Creating the *cSCCscore* Web Site

1. User Interface

1.1 Input data.

Please indicate the most appropriate response:
My gender is:
female ☐ male ☐
My current age is:
☐ years
My tendency to sunburn is:
Low ☐ Moderate ☐ High ☐
I have been diagnosed in the past with an actinic keratosis:
true ☐ false ☐
I have been diagnosed in the past with an invasive squamous cell skin cancer:
true ☐ false ☐

If false: I have been diagnosed in the past with a non-invasive (also called in-situ) squamous cell skin cancer:
true ☐ false ☐

I have been typed for the 16 genetic variants associated with increased risk of squamous cell skin cancer (*option to see a list of risk alleles for these sixteen variants*):
true ☐ false ☐

If true: The number of risk alleles that I carry is:
< 8 ☐ 8 or 9 ☐ 10 or more ☐

If false: Based on the squamous cell skin cancer histories of my parents, siblings and children, my genetic risk for this cancer is:
Low ☐ Moderate ☐ High ☐ .

This input is transformed into the eight covariates shown in Table 1.

2. Using the input data to produce the output.

The output is the probability P of developing a squamous cell cancer in the next three years. P is given by

$$P = 1 - \left[1 + \frac{\phi}{\alpha_1} \left(e^{3\alpha_1} - 1 \right) \exp\left(\alpha_0 + \sum_{j=1}^{8} \beta_j z_j \right) \right]^{-\frac{1}{\phi}}. \qquad (1)$$

Equation (1) involves eight covariates $z_1,\ldots,z_8$ whose values are created using the patient's input, and 11 parameters, whose definitions & sex-specific values are given in Table 2.

2.1 Using the Input to create the covariates. Table 1 shows how to create the covariates from the input data.

Table 1.

Symbol	Covariate
z_1	Age (yrs) ÷10
z_2[a]	Moderate sun sensitivity
z_3[a]	High sun sensitivity
z_4[a]	Moderate genetic risk
z_5[a]	High genetic risk
z_6[a]	Hx of actinic keratosis
z_7	Hx of Noninvasive SCSC
z_8[a]	Hx of Invasive SCSC

a) z = 1 if box is checked; z = 0 otherwise
b) SCSC = squamous cell skin cancer

2.2 Using the covariates to create the assigned probability P of developing a new cancer in the next three years.

Table 2. Sex-specific Parameter Values

Description	Symbol	Value	
		FEMALES	MALES
	Covariate Regression Coefficients		
Age/10	β_1	0.67	0.62
Mod Sun	β_2	0.08	0.09
High Sun	β_3	0.27	0.13
Mod Risk	β_4	0.16	0.30
High risk	β_5	0.54	0.66
AK hx	β_6	1.74	1.80
Noninvasive hx	β_7	0.98	1.02
Invasive hx	β_8	1.51	1.37
	Other Parameters		
intercept	α_0	-10.50	-9.89
Time trend	α_1	0.17	0.17
Variance	ϕ	3.42	2.60

2.2 Final Output to user:
Your probability of developing a new squamous cell skin cancer in the next three years is _____ % (INSERT 100xP).