

UVR Pilot Project

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Executive Summary

Funding available through the Wellington Cancer Prevention and Early Detection Network served as the impetus for an ultraviolet radiation (UVR) pilot project in the spring of 2010. Two secondary schools, College Heights Secondary School (CHSS) in Guelph, and Orangeville District Secondary School (ODSS) in Dufferin, participated in the pilot. Youth were selected as the target audience because sun exposure is greatest with youth (aged 16-24), particularly young women, who are also more likely to use tanning equipment than young men or older adults.

A literature review conducted in December 2009 as well as consultation with an internal Sun Safety Committee and a teacher at CHSS helped to shape the pilot, including resources developed, timing, and evaluation.

A key resource utilized in the pilot was a software program called Mirror PhotoFile® (Mirror) which makes surface skin features like fine lines and pigmentation more visible. Mirror enhances digital photographs uploaded from regular cameras which can then be printed off using a regular photo printer and provided to the recipient as a keepsake. Teachers in several classes delivered Mirror and a highly visual PowerPoint presentation to cosmetology, parenting, and science classes. Cosmetology students were primarily targeted for this pilot because their curriculum includes skin cancer and these students may pursue occupations in aesthetics where they could share this knowledge with clients. Feedback from students after the lesson was very positive in terms of their learning, behavioural intention, and the lesson itself.

The teachers also delivered pre and post questionnaires which were intended to gauge whether there was a change in awareness/knowledge, attitudes/beliefs, and behavioural intentions with regard to UVR protection from before to after the lesson. Unfortunately, when it came time to conduct the follow-up questionnaire, the pre and post data was unavailable. Consequently, a modified follow-up questionnaire was administered by a Health Promotion Specialist at CHSS in December. This small sample of the original participants provided limited quantitative data, though reinforced the literature finding that youth are relatively well informed of the risks of UVR, yet continue to tan regardless. Encouragingly, three of the eight female participants felt the UVR lesson conducted in the spring caused them to tan less (both indoors and outdoors) over the summer months. Also, formal and anecdotal feedback from teachers and students supported the use of Mirror in the classroom and attributed any change in attitude or behavioural intentions to the impactful images it produced. This pilot project also drew positive media attention in May and June from two community newspapers and CTV SWO News.

Though the limited data from this pilot project is positive and the use of the resources (Mirror and PowerPoint presentation) were recommended by the teachers involved, these findings should be viewed with caution, and evaluation is strongly recommended for any other pilots or classes utilizing these resources. Furthermore, a comprehensive approach to UVR is also recommended as the positive changes may not be sustained over time. Ideally, a comprehensive approach would continue to raise awareness about UVR protection, engage youth in related initiatives, and help support behaviour change in the school through healthy policies and practices – all to reinforce what was learned and gained in the classroom.

Background

Skin cancer is the most common type of cancer diagnosed in Ontarians – accounting for approximately one-third of all new cancer cases.¹ Exposure to ultraviolet radiation (UVR) is a known carcinogen, which is found both in the sun’s rays, as well as in the light from artificial tanning equipment² – devices that are known to increase the risk of melanoma (a potentially fatal type of skin cancer) by 75% when use starts before the age of thirty.³ Despite the risks associated with UVR, both young men and women actively seek tans – especially women where almost half (49%) aged 16-24 tan from the sun and more than a quarter (27%) use tanning equipment.⁴

Given the risks of UVR and higher prevalence of sun-seeking and indoor tanning among youth, there is a clear need to raise awareness within this demographic using targeted and evidence-based interventions. Funding was available until March 2010 for the 2009-2010 fiscal year from the Wellington Cancer Prevention and Early Detection Network (WCPEDN). The WCPEDN is funded by Cancer Care Ontario (CCO) which outlined 6 goals in the Ontario Cancer Plan 2008-2011, including the reduction of cancer incidence through prevention. This funding provided an opportunity to implement a UVR pilot project targeting youth in the region as it was consistent with CCO’s objectives and was well-timed with the spring and summer months approaching.

UVR Pilot Project

Plan Development

Literature Review

In December 2009, the Health Promotion Specialist (HPS) conducted a literature review on effective UVR interventions targeting youth. This review found that youth find tans healthy and attractive, and still seek and desire a tan despite having knowledge of the risks. Also, studies that utilized curriculum and UV cameras were more effective than curriculum alone in modifying attitudes, beliefs, behavioural intentions, and behaviours regarding UVR exposure.⁵ UV cameras make pigmentation (i.e. freckles and age spots) as well as fine lines more visible – both of which are typically signs of skin damage from the sun (i.e. “photoaging”). Researchers hypothesize that this technology is more impactful than information alone because it shows the existing or short-term effect of UVR on one’s appearance rather than emphasizing the potential long-term consequences (e.g. cancer).* It is also important to note that studies also supported a comprehensive approach to produce sustainable behaviour change.

