscreen either with or without exposure to ultraviolet radiation. If this happens, try a different sunscreen as the chemical combinations vary. For example, use a straight physical sunscreen with zinc oxide or titanium dioxide only or use a sunscreen without PABA and benzophenones. Additionally, you should check the expiration date as expired sunscreen may have degraded ingredients which can irritate the skin. Any sunscreen that smells rancid or has changed color should not be used.

- **Medications That React with UVR**

  After exposure to UVR, many common medications can cause a skin reaction (sunburn, rash, itching, scaling, swelling or irritation). The combination of UVR (especially from indoor tanning)[65] and these medications leads to a photoallergy or photosensitization that can be systemic or localized. Medications include antihistamines, coal tar derivatives (dandruff shampoos), birth control pills, hormone replacement therapy, non-steroidal anti-inflammatory drugs (ibuprofen), tranquilizers, sulfa drugs, oral medications for diabetics, antibiotics (cyclines), antidepressants, antiarrhythmics, antihypertensives, diuretics, antineoplastics, and acne treatments (isotretinoin, salicylic acid).[65] Skin areas covered by tattoos are more photosensitive due to the cadmium sulfide, so many tanning salons sell stick-on cover-ups.

- **UV Spectrum Coverage**

  The barrier blocks, zinc oxide and titanium dioxide, in non-micronized form cover the UVB, UVA, and part of the visible light spectrum. In micronized form (more cosmetically attractive, less visible) they cover the UVB and most of the UVA spectrum. The chemical sunscreens cover either the UVB spectrum (cinnamates, salicylates,

padimate-O, benzophenones), the UVA spectrum (photostabilized avobenzone), the UVA and part of the UVB spectrum (ecamsule), or the UVB and UVA II spectrum (octocrylene, phenylbenzimidazole). As a single sunscreen agent, zinc oxide provides the greatest protective coverage, the lowest allergic reactivity, and the highest safety record.

- **Photostabilization**

  Photostabilized avobenzone and ecamsule (Mexoryl) are currently the best methods of UVA protection in *chemical* sunscreens in the U.S.[62] Avobenzone 2% is photostabilized in the U.S. by the addition of 1% octocrylene. Avobenzone's photoprotective capacity decreases by 50-60% after exposure to sunlight for one hour and increases the degradation of octyl methoxycinnamate.[61] Octinoxate or octyl methoxycinnamate (OMC) is also not photostable, but does not degrade as quickly as avobenzone and is often combined with zinc oxide. The addition of OMC to avobenzone, however, causes both to more rapidly deteriorate. This negative synergistic effect can cause some sunscreens with a higher SPF to allow more burning than those with a lower SPF. Polymorphous light eruption and solar uticaria are two common reactions to UVR, especially UVA, that can be decreased by use of a stabilized UVA sunscreen.[66]

- **Broad Spectrum**

  In the U.S., the FDA has allowed a sunscreen to be labeled “broad spectrum” if it covers the UVB wavelength and part of the UVA wavelength spectrums.[67] In comparison, the Australian standard requires a UVA transmission of less than 10% in the 320-360 nm wavelengths (UVA II). Due to these differences, there are sunscreens that block more UVA being used in Europe, Australia, and Japan under the names Tinosorb, Uvinul, and Neo-Heliopan. There are also U.S. sunscreens that have minimal UVA protection being labeled as broad spectrum.

  In August 2007, the FDA proposed an amendment to the final monograph governing sunscreen labeling. This amendment will have a specific rating for both UVB and UVA protection[67] rather than relying on the term "broad spectrum." In the U.S., combinations of UVA sunscreens are being developed that offer a higher level of protection by combining avobenzone (Helioplex is a combination of avobenzone and oxybenzone), benzophenones, mexoryl, zinc oxide and titanium dioxide with other sunscreens and stabilizers that allow for better UVA coverage. Ecamsule, the newest UVA sunscreen, was approved for use in the United States by the FDA in August 2006.

  It should be noted that using a sunscreen with a high level of UVB protection, but little UVA protection can falsely lead a person to believe they are protected as they will not experience the erythema associated with a UVB burn, but will sustain the DNA damage associated with UVA exposure.[68-69]

- **Safety**

  Generally, most sunscreens have a good in vivo safety profile. However, there are some precautions of which to be aware. Benzophenones, specifically oxybenzone, have been

shown to penetrate the skin, be absorbed systemically and excreted in human urine. Benzophenones as a class also have one of the highest skin irritation rates. Oxybenzone (benzophenone-3) has been found to cause skin allergy, especially after exposure to UVR.[70] Micronized titanium dioxide has been shown to generate free radicals and cause damage within in vitro cell tissue in the presence of sunlight. However, current research shows, that unless the skin is breached, titanium dioxide is not absorbed systemically and dermal penetration appears to be confined to the outermost surface of the stratum corneum.[71-72] PABA has a high rate of adverse skin reactions and stains clothing. It is rarely found in today's sunscreens. Padimate O was developed in response to this, but use of this sunscreen class has declined due to the issues with the old formulation of PABA.[59]

Many of the studies of sunscreens' estrogen effects are in vitro screening assays, not in vivo results, and are suggestive of only weak activity. Oxybenzone and octylmethylcinnamate have demonstrated estrogen-like effects. Oxybenzone has been shown to be metabolized rapidly and has a favorable toxicity profile based on repeated rodent exposure studies. It also is found in nearly 60% of all US sunscreens making it one of the most common.[71] The benefit of using sunscreen and reducing skin cancer rates needs to be weighed over possible safety risks that have thus far not warranted non-use or removal of a sunscreen from the market. However, long term studies need to be done, and until then, if a patient has breast cancer or a child reacts to a sunscreen, it may be prudent to examine the ingredients and switch to a sunscreen with different ingredients.

Several studies have shown that using a combination insect repellent (N,N-diethyl-meta-toluamide or DEET) and sunscreen or using them concommitantly will increase the repellent and the sunscreen (benzophenones) absorption, and skin penetration,[73] and decrease the SPF.[50, 74] Plus, due to the need to reapply sunscreens more often than repellents, if using a combination, this will result in a higher dose of DEET than recommended.[75] Because higher concentrations of DEET, especially in children, have been associated with eye and skin irritations, headaches, irritability, and seizures, the American Academy of Pediatrics recommends using repellants with less than 10-15% concentrations of DEET.[76] It may be best to apply repellent and sunscreen separately.

Choose a Type (Vehicle)

All sunscreens are mixed with a vehicle that transports the sun protective agent to the skin. These vehicles (lotions, oils, gels, sprays, mists, sticks, powders) have advantages and disadvantages.

- **Lotions and Creams**

  The majority of sunscreens come in lotion form. Lotions and creams spread easily on the skin and therefore offer good, even coverage you can see on the skin. They also come in a variety of smells (baby powder, fruit, coconut, etc.) from which to choose. Some may find them heavy to use on the face (especially water resistant types) or too greasy to apply near clothing or hair. They can also feel hot on a warm day and may be hard to apply or reapply when at the beach due to sand adherence to the skin.

Type	Pros	Cons
Lotions	▪Spread easily ▪Good coverage/Can see coverage ▪Vehicle of most sunscreens ▪Assortment of smells	▪May feel heavy or greasy ▪May feel hot ▪Hard to reapply on beach (sand)
Sport or Dry	▪No oily film, dry to touch ▪Less runny with sweating ▪Often oil-free/non-comedogenic	▪May have higher alcohol content ▪May be more easily removed
Gels	▪Apply easily (hairy surfaces) ▪No greasy film/Dries quickly ▪Cologne-like smell	▪Higher alcohol content ▪May burn sores, cuts or pimples ▪Caution using on face or babies
Sprays	▪Hard to reach areas (back, legs)	▪Machine-gun spray pattern – messy ▪Uneven coverage/Still have to spread ▪Sunscreen lost to air ▪Less thick than lotions
Mists	▪Easy to use/Easy to apply ▪No film, dry to touch, cooling ▪Don't have to spread or rub in ▪Hard to reach areas- back, legs, scalp	▪Hard to see coverage ▪Spotty coverage (windy, focused spray) ▪Sunscreen lost to air ▪Don't inhale
Sticks	▪Heavy coverage ▪Good for nose, lips, ears, sm. areas ▪Stick trick for outdoor sports	▪Wax matrix – hard to spread ▪Uneven coverage over large areas ▪Melts in sun
Mineral Powder	▪Light weight, easy to apply ▪Comes in a variety of skin colors	▪Can clog pores ▪If skin dry, residue may show

Sunscreen Type (Vehicle) Table (modified from [77])

- **Sport Formulations**
  Oil-free and sport formulations are more cosmetically suitable (don't leave an oily film, feel dry to the touch), but may be removed more easily by the salt in the ocean water and the chlorine in the pool water. They tend to be less runny with sweating and often come in non-comedogenic formulations which are good for teens' acne-prone skin. However, sport formulations often have a higher alcohol content so they may be more drying to the skin. Dry touch formulations dry to a powder finish, not tacky. No matter what the bottle claims, they do not last eight hours.

- **Gels**
  Gels are made with a high percentage of alcohol and thus apply quickly over large surfaces (especially hairy skin), leave less residue, and dry quickly. Additionally, they

often smell like cologne, so young males tend to like wearing gels. However, because of the alcohol, if you apply the gel to your face it can burn your eyes and sting any open areas like sores, cuts, rashes or pimples. Since these may run into the eyes or nose with sweating, alcohol-based gels are generally not suitable for young children to use on their face. They also may be drying to the skin, especially the face and hands.

- **Sprays/Mists**
  Sprays tend to spray out of the bottle in a shotgun fashion leaving a glob of sunscreen and small scattered spots that may hit clothing, the floor, and everywhere. They do not cover evenly, tend to be messy, and a portion is lost to your surroundings (in the air, on the ground, on your clothes) making them more costly. Since they have to traverse a pump to be used, the composition also tends to be more watery than lotions. Also, sprays still need to be rubbed in.[78] However, they can be used for hard to reach areas (back, back of legs).

  Mists are good for difficult to reach areas like the back, the back of legs, and areas of sparse hair like a balding scalp or part line. They are also very easy to apply and reapply, but because of their clear color it is difficult to tell what skin you have covered with the sunscreen and what you have missed. Windy weather increases the amount of skin not covered as does the focused spray of the mist sunscreens. Also, some of the misted sunscreen is lost to the air and on surroundings instead of reaching the skin. This can make them slightly more expensive, but their ease of use is a great advantage. They leave no film, rapidly dry to the touch and are cooling in a hot climate.

  Typically, mist sunscreens contain alcohol so they should be sprayed on your hand and then rubbed on your face to avoid burning your eyes and nose.[79] Although, one study found that alcohol-based mists were the favorite sunscreen vehicle for facial application.[80] Additionally, there are no current studies on what inhaling misted sunscreen does to your lungs and body. When using mist sunscreens, instruct students to hold their breath, spray on the sunscreen, and then walk out of the sunscreen cloud to prevent inhalation. This is to keep it from getting in the eyes, nose and/or mouth. For the environmentally conscious, mist sunscreens use a bag-and-valve technology (air pressure pushes the mist out) not an ozone-depleting aerosol.

- **Sticks**
  Sticks are made of a wax matrix (like crayons) and therefore do not spread easily over large surface areas or evenly until very warm, at which point they melt. They are best for small areas that require a heavy coating like the lips, nose and ears. Sticks are also good to use around the eyes as they don't run and can prevent other sunscreens from running into your eyes when you sweat. A tip for athletes: take the stick sunscreen, and draw a circle around each eye, going over the eyebrow and under the eye. The eyebrow is a ridge with hair that is anatomically made to protect your eye. The wax will divert the forehead sweat down the nose and temples, away from the eyes. Additionally, for females, a light dusting of a facial powder will also help absorb sweat. This can be applied over the stick sunscreen (in addition to) or by itself.

- **Mineral Powders**
  Cosmetic powders with sunscreens offer the advantages of ease of application, a lightweight feel, and come in a variety of flesh-tone and tan colors.[81] The minerals are composed of elements such as titanium dioxide, zinc, and bismuth oxychloride which are micronized to refract and reflect UV light, and iron oxides which add color. Disadvantages include possible clogging of pores and if the skin is dry, the powder residue may show. Many bronzers contain sunscreens allowing both a tanned look and protection.

- **Smell**
  It's very important to smell a sunscreen before buying. If you don't like the smell, you will be less likely to apply it in the proper amount or to reapply it when necessary.

How Much and Where?

Sunscreen labels often don't tell us how much to apply. Instructions like "apply liberally before sun exposure" and "apply generously and evenly" don't provide *an amount*. As a result, most of us apply much less than the quantity necessary to receive the SPF protection number listed on the bottle. The FDA-mandated SPF determination requires that sunscreen be applied at a density of 2 mg for every cm^2 of skin. An average adult (5'4", 150#, 32" waist) has two square meters of skin, meaning that the application rate should be 40,000 mg or 40 grams of sunscreen for one adult.[49] This equals about one full ounce or one-fourth cup.[82-82] Larger adults have more body surface area and require more sunscreen (1.5 - 2 ounces). For a child, coverage is achieved with 1/2 - 3/4 ounce, depending on body size. For comparative analogies, one ounce is roughly equivalent to a full shot glass, a golf ball sized glob, or six teaspoons.

Body Area	Amount Needed
Face and Neck	1 teaspoon
Front Torso	1 teaspoon
Back Torso	1 teaspoon
Each arm	0.5 teaspoon
Each leg/foot	1.5 teaspoons

For the average adult, this means a six ounce tube of sunscreen is only good for six applications. Many people not only use one tube of sunscreen for the whole summer, but also share it with family or friends thereby not receiving the full SPF value.

Studies have shown that most people apply one-fourth to one-half of the recommended amount of sunscreen.[84-86] Additionally, studies show sun protection does not fall off in a linear fashion (meaning if you apply half the amount, you get half the protection) but instead approaches the square (if you apply half the amount, you get about one-fourth the protection)[37] or even less. To illustrate this, one study found that applying sunscreen with an SPF of 50 at $0.5mg/cm^2$ yielded an SPF of only 2.7.[87] In addition, areas such as the neck, ears, and temples are often missed. The solution to both problems is to apply a first coat of sunscreen, wait 20 minutes, and then apply a second coat of sunscreen.[88]

Expiration dates should also be checked. Most sunscreens have a three year shelf-life.[89] In reality, the conditions to which many sunscreens are exposed (high heat and direct sunlight when the bottle is left lying in the sun at the pool or put in the trunk of the car) can more rapidly decrease the shelf life. Use common sense - if you apply last summer's sunscreen and it makes your skin react with redness and itching it may be time for a new bottle. If the consistency of the sunscreen is runny or much thickened compared to what it is like when new, discard the bottle. The same applies if the color or smell have changed. It is a good idea to date the bottom of the bottle or side of the tube with a permanent marker when it is first purchased or better yet, buy new bottles every summer and discard the old ones.

o Reapply Every 1-2 Hours

Substantivity is a term that describes how well a sunscreen affixes to your skin under adverse physical conditions (contact with water, sweating, rigorous exercise). The more substantive a sunscreen is, the better it adheres and the longer it lasts. Water resistant sunscreens are made to last approximately 40 minutes in water, while very water resistant (previously called waterproof) sunscreens last about 80 minutes in water[90] and are the longest lasting sunscreens available (the most substantive). It should be noted that "waterproof" is a misnomer as no sunscreen is totally waterproof. All sunscreens must be reapplied.

In general, the rule is to apply a full one to two ounces of sunscreen every one to two hours[91] while outside. However, Diffey suggests applying the first coat 15-30 minutes before going outside and then reapplying soon afterwards (within 15- 30 minutes) rather than at 2-3 hours to achieve adequate coverage.[88] An early second coat will also double the sun protective factor and cover frequently missed sites (ears, sides of neck, temples).[61, 92] Sweating, swimming,[93] toweling off, the salt in ocean water, and the chlorine in pool water all help to remove sunscreen. Pay particular attention to your shoulders, areas under eyes, lips, nose tip, and ears as these areas tend to be missed, easily burned, and sunscreen is easily rubbed off. The face needs vigilant protection as there are high risk anatomical areas (eyes, nose, mouth, ears) that may require extensive reconstruction if a cancer grows that necessitates removal of a large area of tissue.

