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FINAL REPORT

to the

National Institute of Occupational Safety and Health

Project Title: EPIDEMIOLGOICAL STUDY OF MALIGNANT MELANOMA

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TABLE OF CONTENTS

I. Accrual of Study Participants

Between 1972 and April 15, 1979, 771 patients treated for primary malignant melanoma at New York University Medical Center were interviewed by the NYU Melanoma Cooperative Group. From the beginning of this study up to January 31, 1982, and additional 364 cases accrued, resulting in a total of 1135. Table 1 gives the number of cases interviewed by year of first diagnosis. Seven hundred forty-three controls were interviewed between October 1, 1979 and January 31, 1982.

Of the total number of cases, 30 were excluded because of age under 20 years or unknown (11), non-white race (6), or previous melanoma (13). Of controls, 163 were excluded for reasons of age (1), race (80), previous melanoma (7), other previous skin cancer (35), other previous malignancy (18), or current diagnosis of cancer (22). After exclusions, 1105 cases and 580 controls remained. The effective sample size is 760 (harmonic mean of 580 and 1105).

II. Interview Protocol

Patients entering University Hospital, Bellevue Hospital, or Veterans Administration Hospital for treatment of primary malignant melanoma were given an interview and physical examination by the Melanoma Fellow. A detailed pathologic study of all specimens was performed independently of any knowledge of demographic data collected and whether or not a previous pathologic review of the same lesion had been made. However, if a lesion had been biopsed

Table 1

Number of Patients Diagnosed by the NYU Melanoma Cooperative Group for Primary Malignant Melanoma, by Year of First Diagnosis

Year of First Dx	No. of Patients
(Nov.) 1972-73	93 (8.2)*
1974-75	180 (15.9)
1976-77	302 (26.6)
1978-79	330 (29.1)
1980-(Jan.)1982	230 (20.2)
Total	1135

* Percent in parentheses

more than thirty days prior to admission, it was no longer considered a primary malignancy, and the patient was excluded from the data base. Any lesion not histopathologically confirmed to be melanoma was also excluded. Informed consent was obtained from each melanoma patient entering the study.

Potential controls were randomly chosen from among patients 20 years of age and older appearing for a first visit to the NYU Skin and Cancer Unit general skin clinic or a first re-registration after two years absence. Patients under twenty years of age were excluded because there are few melanoma patients and many potential controls in that age range. Restricting controls to patients appearing for first visits or re-registration was designed to eliminate biases due to the inclusion of long-term patients with chronic skin disease. At that point the only other determining factor in the choice of controls was that there be sufficient expected waiting time for that patient to complete the interview. As soon as a patient appeared at the skin clinic meeting these criteria, that patient was chosen as a potential control by the control interviewer (different from the Melanoma Fellow). Other exclusions occurred at the time of analysis, after a definitive dermatologic diagnosis was obtained from patient records at the clinic. As with cases, informed consent was obtained from each potential control.

Every effort was made to ensure that cases and controls were interviewed in as identical a manner as possible, by mutual interview observation between the Melanoma Fellow and the control interviewer and by the development of a comprehensive manual for interview procedure.

III. Confidentiality

To ensure the confidentiality of data collected, participants' names are used only to obtain missing data and will be inked out when no longer needed. At that point, the only identification in the study data file will be the ID#; however, when necessary, the ID# will be able to be linked with the participant's name in a computerized master list, which will be the only place names will appear permanently. Access to this file will be restricted to the purpose of data collection and will in no way be used for the analysis of the data file.

IV. Demographic and Medical Characteristics of the Study Group

Table 2 summarizes distributions of age, sex, marital status, weight, and height for cases and controls. Table 3 describes the pathologic characteristics of the lesions of melanoma patients. Nearly 70% of cases were of the superficial spreading type. The mode level of invasion was IV, and the most frequently reported thickness category was 1mm or less. A summary of the current dermatologic diagnosis of controls is given in Table 4. In decreasing order of frequency the conditions for which the controls were seen at the clinic were: nonmalignant neoplasms; diseases of the nail, hair, hair follicles, and sweat and sebaceous glands; infectious and parasitic diseases, excluding those of the skin; skin infections; psoriasis and other scaling dermatoses; contact and radiation dermatitis; eczema; seborrheic dermatitis; pruritis and other related conditions; and allergic diseases caused by internal agents.