¹ Cancer Care Ontario. *Cancer System Quality Index – CSQI*, 2008.

² U.S. Department on Health and Human Services, Public Health Service, National Toxicology Program. *Report on Carcinogens, Eleventh Edition: Ultraviolet Radiation Exposures*, 2005.

³ International Agency for Research on Cancer (IARC), World Health Organization. *Exposure to Artificial UV Radiation and Skin Cancer*. 2006.

⁴ Canadian Cancer Society. *National Sun Survey Highlights Report*, July 10, 2008.

⁵ Watters, B. *Literature Review: Youth and Tanning*, Wellington-Dufferin-Guelph Public Health, December 2009.

**Note: A 2009 Australian SunSmart campaign targeting youth focused on the risk of cancer, but it still focused on the negative consequence to one's appearance (i.e. scarring from tumour removal) which studies show is the main reason youth tan.⁶*

Mirror Software

Also in December, the HPS investigated UV cameras which led to an American company (Canfield Scientific Imaging) that formerly produced UV cameras but now produces a software program called Mirror. Mirror enhances surface skin features like a UV camera; however it enhances digital photographs uploaded from regular cameras whereas specialized UV cameras produce images using UV light (see below for an example). Though this software is typically used by dermatologists and plastic surgeons to provide advice on treatments or maintain a photo record of a client's treatment process, it has also been utilized for educational purposes.

A sales representative from the company provided the name and contact information for the Executive Director of the Children's Melanoma Prevention Foundation in Massachusetts⁷, Maryellen Maguire-Eisen. Ms. Maguire-Eisen provided invaluable information regarding her experience with the two technologies. She used to use a UV camera for her UVR lessons; however she sought out alternatives after her Polaroid film (used for such cameras and donated to her program) ran out. She has subsequently been using Mirror, and prefers this technology over the cameras because it produces images comparable to a UV camera; is easy to use; allows the option to save images; and is more cost-effective because images can be converted to PDF and emailed at no cost, or printed on photo paper which is less costly than Polaroid film.

Ms. Maguire-Eisen also provided advice regarding the use Mirror. She recommended that photos from participants be sought ahead of time, so as to save time during the lesson, and that only photos of fair-skinned individuals be used for demonstration purposes because skin surface features are less visible with dark skin. Also, Ms. Maguire-Eisen did not recommend the use of Mirror at events such as health fairs because she found there is inadequate time to properly educate an individual about UVR risks, what they see in their photo, and how to protect themselves. Her finding is consistent with the literature, which found presentations to classes were more effective than short interventions (e.g. at beaches).

Picture 1. Example of photo enhanced by Mirror software (right)



Photo courtesy of Canfield Scientific Imaging

⁶ SunSmart, The Cancer Council Victoria. Tanning and Solariums, Retrieved January 14, 2010 from http://www.sunsmart.com.au/sun_protection/tanning_and_solariums

⁷ The Children's Melanoma Prevention Foundation, Retrieved on January 14, 2010 from <http://www.melanomaprevention.org/>

Sun Safety Committee

The literature review provided insight into youth's behaviours regarding sun protection and tanning, while Mirror presented a possible tool for the classroom. The HPS reconvened the internal Sun Safety Committee for meetings on January 26 and February 3, 2010 to discuss the pilot project, shade policies at the school board level, and an internal sun safety policy for staff. The committee was represented by the Healthy Living Team (Glenna Rogers and Cris Nobrega), Youth and Adult Clinical Team (Deb Blais), and Inspection Team (Mary Macknachy). These teams have contact with schools and child care centres, which have typically been the focus of UVR initiatives in the past. As Deb Blais was not available for the meetings, the HPS met separately with her to consult on the pilot project.

Internal consultation suggested that a pilot was best implemented within a small number of relevant classes at one or two schools. Specifically, cosmetology classes were identified for the pilot because their curriculum includes skin cancer, and these students may be more likely to work in aesthetics where they will be role models for skin care and may offer advice to customers. Based on this, CHSS and ODSS were suggested for the pilot project because these schools offer cosmetology classes.