Several studies have shown that people who have applied sunscreen tend to spend more hours in the sun both receiving increased sun exposure and elevating their rates of skin cancer.[94-95] This may be due to the fact that they have a false sense of security considering themselves "protected" with one application.[96-97] In addition, Huncharek conducted a meta-analysis of over 9000 patients from 11 different studies and found that increased use of sunscreen is not directly associated with an increased risk of melanoma.[98] Remember that there is no sunscreen that "lasts for 8 hours" or "all day" no matter what is on the label. People who wait longer than 2.5 hours to reapply sunscreen have a five times greater chance of getting sunburned than those who reapply every two hours.[59] It is important to apply sunscreen in the proper amount, reapply regularly, and not rely on sunscreen as your sole protection from UVR. Finally, while it seems contradictory, ultraviolet radiation degrades sunscreens. Avobenzone frequently starts at sun protection factors several fold higher than the number listed on the bottle and within a short time is less than the labeled SPF. Most commercial sunscreens lose a large part of their protective

capacity after only 60 minutes.[64] Sunscreen should be applied daily year-round[99] and use of sunscreen with an SPF of at least 15 has been shown to decrease thymine dimer formation, which are signature UV-induced DNA changes associated with cancer development.[100] For teens and lay people, two of the most important issues regarding sunscreen use are if it provides good UVA /UVB protection and if one will use it consistently.[101]

Sunscreen Basics

- Use a sunscreen with SPF 30 or above, UVA/UVB coverage
- For sensitive skin, use straight physical blocks (less irritating, white in color)
- Body coverage = 1-2 oz (adult), 1/2 - 3/4 oz (child)
- Apply two coats, 20 minutes apart
- Apply 20-30 minutes before going into the sun
- Reapply every 1-2 hours
- Use each bottle for only one summer (date bottle)
- Check smell, get one you like
- Use lotion/gel on body, stick on nose and lips, spray for scalp/back (no gel on face)

Choose it to use it = pick a sunscreen you like and you will use

• Indoor Tanning Beds

Ultraviolet radiation comes in two common forms: natural sunlight and artificial indoor tanning light. Indoor tanning has been found to cause skin cancer[102] due to the intense UVA[45] and UVB radiation. There are many factors that motivate the use of indoor tanning. Chief among them is the immediate convenience (perceived attractiveness of the tan, relaxation), low cost, and perceived health benefits.[103] Teens tan due to peer pressure, desire for the bronzed look, and because it is condoned by their parents.[104] Behaviorally, indoor tanners fall into three distinct categories: intermittent tanners who predominantly tan before a special event (formals, spring break, start of summer) and then little over the rest of the year, regular tanners (tan 3 times per week, all year) and mixed tanners (combination of both).[105]

Use of indoor tanning is associated with a 2.5 increased risk for SCC and 1.5 increased risk for BCC even after adjusting for the number of sunburns and sun exposure history.[106] Veierod studied over 100,000 women for eight years and found that using indoor tanning only twice a month increased the risk for melanoma by fifty-five percent.[107] Two different studies in Europe concluded that the use of sunbeds or sunlamps resulted in an 8.9-fold and 7.7-fold increased risk of melanoma, especially if used before the age of thirty years.[38] Most indoor tanning beds and standup units use lights that emit a high percentage of UVA radiation (97-98%) and a low percentage of UVB (2-6%).[47] In the higher pressure tanning units, the UVB is removed by special blue glass filters to prevent erythema or burning, since clients want to be tan, not burned.

Lamp Differences

The majority of tanning beds contain thirty to fifty 100-watt light bulbs and require an average tanning time of twenty minutes. Most standup units use 40 or more 160-watt bulbs decreasing the tanning time to only eight to fifteen minutes. The lights or lamps (in order of lowest to highest output) include low-pressure fluorescent lamps that convert UVC radiation into longer UVA and UVB wavelengths through use of a phosphor layer; reflective lamps (RUVA) that focus and concentrate their output through the use of an internal reflective coating; very high output lamps (VHO) that consume more electrical power and put out more radiation, thereby requiring a cooling zone at the end of each light; and high pressure lamps that reach very high radiation intensities and emit a broad spectrum of UVA, UVB and some UVC radiation.[47] Lower output units require about 20 minutes to use, higher output units require a shorter time of 8-15 minutes.

Radiation Levels

Tanning beds often contain a rectangular insert for faces that have even higher intensity lamps than the lamps that radiate the body. In a 2003 study, the average wattage of indoor tanning lamps for UVA radiation was 192 W/m^2 and for erythemally-weighted UVB was 0.35 W/m^2.[108] These lights contain four times more UVA and two times more UVB than the radiation from the noon sun during the summer in Washington, DC.[108] In the high-pressure tanning beds, UVA doses of 10-15 times natural sunlight have been found by the FDA.[109] Tanning indoors also increases one's annual solar UVA exposure from 30-300% over outdoor exposures.[110]

Loosely Regulated, Poorly Enforced

While the FDA has regulations on sunlamps, including the acceptable levels of UVC radiation, requirements for protective eye goggles, a warning label, user instructions, and a timer to limit amount of time under the lights (Chapter 21 of the Code of Federal Regulations, Part 1040.20 or online at www.fda.gov), many salons exceed the number of times allowed per week,[111] allow patrons to start at a high level of radiation,[108] allow restricted minors to tan,[112] and allow eyewear to be brought in by the patron, which may not be protective. Additionally, timers are often off by several minutes. Compliance with voluntary regulations is poor.[113] Without a federal mandate, it is up to each state's government to enforce these regulations, and enforcement is sporadic at best.

Lack of Age Limit

There are no federally mandated age limits restricting use of a tanning device. In February 2005, the World Health Organization and the American Academy of Dermatology called for a ban on the use of tanning beds by minors (those under 18 years of age). Indoor tanning emits considerably more UVA radiation in a shorter timespan than natural sunlight and UVA penetrates deeper (into the dermis[45]) causing long term damage. Several studies indicate that the use of tanning beds not only increases the risk of skin cancer, but that risk is higher if use is begun earlier in life.[114] This growing concern is partially supported by the steadily rising rate of pediatric melanoma,[115] the fact that over 2 million U.S. teens use indoor tanning annually,

and the fact that the percentage of use increases from 5% of 13-14 year-olds to 39.6% of 17-18 year olds.[19] Another study showed that the incidence of indoor tanning use increased in teenage girls who used indoor tanning (3 or more times) from 11.2% at age 13-14 years to 47% by age 18-19 years.[12]

Multiple studies have shown that indoor tanning may be addictive[116-117] since UVR is a reinforcing stimulus in frequent tanners[118] and there is a release of "pleasure" chemicals (endorphins, serotonin) by the brain with the skin's absorption of UV light.[119-120] Younger age with first use of indoor tanning (14-15 years) and more frequent use (> 3 times use in life) were associated with difficulty in quitting.[114] Teens whose parents used tanning machines, used indoor tanning more often and started four years earlier than their parents.[121] This is in spite of the fact that those same parents (69%) stated they did not want their children to use tanning beds, but only 15% had discussed this issue with their adolescents.[121] Teens whose parents allowed them to indoor tan, who believed that most of their peers liked the tanned look, and who perceived that their peers used indoor tanning often were more likely to indoor tan themselves.[14] Excessive tanning can be characterized as a body dismorphic disorder in persons with perceived "defects" such as scarring or mild acne who use tanning as camouflage.[122] Silvan and DeLeo suggest an integrated dermatological approach to addictive sunbathing behavior that finds links between the psyche and the body through exploration of the impact of body image, self-esteem, and development.[123]

Many states have enacted legislation to limit indoor tanning by requiring parental or physician consent to use indoor tanning facilities. However, only a handful of states have enacted a ban *prohibiting* children under 14 or 16 years from using commercial indoor tanning units. The tanning industry is a multibillion dollar business, and it lobbies heavily against these changes.[47] Furthermore, most state laws lack enforcement and salons vary in their adherence to FDA proposed rules.[108, 124-125] In contrast, youth smoking and alcohol consumption dropped significantly in many states with federally-mandated age restrictions. Interestingly, parental signed consent is legally required for minors to be treated for dermatological disorders (psoriasis, atopic dermatitis, granuloma annulare, and scleroderma) utilizing UV light in a medical office. These treatments are done under wattage-controlled and timed conditions by a physician with years of education and experience. However, we allow minors to frequent tanning salons where the level of UVR and timing of exposure vary widely and there is a lack of medical oversight.[126]

• Alternatives to Tanning

Behavioral studies have shown that just teaching the health effects of sun abuse is often not enough to change behaviors,[103] as behaviors have multiple complex associations. Offering other methods for maintaining appearance is advised.[127] Many people believe a tan looks healthy and those that do are five times more likely to use indoor tanning.[128] Behavioral decisions are often conceptualized as a choice between alternative courses of action in which the most positive choice is selected.[129] Teaching alternative methods for appearing tan without accumulating the UV exposure offers teens a more positive, less risky choice. Teens who seek UVR to look bronzed may respond better to suggestions

of using self-tanners and bronzers. Behavioral studies indicate that it is important to offer both healthy alternatives and non-judgmental interventions to affect a higher rate of change.[130] Additionally, it has been shown that the use of self-tanners leads to a reduction in favorable attitudes towards the use of indoor tanning.[131]

It should be noted that there is conflicting evidence regarding the use of self-tanners. One study found users of self-tanners to have a higher rate of sunburns and tanning bed use.[132] However, this may be a consequence of the use of self-tanners in combination with indoor tanning to achieve a very bronzed look in persons who have a strong need (addiction) to be tan or a lack of knowledge regarding the low rate of sun protection (SPF 1-2) from a "fake tan."[133] Conversely, Mahler found that when combined with UV photography, use of self tanners decreased the number of hours spent sunbathing.[134] Additionally, Sheehan found a 73% decrease in use of indoor tanning when using self-tanners.[135] For teens, it is good to warn them that when using self-tanners they should still use a sunscreen[136] or use a self-tanner/sunscreen combined product. Finally, since most teens don't like being told what not to do, and often what to do, for that matter, it is important to offer non-radiation opportunities to look tan. Options include using the spray-on booths at tanning salons, airbrushing either at a salon or home, self-application of sunless tanner, and the use of wash-off cosmetics like powdered bronzers and tinted sunscreens.

Since only 11% of US adults currently use self-tanners,[137] teaching the proper application and rationale may make this a better option for teens to use. If applied properly, most of the current self-tanners do not cause the same orange discoloration of previous formulations. Most self-tanners contain a simple sugar called dihydroxyacetone (DHA). This sugar reacts with amino acids to produce yellow-brown pigments called melanoidins and only dyes the topmost layer of the epidermis known as the stratum corneum. Color change varies from orange to brown depending on skin type and amount of solution applied. Color develops within 3-5 hours after application and lasts about 4-5 days. Maintenance of the DHA "tan" requires reapplication every 2-5 days depending upon skin type and percentage of DHA in product used (most are between 3-5%,[138] daily-use moisturizers with DHA have around 1%).

- **Spray-on/Airbrushing**

  When using the spray-on versions of DHA (salon tanning or airbrushing) there are some safety precautions to follow. While DHA is considered relatively safe, there are no current studies regarding inhalation of DHA, so it is best to hold your breath while inside the booth (spray times run 15-30 seconds). If you are allergic to DHA, are pregnant or have asthma, it is probably best to avoid using spray-on tanning methods.[139] Most salons will provide a shower cap to protect your hair and a towel to wipe off excess solution. One should also use a barrier cream to protect nails, soles of feet, and palms of hands. These areas have thicker skin and will absorb more of the DHA leading to a darker color. Also, areas of skin that are more wrinkled (elbows, knees, ankles, crow's feet, and lines around mouth) tend to absorb more of the DHA and become darker as time goes on. Dihydroxyacetone is minimally photoprotective by itself (SPF 2-3)[133] so you must still use a sunscreen unless the product has a sunscreen built in.

Self Application

There are several techniques that can help create a good overall tan when self-applying DHA. In order to obtain a good coloration from DHA, you should first purchase a self-tanning lotion that is colored or tinted so that you can visually see where and how much you are applying (apply an even coat and prevent streak marks). It is also a good idea to buy a box of inexpensive disposable gloves. Wearing these will prevent your palms from turning dark (if you don't have gloves, wash your hands immediately after applying self-tanner). Prepare the skin surface by shaving (if applying to an area that will be shaved, like females' legs), exfoliating to remove

Self-Tanner (DHA) Application Basics

- Shave and then exfoliate skin
- Moisturize lightly and allow moisturizer to absorb for 3 minutes, or don't moisturize
- Apply self-tanner wearing plastic gloves
- Use a tanner with color to visualize even application
- Use a "light" or "fair" formulation if Skin Type I or II
- Lightly coat wrinkled, bendable areas (ankles, knees, elbows, wrists)
- Reapply every 4-5 days
- Avoid daily application with 3-5% DHA (this will turn you orange!)

dead skin cells (the dead cells uptake more of the self-tanner and will initially appear darker and then peel off to reveal a lighter patch of skin), and then moisturizing the shaved and/or exfoliated skin (allow the moisturizer to sink in for about three minutes). Uniform moisture content of the stratum corneum over several hours is important to the development of even pigmentation from the DHA.[140] Under- and overhydration can decrease the pigmentation reaction. Finally, apply the self-tanner in even strokes and with a lighter application on highly mobile body areas (knees, elbows, ankles, around eyes and mouth), which will uptake more of the self-tanner, turn darker, and accent wrinkles. Those areas of your body naturally tan a lighter color than other parts and will shout "fake tan" if darkened. Since the outer skin layer sloughs off every 4-5 days, this is how often self-tanner needs to be reapplied.

Applying self-tanner daily in an effort to get a dark tan quickly will create an abnormal coloration. It is best to reapply the 3-5% solutions no more than every 2-3 days and to start with a light to medium formulation rather than dark. Many people purchase the "dark" formulation and apply it daily which will eventually turn their skin orange. One percent DHA solutions in moisturizers can be applied daily. Color change is usually seen within an hour and full change takes 8-24 hours.[138] The resulting color is also dependent upon your skin type and natural coloration. Dark blonds and brunettes have the best color results. Redheads and white blonds (Skin Type I) and darker haired persons with olive skin tones do not have as "natural" a result as those with golden undertones.[138] Self-tanners work well for Skin Types II and III if you start with the "light" or "medium" formulations, apply it no more often than every three days, and allow yourself to "tan" over a period of about 1-2 weeks. Trying to get an overnight "tan"

will turn you an abnormal color. Although these instructions may appear cumbersome at first, with successive use self-tanning becomes simple, quick, and easy.

Since DHA is a 3-carbon sugar it tends to smell like burning cookies as the color develops. Allow 3-4 hours for the color to fully develop and then shower to remove the smell. Avoid working out (sweating) and tight clothing as these will make the self-tanner run and leave streaks or marks.

Another option is to use a cosmetic bronzer (powdered or liquid) or a tinted sunscreen or foundation. These have to be applied daily since they wash off with soap and water and can be rubbed or sweated off. The trick to applying bronzers is to place them on the areas of the face normally "kissed" by the sun (apex of nose, middle of forehead, apples of cheeks, and chin). Applying the bronzer liberally all over the face may give one a fake tan appearance due to a too heavy application. Conversely, tinted sunscreens and foundations are to be applied over the entire facial and neck surfaces.

• Non-Sunscreen Sun Protective Methods

o Limit Your Time in the Sun During Midday

The sun's rays are at their greatest strength between 10 am and 4 pm so be careful when outdoors during these times. Since many people go outside during these hours and this message may seem unrealistic and therefore easier to ignore,[25] it may be more practical to strictly limit your time in the sun during the hours of 11 am to 1 pm when the UVR is most direct. Protect yourself and limit your exposure during the other hours.

Short Shadow, Seek Shade Ask the students when their shadow is the longest and the shortest. When is the sun most and least direct? Your shadow is non-existent or minimal at noon when the sun is directly overhead. As the day progresses, your shadow lengthens with the decreasing sunlight. If you have no shadow or a shadow shorter than your height, you should find shade and protect yourself. Meteorologist Leith Holloway devised this rule after discovering that when your shadow is equal to your height, the earth's atmosphere has a sun protective factor of two to three.[141] As the sun sets lower in the sky, it is filtered by more of the atmosphere and at a less direct angle, thus becoming more protective. This method is also a great way to measure sun intensity without having to wear a watch or know the exact time, so even very young children can tell when they need to find shade.

o Wear Sun Protective Hats, Glasses and Clothing

Hats are an easy way to protect your head, face and neck from the damaging effects of the sun. Hats with a wide brim (> 3") are best as they can decrease UVR on the forehead, cheeks and nose by a factor of five[142] and offer coverage of your ears, eyes, and most of your neck. Baseball caps protect the scalp and the upper half of your face, but do not prevent UVR from reaching your ears, lower face or neck. Visors only protect your forehead and leave your

scalp, ears, lower face and neck exposed. Hats are very user specific and can easily be thought unfashionable or expose one to ridicule[143] especially if worn during adolescence. Teens are more likely to wear a hat if many of their peers are wearing the same style and if it is socially acceptable (the norm). A key factor in getting a teen to wear a hat is having them select it themself. Many teens will wear baseball caps (especially those playing outdoor sports), but shy away from wearing the more-protective wider brim hats since it is not what they or their peers wear. However, wearing any hat is better than no hat.

Sunglasses are important to protect you from sunburning your cornea, but perhaps more importantly, for preventing future cataracts and macular (retinal) degeneration. There are two key principles to keep in mind when selecting sunglasses: they should wrap around the temple and have a UV label.[28] Sunglass lenses should wrap around the outer edge of the eye towards the temple and fit closely to the skull because approximately 30% of UV light can enter in the non-covered side areas.

