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:
  1. AIDS
  2. Herpes
  3. A rash from the cleaning chemicals
  4. An STI
  5. 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, benzoyl peroxide), antidepressants, oral antidiabetics, tranquilizers, diuretics and antiarrhythmics can cause photosensitivity, skin rashes, hyperpigmentation, and other reactions when exposed to UVR.**

Slide 8
- Tanning beds can give off radiation up to 10-15X the noon day sun
  - 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
  - **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!
  - **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.**

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.**

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.
  **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.

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.
  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.
  **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 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
    • Increasing by 3-4% every year
  - 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
    • Tanning bed use before age 35 increases melanoma risk by 75%
  - **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.
  - Epidermis is only 0.1mm thick = thickness of a piece of notebook paper
  - **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.**

- **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/lymphatic 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) than the more common superficial spreading melanoma.

- Incidence. 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
      - 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

  - **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.**

  - **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
    - Family history of skin cancer (8-12-fold increase over general population)
      - **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 melanoma19, 20-22

- Slide 52
  - Three or more outdoor jobs in the summer as a teenager55
  **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 stretches54 don’t heed sun protective measures, and frequent indoor tanning salons.

- Slide 53
  - Use of indoor tanning beds
  - Norwegian study, October 200355
    - 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.** There is controversy over its use in melanoma, but it shows promise for use in lentigo maligna melanomas (in situ melanomas).**56

○ 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 melanin 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.