School Consultation

Public Health School Liaison, Glenna Rogers, and the HPS initially met on February 17, 2010 with cosmetology teacher, Robb Mayer, to discuss the possible structure and timing of the pilot. Mr. Mayer provided the cosmetology binder and textbook for review and recommended the pilot for older students (grade 11 and 12). The group then met with Principal, Beth Burns, to review the proposed pilot. The group agreed that the pilot provided an excellent opportunity for earned media. Cosmetology teachers Louise Fearon at ODSS (who was contacted directly by the HPS) and Malanie Brown at CHSS, also agreed to participate in the pilot project.

WCPEDN Funding Request

A funding request for the pilot project, which included Mirror, a laptop, laptop case, photo printer, and supplies, was submitted to the WCPEDN on March 1, 2010. The proposal was approved on March 12, and plans for the pilot project moved forward. (See the Appendix for the funding request).

Additional Resources: Teacher's Resource, PowerPoint Presentation, & Sunscreen Samples

In addition to Mirror, a Teacher's Resource document and PowerPoint presentation were assembled and provided to teachers to support the UVR lesson in the classroom (see the Appendix). The Teacher's Resource provided scientific information about UVR, a Myths/Facts document on indoor tanning, and instructions on using Mirror. Also, a harm reduction approach to UVR protection was recommended (i.e. "decrease" UVR exposure rather than "avoid"), as research has found abstinence messaging related to tanning is not effective with youth.

The PowerPoint presentation was targeted toward youth (particularly females), and featured photos of skin cancer, fair-skinned celebrities and young people; teen magazine articles; a newspaper article of a teenager diagnosed who formerly tanned excessively and was diagnosed with skin cancer; and an interview with Miss Maryland – a young beauty pageant winner who was diagnosed with melanoma. Training on the equipment, as well as a review of the accompanying materials took place before the class’s UVR lesson.

To provide some environmental support for the students participating in the pilot, sunscreen samples (Ombrelle Face SPF 45) were ordered at no cost by L’Oreal and provided to the cosmetology teachers to distribute as they felt appropriate. Teachers reported afterwards that they chose to distribute the samples to the students after the lesson.

Goals and Objectives

The ultimate goal of the pilot project is to decrease the incidence of skin cancer. However, more measurable and short-term and mid-term objectives included the following:

- Increase awareness/knowledge of the risks of UVR
- Decrease the perceived benefits of UVR exposure
- Increase behavioural intention to engage in UVR protection behaviours
- Increase UVR protection behaviours*

Logic Model

Activities	Short-term Objectives	Mid-term Objectives	Long-term Objectives	Goal
UVR curriculum & PowerPoint	Increase awareness of UVR risks	Increase UVR protection* over summer	Sustain UVR protection* throughout year	Decrease skin cancer incidence
Mirror-enhanced photo	Decrease perceived benefits of UVR			
	Increase behavioural intention to engage in UVR protection* over the summer			

**UVR protection can include a range of activities including less tanning indoors or outdoors, use of sunless tanning products in lieu of UV-induced tanning, seeking shade, or wearing sunscreen, a hat, sunglasses, etc.*

Target Audience

The target for the pilot project was primarily female cosmetology students in grade 11 and 12. Male cosmetology students as well as students from other classes and grades were secondary targets. Several classes participated in the pilot which had curriculum related to health, safety, or UVR including cosmetology, parenting, and a science class.

Parent Letter & Consent Form

In consultation with the Freedom of Information Officer at the Upper Grand District School Board (UGDSB), a letter to parents (see Appendix) along with an UGDSB consent form were sent to parents and guardians of students involved in the UVR lesson. Students were required to have their parent or guardian sign the consent form for the questionnaire data to be collected. All forms were signed, returned, and filed by the cosmetology teachers at their respective schools.

Data Collection Tools

Pre, post, and follow-up questionnaires were developed for the pilot project. The pre and post questionnaires were administered before and after the UVR lesson (which also included a demonstration of Mirror). Students also received their enhanced photo after the class if they chose to submit it. The pre and post questionnaires were intended to show whether there was an increase in knowledge after participating in the lesson, as well as an increase in behavioural intention to protect oneself from UVR (particularly over the summer months). The purpose of the fall follow-up questionnaire was to determine whether there was any change in behaviour based on the behavioural intentions from the spring.

Unfortunately, when it came time to conduct the follow-up questionnaire in the fall, the pre and post data was unavailable. Also, due to the small sample size (5 students) at ODSS, follow-up questionnaires were administered at CHSS only in December. As such, the findings in this report rely on limited quantitative data from a revised follow-up questionnaire with students at CHSS and anecdotal information from students and teachers.

Earned Media

As noted earlier, this project provided an excellent opportunity for earned media in the community. Media attention raises the awareness of UVR and tanning in the general public, and also highlights and celebrates the involvement of the teachers and students involved in the project. A media release was issued on May 26, 2010, which was subsequently picked up by the Guelph Mercury who interviewed the HPS shortly thereafter and printed an article on May 28.