Make sure the glasses have a label that says, "100% UV protected" or "400 UV absorption." These labels should meet ANSI (American National Standards Institute) criteria and block at least 99% of all UV rays.[144] If labeled "Z 80.3," the glasses block 95% of the UVA and 60% of the UVB rays. If labeled "cosmetic," the glasses block approximately 70% of the UVR. Just because the lenses are dark does not necessarily mean they block UVR. The darker the lens, the greater the pupil dilation, the more UVR enters the eye. UV protection is provided by a chemical applied to or mixed in the lenses, not the color, so make sure there is an ANSI label. Some contact lenses and regular glasses have built-in UV protection where the lens darkens with UV contact. Lee found that while 71% of teens owned a pair of sunglasses and the mean age for wearing them was 10.4 years, the majority (81%) wore them occasionally or not at all.[145] Everyone should wear UV protected sunglasses now that they are readily available in sizes for all age groups. Infant sunglasses often have a cloth strap that ties with a Velcro closing that can be adjusted to the baby's growing head circumference and toddler glasses that are made of flexible safety plastic with arms that curve around the ears to keep the glasses on their small heads.

Clothing that is sun-protective can be divided into two categories: Ultraviolet Protection Factor (UPF) clothing and regular clothing of specific fabric qualities. UPF standards were first approved in Australia and New Zealand in 1996 to measure a fabric's ability to block UVR from reaching the skin. UPF clothing has three rating levels, described in the following table.

UPF Rating	Protection Level	Protection Provided
15-24	Good	93.3-95.8% of UVR
25-39	Very good	96-97.4% of UVR
40-50	Excellent	97.5-98% of UVR

In the U.S., these standards are voluntary and were developed by the American Society for Testing and Materials (ASTM). The terms UPF and SPF are interchangeable in percentage of protection (UPF 30 = 96.7% UVR protection). UPF swim shirts for teens are also called "surf shirts." Many of these "surfing" shirts were originally developed to prevent skin rashes from the continuous friction of the surfer's skin and the ocean saltwater with their boards. Surf shirts generally have high (50-150) UPF ratings. However, these surf shirts are made of polyester materials that may be hot in the humid summers in areas of the U.S. like the South or Midwest. Other UPF shirts are available in more breathable fabrics with protective factors of thirty to fifty. Look for UPF labels on sun protective clothing, which can be found online or locally in sporting goods stores.

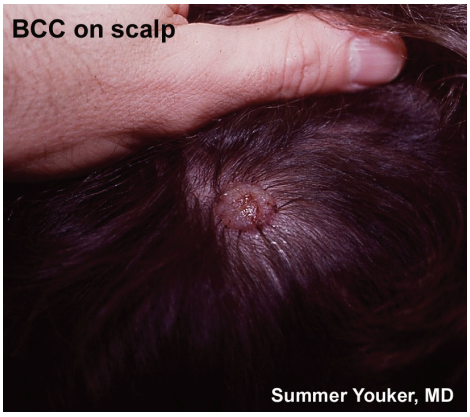
Depending on a variety of factors, regular clothing can also be very sun-protective. Factors that increase a clothing's amount of sun protection include a tighter weave, a darker color, a heavier weight, and/or less stretch. Additionally, clothes that are drier are better at fending off UV rays.[146] Wet fabrics can have their photoprotectivity reduced by one-third.[147] Synthetic fabrics like polyester and polyacrylics are also better than cotton or nylon because the size of the spaces between the fabric fibers (pore size) is smaller and the composition of the material is denser.[148] Intuitively, one would think that lighter colors would be better as they reflect sun and are cooler (temperature-wise), but studies have shown that darker colored fabrics block more light. Most laundry detergents contain optical brighteners that deflect UV light so cleaner clothes are more sun protective than dirty ones.[149] Denim jeans are one of the best fabrics with an SPF of 1700. Looser fits are more protective due to the air space between the skin and the fabric. However, UVA transmission can be high despite a UPF of 30 or above[150] because the UPF represents the protection from UVB only. Finally, if you are unable to obtain UPF clothing, Rit Dye makes a wash-in sun protective chemical finish for clothes that provides an SPF of 30, is good for 20 washings, and doesn't alter the color of the fabric.

Know Your Environment

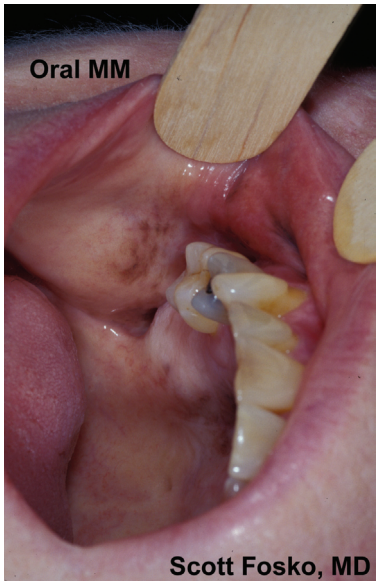
Reflection off natural surfaces, increase in altitude, decrease in latitude,[9, 151] time of day, time of year, and percentage of cloud cover all affect the amount of UV radiation that reaches the earth's surface. According to the CDC, water reflects 100% of UV rays, snow and ice reflect 80-90%, sand 20-30%, and grass reflects 2.5-3% of UV waves.[152] This is important because some teens think they are more protected when snowboarding because they are not lying out on a beach directly in the sun. Skiing and snowboarding have a particularly high level of radiation exposure not only due to the reflection from the snow and ice, but because the atmosphere is thinner at higher altitudes. Additionally, we don't feel the heat, so we tend to stay out in the sun longer and use less sunscreen. Latitudes closer to the Equator have more direct UVR and a thinner ozone layer increasing exposure. Time of day (the sun's rays are most direct at solar noon) and time of year (the narrower angle of the sun's rays in the summer radiates more UVR) are other factors. Scattered clouds and overcast clouds allow 89% and 32% of UV rays to reach the earth, respectively.[152] So even on a cloudy day in the winter, protection is still necessary.

• Keeping Yourself Healthy

○ Perform a Monthly Self-Exam



Learn how to examine your body's skin on a regular basis for changes in existing spots and development of new spots. Make sure to look in areas not typically in direct sunlight (part your hair and examine the scalp, look behind the ears and between the toes) and in areas where the sun does not shine (the genitals, inside of the mouth, soles of the feet, and armpits).



Use a mirror to check areas like your back and the back of your legs that are difficult to see. Keep a diary or mole chart of where the large spots are located and their size (use a ruler or paper tape, measure in millimeters). An easy way to keep track of changing moles is to lay a piece of transparent paper (a transparency used in overhead projectors) over the mole and draw the mole's size and shape using a fine marker. Place the date and location of the mole on the transparency. Photographs of the moles using a ruler for scale can also be helpful. University medical centers often offer mole-mapping which is a digital picture mapping of your skin. Later mappings are then compared for changes. Mole mapping has been shown to increase the accuracy of a person's ability to diagnose changing lesions.[153]

○ Know Your Family History

Skin cancer, like other cancers and diseases (heart disease, hypertension, diabetes, etc.) tends to run in families. Approximately 5-12% of all cutaneous melanomas develop in persons with one or more first degree relatives (mother, father, sibling) with melanoma.[154] You are made up of half your mother's genes and half of your father's genes. It is important to know what diseases have affected your parents and grandparents. If you have one or more first-degree relatives with melanoma this increases your risk of the disease by 8-12 fold.[155] If you have skin cancer in your immediate family – parents and siblings – then you should definitely have regular skin cancer exams performed by a dermatologist. If you do not have a family history of skin cancer, you should still perform skin self-exams (SSE) and consider a professional skin screening exam by a dermatologist to use as a baseline.

Patient's ability to accurately identify changing lesions is increased with the use of baseline photographs combined with a skin self-exam.[156] Regular SSE's also lead to earlier diagnosis of lesions with a lower mean Breslow depth[157] and thus a better prognosis. Recommendations

among world and national agencies vary on the need for professional screenings among the general population versus high risk groups. For the general population, the American Cancer Society recommends a professional skin exam as part of a routine cancer check every three years for everyone aged 20-40 years and annually for those older than forty. The American College of Obstetricians and Gynecologists recommends an earlier start at age 13 years for women with risk factors for skin cancer.

○ Who Finds Abnormal Spots?

Several studies have been conducted that show the majority of skin lesions are found by the patient, rather than medical personnel. Dr. Howard Koh of the Boston University School of Medicine discovered that melanoma lesions are found by patients in 53% of cases, by medical practitioners in 26%, by family members in 17% and by others in 4%.[158] Other studies list the rate of lesions found by patients as high as 74% with women more likely to diagnose a melanoma than men and physicians more likely to diagnose thinner melanomas than patients.[159-161]

○ How Long Do People Wait Before Having a Melanoma Lesion Checked?

The average time that most people wait before seeing a physician about a changing mole or spot is 9-12 months, approximately one year.[162-164] For nodular melanomas that have a rapid vertical growth phase, waiting a year will greatly worsen the prognosis.

• Conclusion

Protection is only as good as you make it. You have to practice prevention on a daily basis, year round, not just in the summer or on vacation. It is important to remember that sunscreen is only one element of a larger sun-protective program. Limiting your time in direct sun, seeking shade, wearing protective gear, knowing your family history and skin type, monitoring the daily UV index, checking your skin, avoiding indoor tanning, and being familiar with early detection methods will allow you to enjoy the outdoors with minimal worry of future health problems. Enjoy the outdoors, but practice safety in the sun.

Open Discussion

Tell them this is the conclusion to the program. Open this time up to questions they may have about anything that needs clarification or issues they want to discuss. Some students will have spots they are concerned about and want you to diagnose. Some students will have skin conditions they may think are cancer. Skin cancers are not always easy to diagnose. Look at their spots, alleviate their concern if possible (often it may be just a mosquito bite or pimple), answer their questions, and refer them to their family doctor for follow-up. If they insist on a lesion diagnosis, calmly explain that you are a student still in training and they would be better served by seeing their private medical doctor or a dermatologist.

Lecture Outline and Script: Day Two or Part Two

Prevention/Protection Methods and Alternatives to Tanning

[Non-italicized text is what appears on the slide. Italicized text are statements that should be made, additional background information, easy ways to explain slide points and tips on getting student participation.]

- **Slide 55 - ABC Game -- Title slide**

  ***Show the slide, allow the students to verbally answer which of the ABC's the lesion displays, and then discuss the answers. Underlined answers are the most prominent ABC.*

  - **Slide 56**
    - Evolution, Elevation, Asymmetry, Color, Border, Diameter

  - **Slide 57**
    - Diameter (2.5cm vs. 6mm), 2.5cm = 25mm, Evolving, Border, Color

    ***This is a superficial spreading melanoma, the most common subtype; has a radial growth phase (horizontal) which often allows detection before metastasis.*

  - **Slide 58**
    - Normal moles *or nevi*

  - **Slide 59**
    - Color, Border, Slight Asymmetry

  - **Slide 60**
    - Asymmetry, Evolving, Diameter, Border, Color
    - Very early, Stage 0 *(in situ)* melanoma
    - Commonly seen in older people *with high lifetime cumulative sun exposure*

    ***This is a lentigo maligna (a melanoma in situ often found on sun-damaged or elderly skin). These grow slowly (longer radial growth phase than traditional malignant melanoma in situ) and will eventually become a lentigo maligna melanoma (an invasive melanoma) if left alone for enough years.[57] These are often mistaken as harmless "age spots" by the elderly so they are frequently large at diagnosis and can leave sizable skin defects after removal.*

  - **Slide 61**
    - Evolving, Border (has spread into surrounding skin -- irregular pink areas), Asymmetry, Color

    ***Spread of color into surrounding tissue is a sign of melanoma growth.*

  - **Slide 62**
    - Normal mole

- **Slide 63**
  - Color (no color or pink), Border, Asymmetry, Evolving

  ***This is an amelanotic melanoma (mostly non-pigmented).*

- **Slide 64**
  - Evolving, Border (has spread into surrounding skin), Asymmetry, Color

- **Slide 65**
  - Normal mole, notice the color, this is a redhead

  ***Mole color is based on the amount of melanin (skin type). Lighter skin types will have lighter moles; darker skin types will have darker moles.*

- **Slide 66 -- Prevention/Protection -- Title Slide**

- **Slide 67**
  - The bronzed look is not pretty or healthy
    - UVR leads to wrinkling, sagging, brown spots, leathery skin and skin cancer

  ***Young and old pictures of Robert Redford and Donatella Versace illustrate skin aging effects of UVR.*

- **Slide 68**
  - Tanned is banned
    - Natural skin tone is a sign of beauty
    - Protecting your skin from UVR will decrease signs of aging, old skin

  ***We need to get rid of the "bronzed look is healthy" stereotype and let teens know that it can be fashionable and acceptable to be fair-skinned.*[59]

- **Basic Protective Measures**

- **Slide 69**
  - Know your Skin Type[60,61]
  - *Skin types are based on:*
    - *Hair color without dyes*
    - *Natural skin color without a tan*
    - *Natural eye color without contacts*
  - *Skin types are divided into 6 levels*
    - *Skin Type 1 is the least protected = most at risk*
    - *Skin Type 6 is the most protected = least at risk*
  - Skin types:
    - Skin Type 1
      - Always burns, Never tans
      - *Very fair white skin, white blond or red hair, blue eyes, freckles*
      - Irish, Scots, Welsh

- Skin Type 2
  - Burns easily, Tans a little
  - *Fair skin, blond to sandy brown hair, blue, hazel green or brown eyes*
  - Northern Europeans

- Skin Type 3
  - Sometimes burns, Tans slowly
  - *Medium white, dark blonde to brown hair, grey to brown eyes*
  - Most of the Caucasian *students in the room will be a Skin Type 3*

- Skin Type 4
  - Minimal burning, Tans easily
  - *Light brown skin, dark brown hair, brown eyes*
  - Mediterraneans, Asians, Hispanics

- Skin Type 5
  - Rarely burns, Tans well
  - *Dark brown skin (heavily pigmented), black or brown hair, dark brown eyes*
  - Middle Easterners, Amerindians, Lighter African-Americans, *Darker Hispanics*

- Skin Type 6
  - Never burns, Tans darkly
  - *Black skin (deeply pigmented), black hair, dark brown eyes*
  - African-Americans , Aborigines

** *Ask the students to choose their skin type. Many studies on young people have shown that they often rate themselves as a more protected skin type than they are – if they are a type 2, they rate themselves as a type 3 or 4 (most young people believe they tan easily and burn a little). Explain that a burn is a pink color change. A burn doesn't have to be fire-engine red, painful or blistered.*

***If you have time, select student volunteers from the room who are the different skin types and line them up in order to visually demonstrate the difference in natural skin protection from pigmentation.*

- **Slide 70 -- Three Types of Ultraviolet Radiation**
  - UVA (90% of sun's rays *that reach the earth's surface*)
    - Aging rays/skin cancer
      - Penetrates deeper (dermis)/ glass[62]
      - More skin components can absorb UVA
      - No warning sign *(sunburn)*
      - 20X more reaches earth than UVB[63]
      - Tanning bed bulbs[66]
      - Present all year long in *relatively* equal amounts
      - *Responsible for DNA changes*

- UVB (10% of sun's rays *that reach the earth's surface*)
  - Burning rays, skin cancer
    - Penetrates epidermis, but not clouds or glass[62]
    - Warning sign = sunburn[64]
    - Present in larger amounts in the summer[65]
- *UVC (Doesn't reach earth's surface except possibly at the poles where the ozone hole is large)*
- *Differences between UVA and UVB*
  - *UVA penetrates deeper into the dermis than UVB[65]*
  - *20 times more UVA reaches the earth's surface than UVB [65]*
  - *UVA penetrates glass/clouds/dermis, UVB doesn't [62]*
  - *UVB gives a sunburn, UVA has no warning sign that you're getting too much*
  - *Light bulbs used in tanning beds are mostly UVA (93-98%).[66]*

- **Slide 71 -- How to Choose and Use a Sunscreen**
  - **1st Check the SPF**, start with a 30
    - SPF 2 absorbs 50% *of UV rays*
    - SPF 15 absorbs 93.3%
    - **SPF 30 absorbs 96.7%**
    - SPF 50 absorbs 98%
    - SPF 70 absorbs 98.5%
      - UVB blockage = SPF
      - UVA blockage = no current rating in US, four star system[67] has been proposed and should be seen in 2009 on *most sunscreen labels.*

    ***Ask the students what words the acronym "SPF" stands for. The acronym SPF stands for Sun Protection Factor. Then ask them what SPF they normally use.*

    ***Explain that an SPF of 30 is a good number to use because it protects you from almost 97% of the UVR, but more important is both the amount you apply and reapplication within 2 hours.*