The release was also picked up by the Orangeville Banner which published a short article on June 10, 2010, as well as Janine Grespan from CTV SWO News. CTV aired a two-part news report on the project on June 21 and 22, 2010 at the 6:00 pm local and 11:00 pm national news. The news report was also streamed on their website. Part one of this news report focused on the pilot itself, demonstrating how Mirror works and one student's reaction to her picture. Part two focused on the recommendation to decrease tanning from tanning equipment – similarly, this article included one student's reaction to the report on the beauty pageant winner and her intention to tan less. Part one was purchased by the health unit with the intention of promoting Mirror to other schools and classes. (See Appendix for copies of the media release and newspaper articles).

Timeline

The timeline for this pilot project was very short. The equipment and supplies arrived in March and April; the Teacher's Resource and PowerPoint presentation were developed over April and May; and the lessons were taught in May (at CHSS) and June (at ODSS). Lastly, follow-up questionnaires were administered at CHSS in December.

	2009	2010											
	D	J	F	M	A	M	J	J	A	S	O	N	D
Literature review													
Internal consultation & plan development													
Funding request prepared													
Funding request submitted													
Funding request approved													
Equipment ordered													
Resources developed													
CHSS lessons													
ODSS lesson													
Follow up questionnaire													
Final report													

Budget

Item	Vendor	Unit Cost	Units	Charges	Subtotal	Tax	Total
Mirror software	Canfield Scientific Imaging	\$2,623.67*	1	\$10.00**	\$2,633.67	\$210.53 (GST) + \$131.97 (PST)	\$4,625.81
Laptop computer	Canadian Technology Services	\$1,101.00	1	\$0.00	\$1,101.00		
Waste fee	CTS***	\$2.14	1	\$0.00	\$2.14		
Laptop case	CTS	\$66.00	1	\$0.00	\$66.00		
Portable photo printer & case	CTS	\$197.00	1	\$0.00	\$197.00		
USB cable	CTS	\$10.00	1	\$0.00	\$10.00		
Photo paper (100 sheets/pack)	CTS	\$19.90	5	\$0.00	\$99.50		
Photo printer ink cartridges	CTS	\$31.00	5	\$0.00	\$155.00		
Thank you gift cards	Tim Horton's	\$20.00	3	\$0.00	\$60.00	\$0.00	\$60.00
News article (DVD)	CTV SWO News	\$65.00	1	\$0.00	\$65.00	\$0.00	\$65.00
Timbits & coffee (follow-up quest.)	Tim Horton's	\$13.42	1	\$0.00	\$13.42	\$1.74	\$15.16
Total						\$344.24	\$4,765.97

* Software cost = \$2,500.00 USD (or \$2,623.67 CAD)

**Fed Ex customs fee

***CTS = Canadian Technology Services

Evaluation

Student Feedback

After the lesson in May, five students from CHSS shared what they learned from the lesson, any intentions they had regarding UVR protection, and feedback on the lesson itself. The students' learning was consistent with the curriculum, suggesting the content was well communicated and understood. This was reiterated by one student's observation that "although tanning makes you feel amazing, it's a much better feeling to know you're protecting your skin from harmful UVB rays". The same student reported that she now uses self-tanners and has "completely stopped" tanning at salons, though occasionally gets colour from the sun. Two other students reported that they now wear sunscreen, while a third reported that she intends to wear more sunscreen in the summer. With regard to the lesson, the students reported that it was "good", "very good", "informative", and provided information most students did not know; it showed the "ugly reality of tanning"; and one student reported it was "very enlightening as I now wear sunscreen even though I hate the thick gooie feeling of it."

Teacher Feedback

Three teachers provided feedback about different aspects of the pilot project – Mirror, the Teacher's Resource, the PowerPoint presentation, and the training session (two teachers at CHSS and one at ODSS). Overall, the feedback was very positive. Teachers felt Mirror was an effective tool in the classroom and would recommend its use to others. Specifically, they felt students became more aware of their own risk to UVR, it changed their attitudes around sun protection and tanning, and that students reported intentions to protect their skin more (through use of sunscreen or trying sunless tanning products). The teachers also felt the PowerPoint presentation was a great tool – especially the news report on the beauty pageant winner who was diagnosed with melanoma.

With regard to areas for improvement, the teachers recommended the pilot or UVR lesson be implemented earlier in the school year as cosmetology tends to have practical exams sooner than other subjects. Also, the section on skin types was not well understood from students. One teacher also recommended that the pictures be taken with the students the day before the lesson as it appeared to pique their curiosity. That same teacher also found that there were challenges in engaging his/her grade 10 class in the lesson. This was consistent with another teacher's assessment that this lesson might be better suited for older students (grade 11 or 12) in vocational school settings.

Earned Media

The earned media generated from the pilot project was very positive. As noted earlier, two newspapers in the region picked up the story and CTV SWO News aired a two-part news article. Though the impact of this earned media is difficult to measure, it may have increased awareness in the general public not only of the pilot project, but the risks of UVR and tanning.

Follow-up Questionnaires

Participation

A total of eight female cosmetology students in grade 12 participated in the follow-up questionnaire at CHSS in December 2010. It was not possible to engage all the original participants as they were no longer taking cosmetology, had graduated, or were no longer at the school. Seven students were 17 at the time of follow-up and one was 18 years old.

Skin type

Students with lower skin types (I and II) should protect themselves more from the sun and not tan at all because they always burn; while those with skin type III should avoid tanning as well because they sometimes burn. Unfortunately, there was one student with skin type II and two with skin type III who did not protect themselves more from UVR exposure after the lesson. Overall, half indicated they had skin type III, one each indicated skin type II and IV respectively, and two indicated skin type V.

Knowledge

The students' knowledge of UVR exposure was high – all students answered four out of five questions correctly (none knew that those with skin type I were most at risk for skin cancer).

Attitudes/Beliefs

Overall, the students' attitudes and beliefs regarding UVR reinforced the findings from the knowledge section. They appear to understand the risks of tanning and do not agree with claims made by the tanning industry (for example, that tanning indoors is safer than tanning outdoors). With regard to their answers, all students disagreed or strongly disagreed that a base tan provides protection; tanning indoors is not any safer than tanning outdoors; and that sunburns are not the only sign of skin damage. All but one student agreed or strongly agreed that UVR causes damage you can't see; that young people can get cancer; and that increased exposure to UVR damages skin. Lastly, students were split as to whether tanned skin means there is skin damage underneath.

Behaviours

Only three students (38%) felt that the UVR lesson in May caused them to protect themselves more from UVR over the summer compared to previous years. In particular, all three reported that they tanned less both indoors and outdoors. Increased use of sunscreen was another common behaviour change. Two other students reported that they did not protect themselves more over the summer as a result of the lesson, though wrote "I just protected myself more by applying more sunscreen when needed instead of not wearing any" and "I still like the real tan that lasts longer but I watch my skin a bit more" – suggesting that there may in fact, have been some behaviour change. Students that did not protect themselves more over the summer gave the following reasons: "I applied sunscreen before going out like usual, but I always forget to reapply"; "Because I didn't use it"; and "I didn't really go out tanning this summer, it was too hot".

Conclusions

Despite the limited quantitative data from the pilot project, the feedback from teachers and some students (including those interviewed by CTV) was positive and supported the use of Mirror.

With regard to the eight female students who completed follow-up questionnaires, the results indicate that they have a very good understanding of UVR and its risks. And though their attitudes and beliefs are concurrent with their knowledge, most of these girls admit to tanning (5 out of 8), and only three (38%) said they tanned less after participating in the UVR lesson in May. Nonetheless, due to the small sample size, it is not possible to conclude whether the UVR lesson and use of the Mirror software produced a statistically significant difference.

Recommendations

1. Implement comprehensively

Research supports the use of UV cameras or similar technology to raise awareness of UVR and its risks with youth as well as adults. However, like other health behaviours, a comprehensive health promotion strategy is recommended – one that addresses not only education and awareness-raising, but also environmental supports (e.g. shaded areas – natural and built; sunscreen availability; etc.), community engagement/mobilization (e.g. peer-to-peer models or mentoring, etc.), and policy development (e.g. times of day for outdoor athletics; required hat use at schools; etc.). Also, though cosmetology classes proved to be a good fit for the use of Mirror, other classes which include relevant curriculum may also benefit from this technology (e.g. health, parenting, or even film studies/media arts).

2. Improve data collection

Should more concrete quantitative findings be required for widespread use of the Mirror software then a second pilot project administered directly by Public Health is recommended to ensure accuracy in data collection and prevent loss of data. Also, additional follow-up (e.g. one year later) would be beneficial to determine whether there is a lasting effect from the lesson.

3. Pre-test questionnaires

If a second pilot project is implemented, it is recommended that all questionnaires be pre-tested with youth prior to ensure readability and clarity of the questions. (Note: due to tight timelines, questionnaires were only pre-tested with one youth and some staff from the health unit).