    ***SPF only describes UVB protection. However, most sunscreens contain both UVA and UVB coverage.*

  - **Slide 72**
    - **2nd Check the ingredients** *(listed under "Active ingredients" on bottle/tube)*
      - I. Chemical
        - Absorbs and reflects UVR
        - Clear in color
        - Apply 30 minutes before to allow absorption *(takes 20-30 minutes for these chemicals to bind with the skin cells)*
      - I. Barrier
        - Deflects UVR
        - The white stuff

- Immediate use *(doesn't have to be absorbed, sits on top of skin)*
- Good for sensitive skin *(allergic skin, post skin treatments)*, babies, *those on* acne meds

**Most sunscreens are a combination *of chemical and barrier sunscreens*

- **Slide 73**
  - Sunscreens for Teens
    - Look for
      - Non-comedogenic (less likely clog pores or cause acne)
      - Hypoallergenic (less likely to cause allergic reaction -- good for those on acne meds)
      - Oil-free (does not contain oil that can clog pores)
      - Dry touch/Dri-Block (dry to touch, not sticky/tacky)

- **Slide 74** [68]
  - **3rd Choose Type, Check smell**, *get one you like*
  - *Discuss the pros & cons of the different vehicles (lotions, gels, etc) that sunscreens are carried in.*

Type	Pros	Cons
Lotions	▪Spread easily ▪Good coverage/Can see coverage ▪Vehicle of most sunscreens ▪Assortment of smells	▪May feel heavy or greasy ▪May feel hot ▪Hard to reapply on beach (sand)
Sport or Dry	▪No oily film, dry to touch ▪Less runny with sweating ▪Often oil-free/non-comedogenic	▪May have higher alcohol content ▪May be more easily removed
Gels	▪Apply easily (hairy surfaces) ▪No greasy film/Dries quickly ▪Cologne-like smell	▪Higher alcohol content ▪May burn sores, cuts or pimples ▪Caution using on face or babies
Sprays	▪Hard to reach areas (back, legs)	▪Machine-gun spray pattern – messy ▪Uneven coverage/Still have to rub in ▪Sunscreen lost to air ▪Less coverage than lotions
Mists	▪Easy to use/Easy to apply ▪No film, dry to touch, cooling ▪Don't have to spread or rub in ▪Hard to reach areas- back, legs, scalp	▪Hard to see coverage ▪Spotty coverage (windy, focused spray) ▪Sunscreen lost to air ▪Don't inhale
Sticks	▪Heavy coverage ▪Good for nose, lips, ears, sm. areas ▪Stick trick for outdoor sports	▪Wax matrix – hard to spread ▪Uneven coverage over large areas ▪Melts in sun
Mineral Powder	▪Light weight, easy to apply ▪Comes in a variety of skin colors	▪Can clog pores ▪If skin dry, residue may show

***Pick a student volunteer to apply some gel or lotion to his/her arm or apply to yourself. First, ask if they have any allergies to sunscreens. If so, choose another student or apply to yourself. After application, ask them how it feels and smells and how easy it was to spread. Next, apply a different sunscreen to the same student and have them verbalize the pros and cons. Allow another student to smell a sunscreen. Show them the differences in sunscreens, don't just tell them. This activity will increase participation and discussion, familiarize them with the various vehicles, and possibly increase use.*

- **Slide 75**
  - Stick Trick -- Outdoor Sports
    - Keeps sunscreen from running in eyes.
    - Circle eyes w/ stick/lip sunscreen. *Take the stick sunscreen, and draw a circle around each eye, going over the eyebrow and under the eye. The eyebrow is a ridge with hair that is anatomically made to protect your eye. The wax will divert the forehead sweat down the nose and temples, away from the eyes.*
    - Powder eyelids and forehead. *For females, a light dusting of a facial powder will also help absorb sweat. This can be applied over the stick sunscreen (in addition to) or by itself.*
- **Slide 76**
  - **4th How much, where?**

***Start this slide by asking the students how much they normally apply.*

  - 1 ounce for body (golf ball sized glob) for averge adult (5'4", 150#, *32" waist)*[69]
    - *One ounce = shot glass full or golf ball-sized glob*
      ***Show the students a golf ball placed in your two hands (cupped together). Explain that sunscreen is liquid and will take up more room than a solid golf ball. Show them a tube of sunscreen and ask a student to tell the class how many ounces are in that tube, then ask the class how many applications for one person are in that tube? Next ask how many students share a single tube with friends or family? How many use the same tube all summer?A six ounce tube is only six applications for one person.*
    - *Why should you apply so much?*
      - *To get the full SPF on the bottle, you must apply a full ounce*
      - *If you apply half the amount needed (1/2 oz.), SPF protection doesn't decrease by 50%, it decreases by 75%* [37, 70-73]

      ***This is to reinforce why you suggested they start with an SPF of 30.*
  - 1 teaspoon for face
  - Double coat[74-76]
    - *Apply one coat of sunscreen*
    - *Wait 20 min*
    - *Apply a second coat*

***Studies have shown that most people's first coat is not a full ounce and misses body parts. A second coat will increase the SPF coverage and cover any missed body parts.*

  - 1 (6-8 ounce) bottle = only 6-8 coatings

- Date it, *buy a* new bottle every year
  - *Use a permanent marker and date the bottle or tube*
  - *Sunscreens have a shelf-life of about 3 years*[101]
    - *If kept on a shelf in moderate temperatures*
    - *But sunscreens are usually left outside in the sun for hours at the pool or thrown in a car trunk where high temperatures can degrade them.*
  - *Apply daily year round.*[77]

- **Slide 77**
  - **5th Reapply every 1-2 hours**[58]
    - Removes sunblock = rubbing, sweating, swimming, chlorine in pool, salt in ocean, *and* toweling off [74]
    - Water resistant = 40 min protection
      - *Water-resistant means the substantivity of the sunscreen should last for up to 40 minutes in the water* [75]
    - Very Water Resistant = 80 min *protection*
      - *Very water resistant means the substantivity of the sunscreen should last for up to 80 minutes in the water* [75]
    - There is no all-day sunscreen except a tent. *Sunscreens degrade in UVR.*
    - *If one* waits > 2.5 hrs to reapply *sunscreen there is* a 5X higher chance of sunburn than those who reapply q 2 hrs.[76]

    ***As a lead-in to the next slide, ask students which of them has used a tanning bed. Who has used one this past weekend? How often do they go? Do their parents use tanning beds?*

- **Slide 78 -- Indoor Tanning Beds (No)**
  - Bulbs are 93-98% UVA --
    2-15 times more UVA than summer noontime sun[4, 5, 7, 77]
    Tanning beds are made this way because UVB rays can cause a burn and clients want to look tan, not burned. Unfortunately, UVA penetrates deeper than UVB.
  - Face insert emits more UVA than bed *lightbulbs. If your face looks tan, you think the rest of your body looks tan.*
  - Tanning indoors adds 30-300% more UVA to one's annual solar exposure.[78]
  - Higher level beds emit more radiation in a shorter time period *than the standard tanning beds.*[5, 78-79] *Tanning beds come in various levels or strengths for beginner tanners and maintenance tanners.*

- **Alternatives to Tanning**

- **Slide 79 -- If you must be bronzed, Fake it don't bake --Title Slide**

  - **Slide 80**
    - UV-Free Spray Tanning and Air Brushing [80-81]
      - Relatively safe
      - Don't inhale (use nose filter/pincher)
      - Protect eyes (use goggles)
      - Protect lips (use balm)
      - Cover hair and nails (may discolor)
      - Don't use if asthmatic, pregnant, *or* allergic *to DHA*
    - *Self-tanner has dihydroxyacetone (DHA) in amounts of 3-5%*
      - *DHA is relatively safe if not ingested or inhaled*
      - *DHA acts as a simple sugar that reacts with amino acids in the top most layer of the skin (stratum corneum)*
        - *Produces melanoidins*
        - *Melanoidins temporarily color the skin*
    - *Self-tanner comes in various forms*
      - *Spray-on tanning booths in tanning salons (shower booths)*
      - *Airbrushing machines*
      - *Lotions, mousses, foams, wipes and sprays*
      - *Daily moisturizers with a lower percentage of DHA (1%)*
    - *Spray-on tanning booths or airbrushing*
      - *Spray on booths*
        - *Similar to taking a shower*
        - *Several spigots in the booth spray self-tanner*
        - *Takes less time (15-30 seconds) and is relatively safe if you don't inhale*
        - *Use a shower cap, apply a barrier cream to your fingernails, toenails, lips, palms of hands and soles of feet or wear paper booties on your feet, wear goggles on your eyes, and hold your breath. DHA is absorbed more readily by areas of dry tissue (nails, palms of hands, knees, etc.)*
        - *Drawback: the same amount of DHA is sprayed for every client. This may be too much, especially for teens and smaller framed persons.*
      - *Airbrushing*
        - *Uses a misted version of the self-tanner*
        - *Offered in a hand-held spray gun or in a vacuum-cleaner-like machine*
      - *With either version:*
        - *Do not inhale or ingest, no available studies on consequences*
        - *May not want to use if you are asthmatic or pregnant*
        - *Do not use if you are allergic to DHA (self-tanner)*
        ***Demonstrate for students the spray on self-tanner by spraying it on a sheet of white paper.*
  - **Slide 81**
    - Fake, Don't Bake
      - By age 18-19 *years*, 47% of Caucasian girls have used tanning beds[82]

- **Slide 82**
  - How to Apply Self-Tanner[83-84]
    - Dihydroxyacetone (DHA), a harmless sugar
    - Skin Types 1 and 2, use "fair" or "light" formulation
      - *Amount of color change is based on your skin type. Starting with a dark formulation may turn you an abnormal color (orange) if you are lighter complected. Use the appropriate formulation for your skin color. Do not apply daily unless the DHA percentage is only 1%. Allow adequate time to develop a more natural tanned color (1-2 weeks). Many teens get the darkest formulation, apply it daily, and by day four they are orange. This makes them think the products do not work. Teach them to apply it correctly.*
    - Exfoliate skin, shave first

      Exfoliate (use a product with grains or beads)
      - *The stratum corneum is composed of dried dead skin cells.*
      - *Removing as many of the dead cells as possible will prevent later skin flaking and overaccumulation of DHA leading to orange coloring.*
    - Moisturize, wait 3 minutes, let sink in
      - *Nguyen found that moisturized skin will be more evenly hydrated, the uptake of DHA will be more balanced, and less likely to give one a patchy looking tan. However, overly moisturized skin will not absorb the DHA, so there needs to be a balance between the two.*[83]
    - Wear disposable gloves *when applying self-tanner*
      - *Buy an inexpensive box of disposable gloves.*
      - *This will prevent your palms from turning orange as it takes about 10 minutes to apply self-tanner to an entire body surface. By then, handwashing will not eliminate the DHA that has already been absorbed.*
    - Use a tanner with color to prevent streaks
      - *This will allow a more even application as you can see where it is applied and what sites have been missed.*
    - Light coat on knees, elbows, ankles, eyes, mouth
      - *DHA is absorbed more in these areas due to the skin dryness, thinness, and wrinkling.*
    - Color develops over 3-4 hours, then shower (*to remove* smell)
      - *Avoid tight clothing or shoes, sweating, and exercising for 3-4 hours after applying self-tanner. These actions may rub or sweat the DHA off and cause an uneven tan. DHA is a three-carbon sugar and tends to smell like burning cookies when mixed with your body's heat. The smell disappears after showering.*
    - Start with a light or light-medium formulation and apply no more than every three days for the first two weeks
      - Prevents you from turning orange
    - Reapply every 4-5 days *to maintain color as the top layer of skin flakes off*

      ***Show the students a tube of exfoliating grains and a tube of self-tanner.*

- **Slide 83**
  - Non-self-tanners -- Wash off, Apply daily
    - Powdered bronzers
      - Apply *to* sun-kissed areas *of face* (X) *--this will give a more natural appearing tan*
      - Apply over sunscreen
      - Use all year *not just in summer*
    - Tinted foundations and sunscreens *are other options*
      - *All of the above options will wash off and have to be applied daily*
        ***Demonstrate applying powdered bronzer on a volunteer female student.*
- **Slide 84**
  - Freckles are spots from sun damage. More sun = more, larger, darker freckles.
  - *Many teens believe that freckles have little to do with sun damage. When young, freckles may come and go with the amount of sun exposure and vary with the seasons, but eventually if exposure is constant, they will not fade and may become darker in color, larger in size, and greater in number.*

- **Slide 85-- Non-Sunscreen Sun Protective Methods -- Title Slide**
  - **Slide 86**
    ***Ask students at what time of day do they have no shadow. At what time is their shadow the longest.*

    - Short Shadow, Seek Shade[85]
      - *UVR is most direct at noon*
        - *No shadow since the sun is directly overhead*
    - Shadow Rule -- Shorter than you, seek shade
      If your shadow is shorter than your height, you should find shade
      - *UVR is high*
      - *The sun's angle is direct (most direct 11am-1pm, get out of sun!)*
      - *The protective filtering of the atmosphere is low (when shadow equals a person's height, the SPF of the atmosphere is about 2-3).*[85]
    - Protect yourself from 10 *am* – 4 *pm*, out of sun 11-1

  - **Slide 87**
    - Wear a hat

    Hats are an easy way to protect your face and head
      - Ball caps leave lower face, ears & neck exposed, but cover scalp and upper face.
      - A wide brim hat (3" brim) will decrease UVR on the face and cheeks by a factor of five.[86] *Brims of 4-5" offer the best protection and more coverage. However, any hat is better than no hat.*
        ***Ask students to notice where the shadow is on the person's face wearing the ball cap.*

- **Slide 88**
  - What type of hat does this outdoor worker have on? *Answer: ball cap*
    [Pictures of a 40 y.o. white female who spent five years outdoors conducting field research.]
    ***Ask students what type of hat the woman is wearing.*

- **Slide 89**
  - *Picture of the same 40 y.o. white female with* basal cell skin cancer *on left upper lip (arrow).*
    ***Ask students to note characteristics of basal cell skin cancer (this one is pink, pearly in appearance, almost normal looking, small in size).*

- **Slide 90**
  - *Pictures of the* basal cell skin cancer removed by *Mohs* surgery.
    ***These same pictures are on page 34 of this manual.*

- **Slide 91**
  - *Sequential pictures of the scar.*
  - Basal cell & squamous cell skin cancers have a better than 95% five year cure rate if recognized and treated early.[87]

- **Slide 92**
  - Wear Sunglasses
    - Labeled "100% UV" *or* "400 UV"[88]
      Prevents cataracts, retinal degeneration, skin cancer
    - Wrap around
      - Up to 30% of UVR enters in non-covered side areas
      - *Want the glasses to wrap around the outer edges of the eye orbit and fit close to the skull* [89]
    - Just because lenses are dark doesn't mean they block UV
      - *Ask the students what happens to the pupil of their eye when in a dark room. Answer: it expands, and thus lets in more light. Therefore, dark lenses without UV protection can actually allow in more UVR.*

        ***Demonstrate the wraparound sunglasses by placing them on your eyes and point out the"100% UV Protected" label.*

- **Slide 93**
  - Wear a shirt
    - *Sun protective clothing can be purchased with an UPF*
      - *UPF = Ultraviolet Protection Factor, same protection as SPF (UPF 30 = 97% protection)*

      ***Hold up the UPF shirt for the students to see. Show them the UPF tag.*
      - *UPF clothing can be purchased at sports stores, department stores and online*

- Fabric UV Protection
  - *Qualities of regular clothing that make them sun protective*
    - Weave, tighter is better
    - Color, darker is better
    - Weight, heavier is better
    - Stretch, less is better
    - Wetness, dry is better
      White t-shirt =SPF 7 when dry
      SPF 3 when wet[14]
    - Clean is better
      - *Detergents contain optical brightening agents[90] that deflect UVR*
    - Polyester or polyacrylic better than nylon or cotton
      - *due to smaller pore space (holes between fibers) [90-91]*

***Ask the students what fabric they wear all the time that has one of the highest UPF's. Answer: Denim has an UPF of 1700.*

***Ask the students what they think the UPF for a white t-shirt is (seven). Then ask them what it is when wet (three). Point out that many put on a t-shirt when sunburned at the pool or beach and then get back in the water. In reality, this offers them very little protection and is why they often end up with a bad sunburn.*

- **Slide 94**
  - Reflection and Cloud Cover[15]
    - Sand reflects 20-30% of the UV rays
    - Snow and ice reflects -- 80-90%
    - Water reflects -- 100%
      Reflection off natural surfaces (water, ice, snow) increases UVR
    - Clear skies allow 100% UV rays to reach *earth's* surface
    - Scattered clouds allow 89% of UVR to reach surface
    - Overcast clouds allow 32% of UVR to reach surface
      This is why some people get sunburned on cloudy days. Sun protection is necessary even on cloudy days and in the winter.

- **Slide 95**
  - Altitude, Latitude, Time of Day and Year
    - UVR increases by 8-10% *for every* 1000 feet *increase in elevation[92-93]*
    - *There is* 40-50% more UVR at 5000' (most ski resorts *are 5000' and above)* than at sea level
      Increase in altitude means there is less atmosphere to filter UVR = increase in exposure. These percentages do not take in the additional increased radiation from reflection off the snow and ice.
    - Top of mountain (10,000 feet) = 80-100% more UVR
    - Increased UVR at noontime *(most direct angle of daily UV rays)*, in summer

(most direct rotational angle of the sun's rays), and closer to equator *(more UVR, a thinner ozone layer, and more direct sun's rays).*[60, 77, 94]

- **Keeping Yourself Healthy**
  - **Slide 96**
    - *Perform a* Monthly self skin exam
      - *Examine your body for changes in skin spots on a regular basis*
        - Be sure to check where the "sun doesn't shine"
          - *Melanomas and basal cell skin cancers can grow in non-sun-exposed areas*
        - *Look in places you don't always put sunscreen*
          - *Part your hair and look at your scalp*
          - *Check your ears and behind your ears*
          - *Look at the soles of your feet*
          - *Look between your fingers and toes*
      - *Note the size, shape and color of existing spots*
  - **Slide 97**
    - Know your family medical background
      - *If skin cancer runs in your family, you should definitely have regular full body skin exams by a doctor*
    - See a dermatologist for abnormal spots
  - **Slide 98**
    - Who finds melanoma cancers? You do[95-98]
      - Patients themselves -- 53%
      - Medical care providers -- 26%
      - Family members -- 17%
      - Others -- 4%

      Patients found changes in spots the majority of the time, not doctors or nurses. YOU find the changing spots. You know your body better than anyone else
  - **Slide 99**
    - When in Doubt, Get it Checked Out
      - People wait an average of 1 year before getting a lesion checked.[99-100]

        A year can be too long for some forms of melanoma.
  - **Slide 100**
    - Good news, bad news
      - Bad news with skin cancer
        - it often has an iceberg effect
        - grows in high risk anatomical areas (*nose, mouth, ears, eyes)*

- **Slide 101**
  - Iceberg effect
    - Often by the time the skin cancer is visible on the surface, it has spread in a larger area under the surface skin.

      Pictures of pre- and post-op sizes of a basal cell skin cancer.

      ***Basal cell skin cancers rarely spread to other sites in the body, but often create considerable tissue damage before they are diagnosed. Mohs surgery is a tissue sparing treatment that removes layers of skin (one level at a time) that are then stained and differentiated under the microscope. A map is then drawn, quadranting the lesion site to identify areas of cancerous and normal cells. Only the cancerous sections are then removed. This process is repeated until all tissue samples are normal. Mohs surgery has the highest cure rate (99%) for basal and squamous cell cancers.[56] There is controversy over its use in melanoma, but it shows promise for use in lentigo maligna melanomas.[57]*

- **Slide 102**
  - High risk anatomical areas
    - Nose, Mouth, Eyes, Ears
    - Most skin cancers appear on the head and neck, may leave a large surgical hole *after removal,* and may take several surgeries to reconstruct *facial features like noses, ears, eyes and lips.*
    - Protect Your Face!

- **Conclusion**
  - **Slide 103**
    - The Good News
      - If found early, skin cancer is 90-95% curable[56]
      - It's one of the few cancers you can see

      ***That is why it is important to know what to look for in lesion changes like the ABC's of melanoma.*

      For two day course only: *Today we have concentrated on early detection and what to look for in skin cancers. Tomorrow we will talk about prevention or the different methods of sun protection. In a few minutes we are going to use the skin analyzer machine so let's look at what you'll be looking for in the SAM.*

  - **Slide 104**
    - Female, age 17 years
      - *Left – a color photograph taken with a standard camera*
      - *Middle – a black and white photo taken with a standard camera*
      - *Right – a photo taken with an ultraviolet camera that illuminates sun damage in the upper layer of the skin.*

    ***Note the dark spots across the nose, upper lip, chin, and forehead. The UV camera photo shows skin damage in a way we cannot see with the naked eye. Note in the far left photo that you can barely see even a freckle on the girl's face, but in the far right photo there is sun damage (spots) across her nose, under her eyes, on the top of her forehead, and on her chin.*

- **Slide 105**
  - Female, age 64 years
    - *Left – a color photograph taken with a standard camera*
    - *Middle – a black and white photo taken with a standard camera*
    - *Right – a photo taken with an ultraviolet camera that illuminates sun damage in the upper layer of the skin.*

  ***Note the skin damage visible in the far left photo and the increase in spots in the far right photo. Sun damage is cumulative and causes not only skin cancer, but also wrinkles, sagging skin, and pigment discolorations. Many of the signs of aging skin are due to UVR.*

- **Slide 106**
  - Skin Analyzer Machine (SAM)

    ***Explain that this is the machine they will be putting their heads in.*

- **Slide 107**
  - *Normal digital photo (left) and photo using skin analyzer machine (right)*
  - SAM -- What the colors mean

    Blue purple = hydrated skin
    Brown-purple spots (look like freckles) = sun damaged areas
    White = Dead skin, scars, clogged pores, teeth, lint
    Yellow or orange = oily skin, make-up, sunscreen
    Red-pink = dehydrated skin, thin skin

- **Hands On Demonstration with the Skin Analyzer**
  - **Give the following verbal instructions:**

    "The skin analyzer box that we will be using in a few minutes does the same thing as the UV camera in the previous slides. [Open the SAM and pull back the metallic curtains to show them the inside of the SAM as you talk.] *It is a box with a round mirror and several black lights. The light bulbs inside illuminate the skin layer in a way not visible to the naked eye. This shows sun damaged skin."*

    "Place your chin close to, but not on, the bottom mirror and look down at your own face. Do not place your face close to or on the lights. You can wear eyeglasses in the SAM. There is a slight plastic smell. If you have recently had eye surgery, you should not use the SAM."

    "There is a viewing port on the back of the machine through which another student can see the student inside the SAM. If you do not want your classmates viewing your skin, we can place our hand over the viewport."

    "This is not meant to scare anyone. This is meant to show you your current level of sun damage and encourage you to use sun protection. Damage you see today can be kept from migrating to the surface sooner if you use preventative methods."

    Explain the colors of normal and sun damaged skin. Redheads are the skin type

that show the most damage in the SAM. Be cognizent of student's feelings and their privacy.

Ask the teacher how he/she would like to move the students through the SAM. Some teachers will want students to go up in pairs, others will move students by rows or tables.

Be careful of the electric cord. Students also tend to get excited using the SAM and may pull the lid down upon their head by pulling on the drapes that shield the outside light. It is a good idea to put one hand on the top of the SAM holding it at the handle while the students use the machine. This will keep it from being tipped over, pulled off the table due to someone catching the electric cord, and also allow you to cover the viewport if needed.

***Background information on the SAM (for SPOTS teachers only, not teen students)**: The SAM utilizes long-wave UVA light (325 nm) that is emitted from lightbulbs within a curtained box. UV light from the SAM penetrates predominantly in the stratum corneum and the epidermis where melnanin is distributed. Light penetration is up to 2mm and illuminates different areas in various fluorescent colors. Hyperpigmentation (melanin accumulation) appears as dark spots on a background of skin. Normal hydrated skin appears blue, oily skin appears yellow to pink, and dry skin appears purple. Damaged hyperpigmented skin appears as dark "freckles", dead or very dried skin appears white, and heavy make-up or sunscreen will block the effect of the SAM's lights. It is similar to the Wood's Lamp (365 nm) used in dermatology offices to diagnose and treat skin diseases.*[102, 103]

- **While one SPOTS teacher is running the SAM, the other SPOTS teacher can tell the students this begins the short question and answer period.**

***Ask them questions if they don't ask you. This will break the ice and encourage participation. What was new to them? Was anything confusing? What did they like the most (made the biggest impression)? Thank the students for their time and attention. If you're doing a two-day course, then give them a short preview of what will be covered during the next session.*

SPOTS WORKSHEET

- **SKIN CANCER STATISTICS**
  In the US, _____ out of every _____ people has skin cancer.

- **LIST THE TWO MAIN WAYS YOU CAN DEVELOP SKIN CANCER**
  1. _____ 2. _____
  - **Put a star next to the one you have control over**

- **LIST THE ABC'S OF MELANOMA**

  A = _____

  B = _____

  C = _____

  D = _____

  E = _____

- **LIST FIVE RISK FACTORS FOR SKIN CANCER (Different from protection methods below)**

  1. _____

  2. _____

  3. _____

  4. _____

  5. _____
  - **Put a star next to any risk factors that you have**

- **LIST FIVE WAYS YOU CAN PROTECT YOURSELF FROM THE SUN**

  1. _____

  2. _____

  3. _____

  4. _____

  5. _____

SPOTS WORKSHEET

- SKIN CANCER STATISTICS

  In the US, __1__ out of every ____5____ people has skin cancer.

- LIST THE TWO MAIN WAYS YOU CAN DEVELOP SKIN CANCER

  1. * Ultraviolet radiation – sunlight or indoor tanning
  2. Heredity

  - Put a star next to the one that you have control over

- LIST THE ABC'S OF MELANOMA

  A = ASYMMETRY
  B = BORDER
  C = COLOR
  D = DIAMETER
  E = EVOLVING

- LIST FIVE RISK FACTORS FOR SKIN CANCER

  1. CHANGE IN A MOLE
  2. LOW SKIN TYPE (I, II, or III)
  3. MORE THAN 50 MOLES/BODY UNDER AGE 18
  4. FAMILY HISTORY OF SKIN CANCER
  5. USE OF INDOOR TANNING BEDS

  - Put a star next to any risk factors that you have

- LIST FIVE WAYS YOU CAN PROTECT YOURSELF FROM THE SUN

  1. DAILY USE OF SUNSCREEN ALL YEAR
  2. WEAR PROTECTIVE CLOTHING
  3. STAY OUT OF SUN 10-4, SEEK SHADE
  4. DO NOT TAN
  5. WEAR A HAT AND SUNGLASSES

HELPFUL INFORMATION ABOUT SKIN CANCER

How To Prevent Skin Cancer

- Do NOT use indoor tanning beds!
- Wear sunscreen every day, all year long
- Cover up with hats, glasses, and clothes
- Know your skin type and the UV Index
- Remember: Short Shadow = Seek Shade
- Perform a visual body check each month
- Protect people under age 18 from the sun
- Know your family history for skin cancer
- If you find a strange spot, don't wait— SEE A DERMATOLOGIST RIGHT AWAY!!!

Self-Tanner Tips

- Shave and exfoliate your skin
- Moisturize and let sit for 3 minutes or don't moisturize
- Use plastic gloves to apply
- Use a tanner with color so you can see where you've applied it
- Use a light coat on wrinkled or bendable areas (knees and elbows)
- Reapply every 4-5 days
- Start with lightest shade to avoid orange color

Signs of Basal/ Squamous Skin Cancers

- A reddish patch
- A shiny, pearly bump
- A pink bump with an elevated, rolled border
- A persistent non-healing sore
- A scar-like area with poorly defined borders
- Scaly red patches that are tender
- Open sores that don't heal
- Wart-like growths
- Elevated growth with a central depression

Sunscreen Basics

- Choosing It
  - SPF 30 or above
  - UVA/UVB protection
  - Good smell!
  - Zinc/Titanium Oxide for sensitive skin
  - New bottle every summer
- Using It
  - 1 oz on your body, 1 tsp on your face
  - Apply two coats 20 minutes apart
  - Apply 30 minutes before going outside
  - Reapply every 1-2 hours
  - Use sticks on your lips and nose
  - Use sprays on your head and back

How to Treat a Sunburn

- **Symptoms:** redness, swelling, pain, blisters, fever, chills, and dry, itchy peeling skin
  - ▪Symptoms begin 2-4 hours after exposure, peak at 24 hours, skin peels at 3-7 days.
  - ▪Sensations of pain and heat generally last 48 hours.

- **Oral Treatments**
  - ▪Take ibuprofen (Advil) or Tylenol immediately, and for two days; may relieve some symptoms. Aspirin can be taken by adults but not children under 18 years (may lead to Reyes Syndrome).
  - ▪Drink plenty of fluids to rehydrate your system.
  - ▪A severe burn may require oral steroids especially if swelling is excessive or the burn is on the face and neck.

- **Topical Treatments**
  - ▪Use nonprescription 1.0% hydrocortisone cream as soon as possible to decrease pain/swelling; apply 3 times a day for the first two days unless you have open sores.
  - ▪Apply cool wet compresses to the skin. Chill washcloths in the refrigerator.
  - ▪Use bath products containing oatmeal (Aveeno) to relieve itching.
  - ▪Avoid soap, it can be drying.
  - ▪Take a cool (not cold) bath; showering is okay unless it is too painful.
  - ▪Topical moisturizing creams with aloe or calamine help rehydrate and soothe skin.
  - ▪If skin is broken from open blisters or dry cracks, use an antibiotic ointment on these sites, not a moisturizer or hydrocortisone as these may lead to infection.
  - ▪Avoid applying petrolatum, other ointments or butter – they block sweat glands and prevent heat escaping from the skin.
  - ▪First aid creams or topical anesthetic medications containing benzocaine or diphenhydramine should not be used due to possible irritation or allergic skin reaction.
  - ▪May use non-sensitizing topical anesthetic creams that contain menthol, camphor or praxomine to relieve itching.

- **Home Remedies (may be helpful, but controlled studies are lacking)**
  - ▪Compresses can be soaked in a solution of 1 cup skim milk to 4 cups water (refrigerated) and then applied to skin.
  - ▪Adding vinegar (2 cups, white or apple cider) or baking soda (2 oz.) to bath water may help. Vinegar in a wet compress may be applied directly to skin unless it is open.

- **General Treatments**
  - ▪Swelling is most severe in the first 24-48 hours. Elevate burned body parts if possible. Sleep on two pillows if face is burned.
  - ▪Do not peel off dried skin before the skin beneath is healed, this may lead to scarring.
  - ▪Wear no pajamas or wear them inside out to prevent chafing from seams.
  - ▪Heat exhaustion or heat stroke may accompany a severe sunburn especially in children and the elderly.
  - ▪Keep the burned skin out of the sun until it heals. Burning a sunburn will lead to scarring and possibly skin cancer. Wear protective clothing if outside before healing.

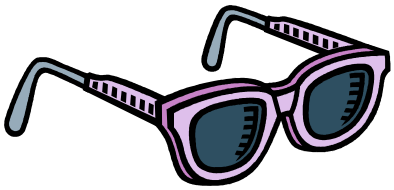
- **Call a Doctor**
  - ▪If a sunburn is accompanied by a fever >102°, large numbers of blisters, severe pain, excessive swelling, fainting, nausea, vomiting, diarrhea or if child is less than 1 year.

Dear Parents,

Today in school . . .

your child was taught about skin cancer and sun protection through the Sun Protection Outreach Teaching by Students (SPOTS) program. During this program, two medical or allied health students spent a class period with your child. Through the use of a PowerPoint lecture, games, hands-on demonstrations, a video, and a skin analyzer machine, your child learned the risk factors for, and how to detect a skin cancer, and ways to protect themselves from ultraviolet radiation.

Why is this important?



Skin cancer is more common than **all** other cancers combined and is one of the leading causes of cancer death among women aged 25-29 years. The two main factors in skin cancer development are exposure to UVR (through sun exposure and the use of tanning beds) and heredity. The rate of adolescent skin cancer has been steadily rising over the past 20 years. Tanning beds are especially problematic because they use UVA rays, which cause advanced skin aging and cancer without producing the warning sign of a sunburn, plus they give off a large dose of radiation in a small time period. Studies have shown that by age 18, 40-47% of white females in the US have used a tanning bed and the UVR in tanning beds is up to 15 X as strong as the sun. Redheads and blonds with blue eyes and fair skin, people who have a lot of moles, and families with a history of skin cancer are at a higher risk for skin cancer. Even in winter and on cloudy days, UVR is present. Sun damage is cumulative – the older you are, the greater the damage. Freckles are often the first sign of sun damage. Parents are an important role model for their children. Please protect not only your student, but yourself. Be a good role model -- demonstrate sun safe behaviors.

Ask your child what they have learned about sun protective methods:

Ask to look at the SPOTS brochure and handout
(includes tips for applying self-tanner and choosing a sunscreen)

- Apply sunscreen every day year round. Put a bottle next to their toothbrush.
- Start with an SPF of 30, apply a full ounce to the body, and reapply every 2 hours.
- Choose sunscreen with a nice smell that feels good on the skin – it only works if you wear it!
- Use wide-brimmed hats, sunglasses, and UPF/SPF clothing.
- The SPF of a wet white t-shirt is 3! Wearing one in the pool won't do much to protect you.
- Seek shade between 10am and 4pm and stay out of the intense sun from 11am to 1pm.
- Ask your child about the ABC's of melanoma (suspicious moles are Asymmetric, have irregular Borders, have more than one Color, have a large Diameter, or are Evolving).

Skin cancer is an easy cancer to see since it grows on your skin. Check your body and the body of your child on a regular basis for any concerning spots and see a dermatologist if you notice anything suspicious.
Early detection is key!

If you have questions about the SPOTS program or would like more information, please visit our websites at http://spots.wustl.edu or http://dermatology.slu.edu/spots

~ The SPOTS teachers thank you ~

SPOTS Video "Get It Checked Out"

Main Points

- ***Yes, YOU can get skin cancer, it's no longer just a disease of older people***.
  More teens and young women are getting melanoma and skin cancer.
  - Statistics

- Primary modifiable behaviors for ***skin cancer are using sun protective methods, something which YOU can easily do***.

- It is ***easy to protect yourself from UVR with a few simple measures***.
  - Risky Business: risk factors are defined
  - ***ABC's of melanoma***: description and pictures (***Skin cancer is one of the few cancers you can see with the naked eye so it is important to know what to look for -- early detection).***
  - Female teen's story of tanning bed use: addictive, inexpensive, social norm
  - Prevention tips: limit UV exposure, use sunscreen, avoid tanning beds, do a skin self-exam, get changing moles checked

- ***When in doubt, get it checked out. The earlier skin cancer is found, the easier it is to treat.***
  - Demonstration of a punch biopsy (reinforces how easy it is to get a changing lesion examined and that earlier is better than later).

- ***Start protecting yourself now. It is never too early.***
  - Messages from the two teens to other teenagers about ***what they wish they had known, how they changed their behaviors, what they would do differently, how it affected their families, and their suggestions*** to other teens.

Format

Video interviews of two teens (male and female) telling their stories of dealing with melanoma are interspersed with commentary from a dermatologist and a Mohs surgeon. The video is narrated by a female teen and the entire format and content has been created to appeal to the adolescent age group.

Main video messages to teens are in bold italics

Answers to Common Questions & Debunking Myths

1. Can indoor tanning beds help clear up my pimples or make my scars fade?

Tanning beds may initially make your acne better, but this is a short term, temporary effect. Indoor tanning beds do not heal acne or help scars to fade. In fact, tanning beds can make both conditions worse over time. The drying effects of ultraviolet (UV) rays can cause your skin to overproduce oil (sebum) and this can actually make you break out more. You may notice that the day or two after using a tanning bed your pimples seem to be clearing, but by the third to fourth day new pimples will form. As for scars, exposure to UV light can make new wounds scar with a darker color and become raised. It can also make old scars stand out white against tan skin.

2. My tanning salon says that tanning beds are safer than the sun. Is this true?

Tanning beds give off at least 2-12 times as much ultraviolet (UV) radiation as the noon day summer sun.[1] Natural sunlight is composed of ultraviolet A, B, and C wavelengths. Ultraviolet C (UVC) rays do not presently reach the earth's surface except possibly at the Poles where the ozone hole is large. Ultraviolet B (UVB) and ultraviolet A (UVA) rays reach the surface. UVB rays are partially blocked by the atmosphere; UVA rays are not. UVB rays are the "burning" rays. UVA rays are the "aging" rays. Both UVA and UVB rays increase the risk of skin cancer development.

The rays from the light bulbs of a tanning bed are composed primarily of UVA rays with approximately 2-6% UVB radiation.[2] These percentages are used in the hopes that the tanning salon patron doesn't leave with a burn as can occur from too much UVB exposure. Unfortunately, there is no early warning sign of skin damage with UVA rays since they don't burn your skin like UVB rays do. However, they penetrate deeper into your skin and cause more permanent damage (early wrinkling, loss of elasticity, freckling/dark spots, and skin cancers). Additionally, most tanning beds have a special rectangular insert to tan the face which can emit much higher doses of radiation than the bed's bulbs. In a 2003 study, the average wattage of indoor tanning lamps for UVA radiation was 192 W/m^2 and for erythemally-weighted UVB was 0.35 W/ m^2. [3] These lights contain four times more UVA and two times more UVB than the radiation from the noon sun during the summer in Washington, DC.[3]

Tanning salons also have different level beds that emit higher amounts of radiation as the level increases. Level three and level five beds emit higher radiation doses than level one beds. In the high-pressure tanning beds, UVA doses of 10-15 times natural sunlight have been found by the FDA[4] and can add 30-300% more UVA to one's annual solar exposure.[5] Studies have shown that not only do patrons exceed recommended limits,[6] but they also begin tanning at maximum doses usually reserved for *maintenance* tanning.[3] Tanning bed use in adolescence increases with age, desire for the tanned look, peers who tan, and belief in the worth of getting burned to receive a tan.[7] Think about it . . .if you use a higher level bed you tan for a shorter length of time, but you receive a higher dose of radiation.

Several studies and meta-analyses of case-controlled studies have demonstrated a significantly increased risk for all skin cancers, including melanoma, subsequent to the use of indoor tanning.[8-10] Remember that tanning is the skin's way of protecting itself from UV rays, whether those rays are produced by the sun or by light bulbs. Overexposure to natural or artificial UV rays can cause eye injury, premature aging and rashes of the skin. It can also increase your chances of developing skin cancer.

3. The tanning salon I go to sells tanning lotions to use in the tanning beds. Won't these protect me from the UV radiation?

These lotions are called tanning accelerators. They are primarily composed of moisturizers with added

colorants like henna, carrot oil or dihydroxyacetone (main ingredient in most self-tanning preparations) that dye your skin a light orange-brown to give the appearance of a darker tan. Some tanning accelerators add a chemical that causes a warm skin tingling in reaction to the tanning bed lights to create the illusion of heat so you feel like you are getting a "good tan." Others may contain tyrosine (an amino acid precursor to melanin formation) and claim this increases one's ability to tan by increasing the amount of melanin. Several studies have not substantiated this claim and the FDA has issued warnings against its use.[11] Finally, most tanning accelerators do not contain sunscreen and will not protect you from the UV radiation.

4. Can children and teenagers get skin cancer too?

Skin cancer is uncommon in children. However, damage that later results in skin cancer is accumulated in childhood and during the teenage years. Skin cancer is becoming a problem for more and more young people—especially those in their late teens and early twenties. Studies have shown that early UVR exposure[12-14] and blistering sunburns double to triple your risk of skin cancer.[15-16] This means that it is important for you to protect yourself from the sun now.

5. Is it okay to take infants out in the sun?

Infants under the age of six months should never be directly in the sun; they should always be shaded and protected. They have less melanin in their skin at this age and are therefore more prone to sunburns.[17] Whenever a baby is outside, they should be protected with wide brim soft hats, sunglasses with Velcro cloth closures that wrap around their changing head diameter, protective clothing, and high UPF umbrellas or tents. Chemical sunscreens are often not recommended for infants six months and under due to the risk of allergic (systemic and skin) reactions. Additionally, their skin may have different absorption rates and their bodily system may not be mature enough to metabolize and excrete any absorbed chemicals from the sunscreens.[18] Physical (barrier) sunblocks containing titanium dioxide or zinc oxide are considered safe for infants/young children and can be applied on skin areas not covered by physical means (clothing, hats). The chemicals in some sunscreens may cause a young child's skin to react with redness and irritation. If so, use a barrier-only sunblock.

6. I tan really easily, so I don't need to worry about skin cancer, right?

Even if you don't burn when you're out in the sun, the sun's rays are still causing damage to your skin—this damage is what causes skin cancer. The damage is also cumulative (it adds up over time) so you may not notice until it's too late. How well you tan isn't the only factor in causing skin cancer. The number of moles or nevi (dark spots) you have on your body[19] is also a risk factor for melanoma, as well as your family history,[20] and your lifetime sun accumulation.

7. Do I need to wear sunscreen while I'm in the car?

Yes. Windows and car windshields somewhat reduce exposure to UV radiation. Clear window glass in most vehicles blocks UVB rays, but not UVA. The Federal Motor Vehicle Safety Standard #205 states that window glass used in cars must allow 70% of the incident light to pass through for safety and visibility. However, this standard also allows for windows that are not needed for driving visibility to be tinted darker or glazed (side and rear windows).[21] This means that front car windshields are partially treated against UVA rays through the installation of a shade band across the top portion of the window. Many older vehicles have tinted windows, but these do not necessarily shield from UV radiation; they shield from glare. Additionally, side windows are often not fully UVA protected. For these windows, a UVA protective film can be applied.[22]

8. Can I catch diseases like AIDS or gonorrhea from a tanning bed?

No. Very few sexually transmitted infections (STI's) survive for long in the open air. Although some STI's can live in a hospitable environment (such as warm, wet towels) for a brief period of time, they can't survive on a tanning bed. In fact, ultraviolet radiation is very effective at killing many bacteria and viruses. Sometimes, however, you may develop a rash (usually red and itchy) wherever your body has touched the tanning bed from the chemicals they use to clean the bed's acrylic surface. Additionally, if you are taking certain medications (tetracycline, doxycycline, sulfa antibiotics, birth control pills, adapalene or isotretinion, to name just a few) they can cause a skin reaction from exposure to UV light. They can also cause other problems, most notably sunburn and itchy rashes.

9. Won't a healthy tan protect my skin?

A tan might look good to some people, but it really means your skin has been damaged. Producing melanin, which makes your skin look darker, is your skin cells' response to block a damaging agent, ultraviolet radiation. The protective ability of a tan your skin can produce is limited based on skin type. For example, in a Skin Type II, a tan is only equivalent to an SPF of two to three.[23-24]

10. If I wear sunscreen, can I stay in the sun as long as I want?

No, sunscreens don't last forever, must be reapplied, applied in the proper amount, and used in conjunction with other non-sunscreen sun protective methods. Studies have shown that applying sunscreen once may give you a false sense of security that you are well-protected and thus can stay in the sun longer.[25-26] This is a fallacy. There is no such thing as an all-day or 8-hour outdoor sunscreen. Sunscreens should be reapplied every 1-2 hours, in the proper amount of 1-2 full ounces, and with an SPF of 30 or above.

The SPF (Sun Protection Factor) number is meant to reflect how many minutes you can stay in the sun. For example, a person with Skin Type I can stay in the sun for about 10 minutes without sunscreen before they begin to burn. If that person applies a sunscreen with an SPF of 15, they should be able to stay in the sun for 150 minutes without burning (10 x 15). However, this equation allows a Skin Type I (most susceptible to skin cancer: fair skin, blond/red hair, blue eyes) to stay in the sun for 150 minutes if using an SPF of 15. That's longer than the two hours in which sunscreen should be reapplied and longer than the longest lasting sunscreens (very water resistant sunscreens last only a maximum of 80 minutes).

Unfortunately, this SPF equation doesn't reflect the reality of the situation. The SPF number is based on applying at least a full ounce to your body (5'4", 150#, waist 32"),[27] which the rare person does. In addition, the SPF was calculated in labs under solar simulators that use mostly UVB light and little or no UVA light. In comparison, natural sunlight has about 20 times the amount of UVA as UVB,[28-29] the reverse of solar simulators. So natural sunlight has a lot more UVA compared to a laboratory solar simulator that uses mostly UVB light. Quite simply, the lab's solar simulators need to use more UVA light to mimic the light wavelengths of natural sunlight, and yet even more to mimic indoor tanning radiation output. Studies have shown that putting on half the appropriate amount of sunscreen does not decrease the protective coverage by half, but by 75%[30] since sunscreen protection does not decrease in a linear fashion.[31] Additionally, the different types of sunscreen adhere and apply in different amounts based on their viscosity and spreadability[32] (lotions cover best because they spread easily; sticks are better for small areas – lips, tip of nose, ears, but spread poorly due to their wax matrix; gels spread easily and cover well but are full of alcohol and if used on the face burn the eyes so people often put on less; sprays/mists can have less coverage due to the fact that much of it may be lost to the air and on other surfaces). Finally, sunscreen is removed by sweating, toweling off, friction from swimming, the salt in the ocean, and the chlorine in the pool. It must be reapplied.

The real answer is to limit your time in the sun between 10am-4pm. If you can't do that, then cover up, reapply using the right amount of sunscreen, and seek shade or use other sun protective methods. Sunscreen

use needs to be combined with other protective methods; it should not stand alone.

11. Do I still need to wear sunscreen during the winter or on cloudy days?

The sun may not feel hot during the winter or on cloudy days, but the UVA and UVB rays are still there and being absorbed by your skin. According to the CDC, 32% of the UV rays still reach the earth's surface on an overcast day.[33] UVA rays penetrate glass so they can easily pass through water vapor (clouds) and they are present all year long, whereas UVB is more prominent in the summer.[34] Remember your sunscreen and protective gear even when the weather is not sunny. Protect your skin 365 days a year by storing a bottle of sunscreen by your toothbrush. Just as we brush our teeth daily, we should get in the habit of applying sunscreen daily, all year long, especially to the face and neck (the principal areas of skin cancer location).

12. I'm going skiing in the mountains, not to the beach, so I don't have to use sunscreen, right?

In the mountains, the sun's rays are more intense because the air is thinner at higher elevations (less atmosphere), you are closer to the sun's rays, and there is more reflection off snow and ice surfaces. For every 1000 feet you increase in altitude, your UVR exposure increases by 8-10%.[35] Most U.S. ski runs are at 8,000-12,000 feet in elevation. This means if you live in St. Louis, MO (465 feet above sea level) and go skiing in Vail, CO, at 12,000 feet elevation, you increase your UVR exposure by 64-120 percent. Plus, you're not hot in the mountains, so you tend to stay in the sun longer. CDC studies have shown that the reflected rays from snow and ice are nearly equivalent to those reflected off of water (80-90%).[33]

13. Are sunless tanning lotions really safe?

Yes. Sunless tanning lotions, otherwise known as self-tanners, are a great alternative to tanning beds or lying out in the sun. Sunless tanning lotions contain 3-5% DHA (dihydroxyacetone), a simple sugar that was first studied in the 1950's in diabetic children who ingested DHA as a glucose tolerance test. DHA dyes or stains the topmost layer of the epidermis (stratum corneum). This layer is composed of mostly dead skin cells that slough off regularly which is why you have to reapply sunless tanning lotion once a week.

If you go to an indoor spray-on tanning booth or use airbrushing to receive a sunless tan, there are precautions you should take because the self-tanner is aerosolized. Precautions include not inhaling (holding your breath is usually fine since the session lasts only 15-30 seconds) or using a nose filter, protecting your eyes (wear goggles), protecting your lips (lip balm), and protecting your nails (with Vaseline) and hair (with a shower cap). Most tanning salons supply a shower cap, goggles, and a towel to wipe off excess self-tanner. If you are allergic to DHA, are pregnant, or have asthma it is probably best to avoid using spray-on tanning methods.[36] Areas of skin that are more wrinkled (elbows, knees, ankles, crow's feet, and lines around mouth) or thicker (palms and soles) tend to absorb more of the DHA and become darker as time goes on. Dihydroxyacetone is minimally photoprotective by itself (SPF 2-3)[37] so you must still use a sunscreen, unless the product has a sunscreen built in.

14. What about tanning pills?

Tanning pills usually contain a mixture of vitamins, carotenoids and antioxidants, such as vitamin C and vitamin E. Tanning pills tint the skin an orange color, especially the palms, but don't produce a "real" brown tan. The color change is due to the accumulation of carotenoids (also found in carrots) in the skin. The color is temporary and usually fades within a few weeks after discontinuing the pills. Canthaxanthin, a beta carotene found in plants and crustaceans, has been associated with retinopathy, uticaria, hepatitis, and aplastic anemia when ingested in large quantities.[36] It has shown up in crystallized form in the eyes leading to injury and impaired vision.[38] Other pills called psoralens are used by dermatologists to treat skin conditions. Psoralens are legally dispensed by prescription and are to be used under a physician's guidance. Improper use

of psoralens not only exposes you to higher doses of radiation, but can cause ocular damage and definitely causes premature aging, drying, elastosis (loss of elasticity), lentigenes (brown age spots), and skin cancer.[39] Medicinal use of psoralens exposes you to the same side effects, but the benefits of resolving psoriasis lesions outweighs the risks for most patients. Additionally, the dose of psoralen and UV light are medically managed and timed.

Tanning pills do not protect against sunburn. When your skin is exposed to ultraviolet (UV) light, it stimulates cells known as melanocytes, which make a brown pigment called melanin. This is your skin's way of protecting against UV damage. Tanning pills don't increase production of melanin, so they don't provide the same protection. Tanning accelerators containing tyrosine have not been shown to work[11] and, while banned by the FDA, are still available.

There is currently a pill (Melanotan) under study that may help increase melanogenesis in low phenotypes, but it is still in the early stages of research.[40-41]

15. How do I apply self-tanning lotion without it looking fake?

If applied properly, most self-tanners today do not cause the same orange discoloration of the old formulations. As stated earlier, self-tanners contain a simple sugar called dihydroxyacetone (DHA). This sugar reacts with amino acids to produce yellow-brown pigments called melanoidins and only colors the topmost layer of the epidermis known as the stratum corneum. It is essentially harmless.

In order to obtain a good coloration from DHA, you should first purchase a self-tanning lotion that is colored or tinted so you can visually see where and how much you are applying. This will allow you to apply an even coat and prevent streak marks. It is also a good idea to buy a box of inexpensive disposable gloves. Wearing these will prevent your palms from absorbing the DHA. If you don't have gloves, wash your hands immediately after applying self-tanner. Next, prepare the skin surface by shaving (if applying to an area that will be shaved like females' legs), exfoliating to remove dead skin cells (the dead cells uptake more of the self-tanner and will initially appear darker and then peel off to reveal a lighter patch of skin), and then moisturizing the shaved and/or exfoliated skin (allow the moisturizer to sink in for about 3 minutes). Uniform moisture content of the stratum corneum over several hours is important to the development of even pigmentation from the DHA.[42] Under- and overhydration can decrease the pigmentation reaction. Finally, apply the self-tanner in even strokes and with a lighter application on highly mobile body areas (knees, elbows, ankles, around eyes and mouth) which will uptake more of the self-tanner and turn darker. Also, those areas of your body naturally tan a lighter color than other parts and will shout "fake tan" if darkened.

Applying self-tanner daily in an effort to get a dark tan quickly will create an abnormal coloration. It is best to reapply it no more than every 2-3 days and to start with a light to medium formulation rather than dark. The resulting color is also dependent upon your skin type and natural coloration. Darker blonds and brunettes have the best color results. Redheads (Skin Type I) and darker haired persons, especially those with olive skin tones do not have as "natural" a result as those with golden undertones.[11] Many people purchase the "dark" formulation and apply it daily which will eventually turn their skin orange. Self-tanners work well for Skin Types II and III if you start with the "light" or "medium" formulations, apply it no more often than every three days, and allow yourself to "tan" over a period of about 1-2 weeks. Trying to get an overnight tan will turn you an abnormal color.

Moisturizers with self-tanner have a lower percentage (1%) of DHA than products marketed as self-tanners. These may be applied on a daily basis depending upon your skin type.

16. Is it OK to tan if you are wearing sunscreen?

Tanning indicates a defensive reaction of your skin to ultraviolet radiation, so no tan is healthy or safe. Use a broad-spectrum sunscreen that blocks both UVA and UVB rays with an SPF of at least 30 and a

high UVA rating. Remember you need to apply sunscreen 20-30 minutes before going out in the sun. This allows the chemicals in the sunscreen to bind with the skin's cells and not be as easily washed off by the chlorine in the pool or the salt in the ocean. Reapply sunscreen every 2 hours, and more often if you are swimming, sweating, exercising or toweling off. Wright found that people who waited longer than 2.5 hours to reapply sunscreen increased their chance of sunburn 5-fold compared to those who reapplied every two hours.[43]

17. Don't I need a lot of sun exposure to ensure I get adequate levels of Vitamin D?

Vitamin D synthesis in the skin occurs with the absorption of UVB which causes the production of D_3 (cholecalciferol). Presently, the average Caucasian adult needs about 5 to 15 minutes of sun exposure on the hands and face three times a week[3] to produce a sufficient supply of Vitamin D. Current daily suggested dosages of vitamin D are 200 IU (5 mcg) for age 0-50 years, 400 IU (10 mcg) for 51-70 years, and 800 IU (20 mcg) for 71+ years.[44] However, new research[45-46] is showing other possible beneficial effects of Vitamin D in modulating immune responses, cardiovascular disease, and diabetes, and decreasing the risk of colorectal adenomas and breast cancer, in addition to the long term known effects on skeletal homeostasis. Thus, increasing the required daily intake (to >30mcg) has been proposed.[47] While Vitamin D can be obtained from fortified liquids (two cups of Vitamin D fortified milk or orange juice supplies 200 IU) and foods (salmon, sardines, shitake mushrooms, tuna, eggs, cod liver oil),[48] to reach higher levels, vitamin supplementation is usually required.

However, there are a few caveats.[49] Persons with gastric malabsorption may not be able to absorb oral Vitamin D. Darker skinned individuals don't produce Vitamin D as easily from sun exposure as do lighter skinned people. Plus, many darker skinned persons are lactose intolerant so intake of Vitamin D enriched milk is not an option. Living at higher latitudes, older age, darker pigmentation, and those who religiously avoid sun exposure (ie: Middle Eastern women who cover their head/body with clothing) may require higher levels of Vitamin D intake. Ingestion of Vitamin D is a safer alternative than exposure to UVR, especially for lighter skinned individuals. Regarding the use of sunscreen and vitamin D: several clinical trials have shown that sunscreen use had little or no effect on Vitamin D levels and osteoporosis,[50] vitamin D levels and clothed infants, and vitamin D levels within a six year study of patients with xeroderma pigmentosum who used sunscreen.[23] Beyond that, the maximum possible cutaneous vitamin D synthesis occurs within a few minutes of sun exposure for light-skinned people (too much sun begins the destruction of vitamin D_3 and the initiation of skin cancer DNA changes) and incidental sun exposure is high.[46, 49] The current best advice is to wear sunscreen and take a vitamin D supplement.

18. Doesn't a tan help you look healthier?

Too much sun actually ages you prematurely. Compare skin on your face and hands with skin on a part of your body that is not regularly exposed to the sun and see the difference. A tan is a short-term bronzed look that can easily be achieved by self-tanners, bronzing powders, tinted sunscreens and other cosmetics. The use of these methods will help to prevent early signs of aging. Early aging is another compelling reason to protect your skin from the damaging effects of ultraviolet light.

19. My mom's doctor told her to go to a tanning bed. Why can't I?

Rarely, an individual may have a medical condition — such as certain types of eczema or psoriasis — for which a doctor recommends exposure to special kinds of UV light. In these people, the UV exposure helps treat their skin condition (the benefits outweigh the risk of the UV light causing skin cancer). The treatment is typically done in a medical setting where the UV light output is both wattage-regulated and time-controlled by a medical professional. Most indoor tanning is not as stringently controlled. These patients also have an

increased rate of skin cancer.[51] The risks versus benefits need to be considered by physicians before advising use of indoor tanning.

20. My facial foundation has an SPF of 15, so I'm protected, right?

Facial foundations with sun protection factors are better than those without SPF. According to Draelos, most facial foundations degrade due to accidental removal, perspiration, oil production, and tearing, thereby decreasing the photoprotection within about two hours.[52] It is recommended that foundation be reapplied every two hours if using for photoprotection. An alternate method is to apply a sunscreen first and then apply a foundation on top of the sunscreen. Either way, reapplication should occur every two hours if using for sun protection.

21. If I put on a sunscreen with an SPF 15 and then put on more sunscreen with an SPF 10, do I get a total SPF of 25?

No, the highest SPF you apply is the highest SPF coverage you will receive. So, in the above case it would be an SPF of 15. Sun protection factors cannot be added mathematically to get a higher level of protection. The best method is to start with an SPF of 30 and apply two coats[53] twenty minutes apart. This will increase your SPF coverage (since most people don't apply the required amount of 1-2 full ounces to receive the sunscreen's stated SPF) and cover areas missed on the first application.[50, 54]

22. If I tan pre-vacation, then I won't burn, right?

No, a tan is equivalent to an SPF of only 2 - 3 for a skin type II.[23-24] The lighter your skin, hair, and eye color, the less protected your skin is from ultraviolet radiation (UVR). A tan is the body's protective response to a damaging agent -- ultraviolet radiation (UVR). Melanin pigment (the brown color in a tan) is produced to help prevent UV radiation from going deeper into the skin, but there is a limit as to how much melanin your skin can produce and thus, how well it can protect you. This limit is based on your skin type. Tanning also produces an increased growth and thickness of the epidermal cells, causes cell damage to melanocytes and keratinocytes, and the tan itself is inadequate to prevent DNA damage. Acquiring a base or pre-tan only increases the risk of skin cancer.[23-24]

23. I was at the beach the other day for four hours and started to get a little burned after one hour so I put on a white t-shirt and ended up very sunburned. I thought the shirt would protect me. What happened?

This is a common misunderstanding. Once you have a pink color change to your skin, you are burned. You should go inside, seek shade, and get out of the sun. A white t-shirt has an SPF of seven until it gets wet, and then the SPF decreases to three.[55] We often put a t-shirt on to protect ourselves from further sunburn, go back in the pool or the ocean, it gets wet, further decreasing its protectiveness. Increasing the moisture content of fabric even by exercising and sweating in hot temperatures will decrease the SPF/UPF of fabric.[56] Finally, cotton (most common t-shirt material) is the least sun protective fabric; polyesters and nylons have a tighter weave and smaller porosity making them a better choice.[55, 57]

24. What is the difference between a sunscreen and a sunblock?

In general, sunscreens contain chemicals that absorb the UV light and sunblocks contain barriers or physical blocking agents that reflect UV light. Physical sunblock creams are made of zinc oxide and titanium dioxide, the white stuff. Chemical sunscreens contain active ingredients with long names like benzophenones, octylmethylcinnamate, and salicylates. Most sunscreens are a combination of sunscreen chemicals and a sunblock barrier. There are also sunscreens that contain only zinc oxide or titanium dioxide, which are called sunblocks by dermatologists and plastic surgeons, that are used after skin resurfacing procedures such as

lasering, chemical peels, and dermabrasion. These sunblock-only lotions are also good for sensitive skin and babies. Currently, zinc oxide deflects the widest spectrum of UVB and UVA rays. However, the use of the term "sunblock" is a misnomer since no sun lotion totally blocks all of the UV rays. Sunscreen is a better word to use.

25. Wouldn't it make more sense for me to indoor tan because I would be spending less time in the sun?

As explained earlier, tanning beds use lamps that emit primarily UVA wavelengths with minimal UVB radiation. UVA radiation penetrates deep into the dermis, but has no warning sign of a sunburn. It also affects more skin cell components than UVB. Also, when you are outside in the sun, you usually apply sunscreen which affords you some protection unlike in a tanning bed where you don't wear sunscreen. Additionally, when outdoors, the heat will often cause you to seek shade or go indoors whereas most tanning beds have built-in fans and some even have air conditioning units allowing longer stays. Finally, consider the amount of UVR you are receiving in a very short time period (refer to answer for question two).

26. How can I guesstimate how much sunscreen is an ounce without using a measuring cup?

An ounce is approximately equivalent to the size of a golf ball or a shot glass. Another suggested measuring technique by Taylor and Diffey is to use the rule of nines (burn assessment using body surface area percentages). Using the rule of nines, the body is divided into 11 surface areas: head, neck, and face; left arm; right arm; upper back; lower back; upper front torso; lower front torso; left upper leg and thigh; right upper leg and thigh; left lower leg and foot; and right lower leg and foot. Use a strip of sunscreen squeezed onto two fingers (the index and middle fingers from the palmar crease to the fingertip) and apply these two strips to each of the 11 body areas.[58] This will approximate one ounce.

27. Is it okay to use bug spray with sunscreen mixed together?

Several studies have shown that using a combination insect repellent and sunscreen or using them concommitantly will increase the repellent (DEET) and the sunscreen (benzophenones) absorption and skin penetration,[59] and decrease the SPF.[28, 60] Plus, due to the need to reapply sunscreens more often than repellents, if using a combination and re-applying correctly this will result in a higher dose of DEET than recommended.[61] Because higher concentrations of DEET, especially in children, have been associated with eye and skin irritations, headaches, irritability, and seizures, the American Academy of Pediatrics recommends using repellants with less than 10-15% concentrations of DEET.[62] It may be best to apply bug repellent and sunscreen separately.

28. When I tan I feel better. It's almost as if I *have to* tan. I feel *the need to* tan. Why is that?

Studies have shown that the absorption of ultraviolet light by the skin may be addictive due to the release of "pleasure" chemicals (serotonin, endorphins).[63-64] It has also been found that UVR is a reinforcing stimulus in frequent indoor tanners[65] and evidence of UV light as a substance related disorder has been demonstrated in college students.[66-67] Furthermore, younger age with first use of indoor tanning (14-15 years) and more frequent use (> 3 times) were associated with difficulty in quitting.[68]

29. Does sunscreen prevent skin cancer?

Studies of nevi in children have shown that with broad spectrum sunscreen use the number, size, and dysplasia of the nevi are reduced.[69-70] With a reduction in the amount, size, and dysplasia of nevi there is a concomitant reduction in skin cancer incidence.

Resources

Skin Cancer Atlases

DermAtlas (Johns Hopkins University)
http://dermatlas.med.jhmi.edu/derm/
http://www.dermatlas.org/derm/

Dermatologic Image Data Base
http://tray.dermatology.uiowa.edu/DermImag.htm

Dermatology Channel
http://www.dermatologychannel.net/skincancer/index.shtml

DermIS
http://www.dermis.net/index_e.html
Click on DOIA tab for dermatology atlas

Internet Dermatology Society Electronic Textbook of Dermatology
http://telemedicine.org/sundam/sundam2.4.1.html#sunlight%20composition

Loyola University Chicago Skin Cancer Atlas
http://www.meddean.luc.edu/lumen/MedEd/medicine/dermatology/melton/content1.htm

Medscape Dermatology Library
http://www.medscape.com/librarydirectory/dermatology?src=Inktomi

UC Davis Dermatology Resources
http://matrix.ucdavis.edu/

Skin Cancer Clinical Trials

Center Watch
www.centerwatch.com

Melanoma Hope Network
636-532-4298
www.melanomahopenetwork.org

National Cancer Institute
www.cancer.gov/clinicaltrials

Skin Cancer Medical Educational Sites

American Academy of Dermatology
1-888-462-DERM
www.aad.org

American Skin Association
www.americanskin.org

DermNet NZ
http://www.dermnetnz.org/

John Wayne Cancer Institute
http://www.jwci.org/index.htm

Mayo Clinic
http://www.mayoclinic.org/healthinfo/

M.D. Anderson Cancer Center
http://www.mdanderson.org/diseases/skincancer/

MedLine Plus
http://www.nlm.nih.gov/medlineplus/melanoma.html

Memorial Sloan-Kettering Cancer Center
212-639-2000
http://www.mskcc.org/mskcc/html/420.cfm

National Cancer Data Base
http://www.facs.org/cancer/ncdb/ncdbabout.html

National Cancer Institute
1-800-4-CANCER
www.nci.nih.gov
www.cancernet.nci.nih.gov
www.cancer.gov/cancerinfo/wyntk/melanoma

National Center for Biotechnology Information
http://www.ncbi.nlm.nih.gov/

National Comprehensive Cancer Network
215-690-0300
http://www.nccn.org/

National Institutes of Health, Health Information
http://health.nih.gov/

OncoLink
http://oncolink.upenn.edu/

START Oncology (Europe)
http://www.startoncology.net/default.jsp

Surveillance, Epidemiology and End Results
http://seer.cancer.gov/

Texas Medical Association
http://www.texmed.org/Template.aspx?id=2443

University of Michigan Comprehensive Cancer Center
http://www.cancer.med.umich.edu/learn/melinfo.htm

University of Pittsburgh Cancer Institute's Melanoma Center
http://www.melanomacenter.org/

Skin Cancer Organizations

American Cancer Society
1-800-ACS-2345
www.cancer.org
http://www.cancer.org/docroot/home/index.asp

Melanoma Hope Network
636-532-4298
www.melanomahopenetwork.org

Melanoma Patient's Information Page
http://www.mpip.org
http://www.mpip.org/patnet/patnet.html
PatNet (online patient network)

Melanoma Research Foundation
1-800-MRF-1290
http://www.melanoma.org/

National Council on Skin Cancer Prevention
http://www.skincancerprevention.org/

Skin Cancer Foundation
1-800-754-6490
www.skincancer.org

Skin Cancer Programs

Centers for Disease Control and Prevention
1-800-232-1311
www.cdc.gov/cancer

EXCITE program
http://www.cdc.gov/excite/skincancer/index.htm

Skin Cancer Education Programs
http://www.cdc.gov/cancer/nscpep/index.htm

Coalition for Skin Cancer Prevention in Maryland
http://www.sunguardman.org/adventur.html

Environmental Protection Agency
http://www.epa.gov/sunwise/

M.D. Anderson Project S.A.F.E.T.Y.
http://www.mdanderson.org/departments/projectsafety/

PoolCool (Emory University and National Recreation and Park Association)
http://www.poolcool.org/

SHADE Foundation
http://www.shadefoundation.org/

Sunny Days, Healthy Ways
http://www.sdhw.info/

SunSafe
http://www.cancer.dartmouth.edu/melanoma/sunsafe.shtml

Sun Safety Alliance
http://www.sunsafetyalliance.org/

SunSmart Australia
http://www.sunsmart.com.au/

Ulman Cancer Fund for Young Adults
http://www.ulmanfund.org/

Glossary

actinic keratosis
- overgrowth of skin layers caused from ultraviolet radiation (UVR), may turn into a skin cancer (precursor lesion), also known as "pre-cancer," often scaly, rough to touch

basal cell carcinoma
- most common skin cancer; found frequently on the head/neck; appear as small waxy, pearly or red bumps that may be bleeding, scabbed and have a rolled edge; rarely metastasizes (overall metastatic rate <0.1%), but can cause extensive tissue damage

biopsy
- sample of tissue

benign
- no danger to health, harmless

Breslow's Thickness
- microscopic measurement (in micrometers) of melanoma thickness from top (epidermal granular layer) to bottom of tumor used to predict prognosis

cancer
- malignant tumor caused by uncontrolled cell growth

chemotherapy
- drugs used to treat cancer

Clark's Level
- depth of penetration of melanoma tumor based on what skin layer (epidermis, papillary dermis, reticular dermis, subcutaneous tissue) tumor reaches

cryotherapy
- treatment of medical problem by freezing, usually with liquid nitrogen

dermatologist
- a doctor who treats skin problems

dermis
- the bottom layer of the skin

dihydroxyacetone (DHA)
- the main ingredient that darkens the skin in most self-tanning products

epidermis
- the outermost layer of the skin

freckle
- brownish spots on skin which turn darker and/or increase in number from ultraviolet radiation

heredity
- characteristics that are genetically passed down from your family members

in situ
- earliest form of cancer, in skin - limited to epidermis, Stage 0

immunotherapy
- treatment of disease by altering an immune response

lesion
- a changed spot in the skin

gene mutations
- part of DNA that is changed

malignant
- dangerous to health, harmful

melanin
- dark pigment/color in skin

melanocyte
- pigment/color producing cell of the epidermis

melanoma
- skin cancer of pigment/color producing cells, 4-6% of skin cancers, highest metastatic rate

metastases
- cancer cells that spread to other parts of the body, away from original place of the cancer

Mohs' micrographic surgery
- tissue-sparing method for removing skin cancer; the skin cancer is generally mapped into quadrants, a layer is cut out, examined under a microscope for cancer cells, next layer removed only excises cancerous portions; provides a very high cure rate

mole
- pigmented or non-pigmented spot on skin composed of melanocytes, some present since birth, may increase in number and size with UVR exposure, large numbers of moles run in families

nevi
- same as mole

phototherapy

- treatment of medical problem with light

risk factor

- something that increases your chances of getting a disease or illness

skin types

- I – fair white skin, always burns, never tans
- II – medium white skin, always burns, tans minimally
- III – medium white to olive skin, burns moderately, tans gradually
- IV – olive skin, minimal burning, tans well
- V – brown skin, rarely burns, tans darkly
- VI – dark brown, never burns, tans very darkly

squamous cell

- 2nd most common skin cancer; frequently found on the face/neck, hands/arms; may appear as red, rough spots that may bleed; can metastasize to body (overall metastatic rate is <3%, but percentage increases with site and subtype)

stratum corneum

- the outer layer of the epidermis which contains the cells that slough off

SPF

- Sun Protection Factor or SPF is a number on the outside of the sunscreen bottle that describes the percentage of protection provided from UVB radiation only.

tanning bed

- a structure lined with light bulbs in which one stands or lays in order to darken the skin

tumor (malignant)

- mass of uncontrolled growth of cancerous cells

ultraviolet radiation

- radiation below the wavelength of 400 nanometers; may be found naturally as in outdoor sunlight or artificially as in indoor tanning beds

UVA

- (320-400 nm): long wavelength; reaches biosphere, little affected by ozone. Causes deep tissue damage; found to be responsible for skin cancer, wrinkling, sagging, and age spots. Penetrates glass, water (clouds) and the dermis. These are the rays used in tanning bed bulbs.

UVB

- (280-320 nm): shorter wavelength; reaches biosphere; partially blocked by the stratosphere and glass; causes skin cancer, cataracts, macular degeneration. Considered the "burning" rays.

UVC

- (100-280 nm): very short wavelength, little reaches biosphere due to absorption and scattering by atmospheric oxygen, nitrogen and ozone; can be dangerous but little reaches humans

Participating Schools

Contact Information

Rockwood School District Partners in Education (PIE), Cathy Finley (636.938.2348) and the SPOTS schedule leaders will create and email a master schedule. Student teachers then sign up for the dates they can teach. Each Rockwood school has a PIE coordinator who will email you with a confirmation. SPOTS teacher should respond to the confirmation. If teaching outside of Rockwood schools, email or call the school's schedule person and PE teacher for scheduling and confirmation of dates.

- **Crestview Middle School**
  www.rockwood.k12.mo.us/crestview/
  16025 Clayton Road
  Ellisville, MO 63011
  636.207.2520

- **LaSalle Springs Middle School**
  www.rockwood.k12.mo.us/lasalle/default.htm
  3300 Highway 109
  Wildwood, MO 63038
  636.938.2425

- **Rockwood South Middle School**
  www.rockwood.k12.mo.us/rsouth/
  1628 Hawkins Road
  Fenton, MO 63026
  636.861.7723

- **Rockwood Valley Middle School**
  www.rockwood.k12.mo.us/rvalley/
  1220 Babler Park Drive
  Wildwood, MO 63038
  636.458.7324

- **Selvidge Middle School**
  www.rockwood.k12.mo.us/selvidge/
  235 New Ballwin Road
  Ballwin, MO 63021
  636.207.2622

- **Wildwood Middle School**
  www.rockwood.k12.mo.us/wildwood/
  17401 Manchester Road
  Wildwood, MO 63038
  636.458.7360

Driving Map

- **Online map of all Rockwood Schools**
  www.rockwood.k12.mo.us/district_info/maps/district/district.pdf

Driving Directions **(directions can also be obtained from online mapping services)**

- **Crestview Middle School**
  I 64/40 West to Clarkson/Olive Exit 19B, go south or left to Clayton Road, go west or right on Clayton to Valley Road, turn right. School is on northeast corner of Clayton and Valley Roads.

- **LaSalle Springs Middle School**
  I 44 West to Eureka/Hwy 109 Exit 264, go north or right on Hwy 109 for 3.6 miles. School is on the right (north) side of road before Rockwoods Reservation entrance.

- **Rockwood South Middle School**
  I 44 West to 141/Valley Park/Fenton Exit 272, merge onto North Highway Drive then south or left onto Hwy 141 to Hawkins Road, turn right onto Hawkins Rd, drive 0.9 miles. School is just past Kellison Elementary, on the right.

- **Rockwood Valley Middle School**
  I 64/40 West to Chesterfield Airport Exit which becomes Long Road. Continue straight or south on Long Rd to Wild Horse Creek Rd, turn right or west onto Wild Horse Creek, turn left or south onto Hwy 109, go 0.7 miles, turn right onto Babler Park Drive (turn will be abrupt and 90 degrees, slow down), go 2.4 miles (past Babler State Park). School is on the left.

- **Selvidge Middle School**
  I 64/40 West to I 270 South to Hwy 100/Manchester Road west Exit 9. Continue west on Manchester Road for 5.9 miles, turn left on New Ballwin Road. School is 0.4 miles down on the right.

- **Wildwood Middle School**
  I 44 West to Eureka/Hwy 109 Exit 264, go north or right on Hwy 109 for 5.8 miles to Manchester Road, turn left on Manchester Rd, go 0.7 miles. School is on the right.

Other Participating St. Louis Schools

- **Cor Jesu Academy**
- **Incarnate Word Academy**
- **Lafayette High School**
- **Mary Institute and St. Louis Country Day School (MICDS)**
- **Parkway Central, North, and South High Schools**
- **Rockwood Summit High School**
- **Saint Joseph's Academy**
- **Visitation Academy**

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LECTURE OUTLINE OR SCRIPT: DAY TWO OR PART TWO

[References 1-59 are listed in Lecture Outline or Script: Day One or Part One]

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ANSWERS TO COMMON QUESTIONS AND DEBUNKING MYTHS

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Sun Smarts

S.P.O.T.S.

Tell us what you think . . .

1. When should you reapply sunscreen?

   A. You do not need to reapply sunscreen
   B. After every 2 hours in the sun
   C. After every 3 hours in the sun
   D. After every 4 hours in the sun
   E. Don't know

2. What are the ABCD's of melanoma?

   A. Alignment, Big, Color, Dark
   B. Asymmetry, Border, Color, Diameter
   C. Abnormal, Big, Crusty, Diameter
   D. Asymmetry, Black, Circular, Diameter
   E. Don't know

3. What is the most fatal type of skin cancer?

   A. Basal Cell
   B. Squamous Cell
   C. Melanoma
   D. Lymphoma
   E. Don't know

4. Who finds most skin cancers?

   A. Doctors and nurses
   B. The person with the skin cancer
   C. Family members
   D. Friends
   E. Don't know

Tell us what you know . . .

5. Red haired people have a greater risk of getting skin cancer.
   A. True
   B. False
   C. Don't know

6. People with a lot of moles on their body have a greater risk of skin cancer.
   A. True
   B. False
   C. Don't know

7. Freckling is a sign of sun damage.
   A. True
   B. False
   C. Don't know

8. Tanning in an indoor tanning bed is safer than tanning in the sun.
   A. True
   B. False
   C. I don't know

9. People who tan very easily do not get skin cancer.
   A. True
   B. False
   C. Don't know

10. If your parents or siblings have skin cancer, your chance of getting skin cancer is higher than average.
    A. True
    B. False
    C. Don't know

11. Skin cancer is the most common cancer in the United States.
    A. True
    B. False
    C. Don't know

12. Having five or more blistering sunburns before the age of 18 years can lead to skin cancer.
    A. True
    B. False
    C. Don't know

13. Getting a base tan will keep you from getting a sunburn.
    A. True
    B. False
    C. Don't know

14. Wearing sunglasses with dark lenses will protect your eyes.
    A. True
    B. False
    C. Don't know

Tell us a little about yourself . . .

15. How old are you?
    A. 11
    B. 12
    C. 13
    D. 14
    E. 15

16. What color is your natural skin without a tan?
    A. fair white
    B. medium white
    C. olive-brown
    D. dark
    E. very dark

17. What is your natural hair color?
    A. red
    B. white or light blond
    C. dark blond or light brown
    D. dark brown
    E. black

18. What is your natural eye color?
    A. blue
    B. green or gray
    C. hazel
    D. brown

19. How many sunburns have you had since you were five years old that made your skin peel?
    A. 0
    B. 1-4
    C. 5-10
    D. 11-20
    E. More than 20

20. Has anyone in your family had skin cancer?
    A. No one
    B. Yes, my parent
    C. Yes, my grandparent/aunt/uncle
    D. Yes, myself/brother/sister
    E. Don't know

21. How many times have you used an indoor tanning machine?
    A. 0
    B. 1-4
    C. 5-10
    D. 11-20
    E. More than 20

22. How would you describe yourself?
    A. American Indian or Alaska Native
    B. Asian, Hawaiian or other Pacific Islander (ie,Filipino)
    C. Black or African American
    D. Hispanic or Latino
    E. White

Tell us what you actually do . . .

23. When do you wear sunscreen?
    A. I do not wear sunscreen.
    B. I sometimes wear sunscreen when I'm near water (beach, pool or lake) or doing something outside (like sports, picnic).
    C. I always wear sunscreen when I'm near water (beach, pool or lake) or doing something outside (like sports, picnic).
    D. I wear sunscreen every day in the summer.
    E. I wear sunscreen every day during the whole year.

24. When you wear sunscreen, how often do you reapply it?
    A. I do not wear sunscreen
    B. I do not reapply it, once I put it on
    C. Every 2 hours
    D. Every 3 hours
    E. Every 4 hours

25. When outside on sunny days, what type of hat do you usually wear?
    A. I don't wear a hat outside
    B. Do-rag, bandanna, scarf
    C. Visor
    D. Baseball cap
    E. Hat with a brim

For questions 26-28 use
A. Never
B. Rarely
C. Sometimes
D. Almost always
E. Always

26. When outside on sunny days, how often do you wear UV protected sunglasses?

27. When outside on sunny days, how often do you stay in the shade?

28. When outside on sunny days, how often do you use sunscreen with SPF 30 or more?

Tell us how you honestly feel . . .

For questions 28-30 use
A. Strongly disagree
B. Disagree
C. No opinion
D. Agree
E. Strongly agree

29. It's worth getting sunburned to be tanned.

30. It's too much trouble to use sunscreen every day.

31. It's too hard to pick out a sunscreen I would use.

Thank you for answering our questions!

More Sun Smarts

S.P.O.T.S.

Tell us about the SPOTS program . . .

1. My favorite part of SPOTS was the . . .
   A. lectures
   B. video
   C. games/Hands-on demonstrations
   D. skin analyzer machine
   E. I had no favorite part

2. The most important thing I learned was about . . .
   A. sun protection methods – how to use sunscreen, hats, shade, clothing
   B. early detection of skin cancers – what to look for, ABC's of melanoma
   C. risk factors – what increases my chances of getting skin cancer
   D. all of it was important
   E. none of it was important

3. Looking at my face in the skin analyzer machine made me want to better protect my skin in the sun.
   A. Strongly disagree
   B. Disgree
   C. I did not use the skin analyzer machine
   D. Agree
   E. Strongly agree

4. Attending the SPOTS presentation really made me want to practice better sun protection.
   A. Strongly disagree
   B. Disagree
   C. I did not attend the SPOTS presentation
   D. Agree
   E. Strongly agree

5. I would recommend the SPOTS presentation to other teenagers.
   A. Strongly disagree
   B. Disagree
   C. I did not attend the SPOTS presentation
   D. Agree
   E. Strongly agree

Tell us what you think . . .

6. When should you reapply sunscreen?
   A. You do not need to reapply sunscreen
   B. After every 2 hours in the sun
   C. After every 3 hours in the sun
   D. After every 4 hours in the sun
   E. Don't know

7. What are the ABCD's of melanoma?
   A. Alignment, Big, Color, Dark
   B. Asymmetry, Border, Color, Diameter
   C. Abnormal, Big, Crusty, Diameter
   D. Asymmetry, Black, Circular, Diameter
   E. Don't know

8. What is the most fatal type of skin cancer?
   A. Basal Cell
   B. Squamous Cell
   C. Melanoma
   D. Lymphoma
   E. Don't know

9. Who finds most skin cancers?
   A. Doctors and nurses
   B. The person with the skin cancer
   C. Family members
   D. Friends
   E. Don't know

Tell us what you actually do . . .

For questions 10-12 use
A. Never
B. Rarely
C. Sometimes
D. Almost always
E. Always

10. When outside on sunny days, how often do you wear UV protected sunglasses?

11. When outside on sunny days, how often do you stay in the shade?

12. When outside on sunny days, how often do you wear sunscreen with SPF 30 or more?

Tell us what you think . . .

13. Red haired people have a greater risk of getting skin cancer.
    A. True
    B. False
    C. Don't know

14. People with a lot of moles on their body have a greater risk of skin cancer.
    A. True
    B. False
    C. Don't know

15. Freckling is a sign of sun damage.
    A. True
    B. False
    C. Don't know

16. Tanning in an indoor tanning bed is safer than tanning in the sun.
    A. True
    B. False
    C. I don't know

17. People who tan very easily do not get skin cancer.
    A. True
    B. False
    C. Don't know

18. If your parents or siblings have skin cancer, your chance of getting skin cancer is higher than average.
    A. True
    B. False
    C. Don't know

19. Skin cancer is the most common cancer in the United States.
    A. True
    B. False
    C. Don't know

20. Having five or more blistering sunburns before the age of 18 years can lead to skin cancer.
    A. True
    B. False
    C. Don't know

21. Getting a base tan will keep you from getting a sunburn.
    A. True
    B. False
    C. Don't know

22. Wearing sunglasses with dark lenses will protect your eyes.
    A. True
    B. False
    C. Don't know

Tell us what you actually do . . .

23. When do you wear sunscreen?
    A. I do not wear sunscreen.
    B. I sometimes wear sunscreen when I'm near water (beach, pool or lake) or doing something outside (like sports, picnic).
    C. I always wear sunscreen when I'm near water (beach, pool or lake) or doing something outside (like sports, picnic).
    D. I wear sunscreen every day in the summer.
    E. I wear sunscreen every day during the whole year.

24. When you wear sunscreen, how often do you reapply it?
    A. I do not wear sunscreen
    B. I do not reapply it, once I put it on
    C. Every 2 hours
    D. Every 3 hours
    E. Every 4 hours

25. When outside on sunny days, what type of hat do you usually wear?
    A. I don't wear a hat outside
    B. Do-rag, bandanna, scarf
    C. Visor
    D. Baseball cap
    E. Hat with a brim

Tell us how you honestly feel . . .

For questions 26-28 use
A. Strongly disagree
B. Disagree
C. No opinion
D. Agree
E. Strongly agree

26. It's worth getting sunburned to be tanned.

27. It's too much trouble to use sunscreen every day.

28. It's too hard to pick out a sunscreen I would use.

Thank you for answering our questions!