Table 2. Demographic Variables for Cases (n = 1105) and Controls (n = 580)

	Cases		Controls	
	Number	Percent	Number	Percent
Age (yrs)				
20-30	109	9.9	206	35.5
31-40	150	13.6	105	18.1
41-50	228	20.6	64	11.0
51-60	281	25.4	74	12.8
61-70	206	18.6	79	13.6
71+	131	11.9	52	9.0
Sex				
Male	538	48.7	264	45.5
Female	567	51.3	316	54.5
Marital Status				
Never married	136	12.3	231	39.8
Married	752	68.1	256	44.2
Separated/Divorced	50	4.5	54	9.3
Widowed	89	8.0	35	6.0
Unknown	78	7.1	4	0.7
Weight (lbs)				
125 or less	222	20.1	153	26.4
126-140	196	17.7	106	18.3
141-160	224	20.3	146	25.2
161-180	215	19.5	92	15.8
181-200	133	12.0	44	7.6
200+	86	7.8	29	5.0
Unknown	29	2.6	10	1.7
Height (ins)				
62 or less	171	15.5	101	17.4
63-65	251	22.7	150	25.9
66-68	269	24.3	156	26.9
69-71	217	19.6	106	18.3
72+	132	12.0	55	9.4
Unknown	65	5.9	12	2.1

Table 3. Pathologic Characteristics of Cases (n = 1105)

	Number	Percent
Histologic Type		
Lentigo maligna melanoma	54	4.9
Superficial spreading melanoma	752	68.1
Nodular melanoma	121	10.9
Acral-lentiginous melanoma	22	2.0
Unclassified radial growth phase	27	2.4
Other	23	2.1
Not Available	106	9.6
Level of Invasion		
I	40	3.6
II	236	21.4
III	255	23.1
IV	403	36.5
V	43	3.9
Indeterminate	6	0.5
Other	7	0.6
Not available	115	10.4
Greatest Thickness of Lesion		
1.00 mm or less	275	24.9
1.01 - 2.00 mm	197	17.8
2.01 - 3.00 mm	74	6.7
3.01 - 5.00 mm	82	7.4
5.01 - 14.00 mm	37	3.4
Not available	440	39.8

Table 4. Current Dermatologic Diagnoses of Controls (n = 907*)

Diagnosis	Number	Percent
Skin infections	59	6.5
Other infectious and parasitic diseases	92	10.1
Allergic diseases (internal agents)	18	2.0
Seborrheic dermatitis	41	4.5
Eczema	42	4.6
Contact and radiation dermatitis	43	4.8
Psoriasis and other scaling dermatoses	54	6.0
Pruritis and related conditions	41	4.5
Diseases of the nail, hair, hair follicles, and sweat and sebaceous glands	150	16.5
Non-malignant neoplasms	210	23.2
Miscellaneous conditions**	136	15.0
Unknown	21	2.3

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* Total diagnoses among the 580 valid controls, 336 (57.9%) of whom had one condition diagnosed, 180 (31.0%) had two conditions diagnosed, 45 (7.8%) had three conditions diagnosed, and 19 (3.3%) had four or more conditions diagnosed. Only the first four diagnoses are included above.

** Includes hypertrophic and atrophic conditions, lichen planus, erythematous conditions, pilonidal cyst, insect bite, diseases of the circulatory system, dermatitis NOS, and other conditions (diagnosed among fewer than five patients).

V. Relative Risk Analysis

Table 5 gives age- and sex-adjusted relative risk estimates for selected variables. Additional analyses will follow on these and remaining variables, particularly after the data are fully edited. It is anticipated that such analyses will be published in the open literature.

Table 5. Relative Risk of Malignant Melanoma for Study Factors

	Odds Ratio[a]	95% C.I.[b]
Age (yrs)		
20-25	0.1[e]	0.1 - 0.2
26-30	0.3[e]	0.2 - 0.4
31-35	0.4[e]	0.2 - 0.7
36-40	0.6	0.3 - 1.0
41-45[c]	1.0	-
46-50	1.5	0.8 - 2.7
51-55	1.6	0.9 - 2.8
56-60	1.1	0.6 - 1.8
61-65	1.0	0.6 - 1.8
66-70	0.7	0.4 - 1.2
71-75	0.7	0.4 - 1.3
76+	1.0	0.5 - 1.9
Weight (lbs)		
≤ 125	1.2	0.8 - 1.8
126-140	1.2	0.8 - 1.7
141-160[c]	1.0	-
161-180	1.2	0.8 - 1.7
≥ 181	1.5[d]	1.0 - 2.3
Height (ins)		
≤ 62	0.9	0.6 - 1.4
63-65	0.8	0.6 - 1.2
66-68[c]	1.0	-
69-71	1.2	0.8 - 1.8
≥ 72	1.5	0.9 - 2.6
Linear trend: p = .02		
Marital Status		
Never married	1.0	-
Ever married	2.4[e]	1.7 - 3.2
Sun Exposure at Work		
Mostly indoor work[c]	1.0	-
Indoor and outdoor work	1.1	0.7 - 1.7
Mostly outdoor work	2.3[e]	1.3 - 4.2
Sex		
Male	1.1	0.9 - 1.3
Female[c]	1.0	-

	Odds Ratio[a]	95% C.I.[b]
Recreational Sun Exposure		
Mostly indoor activities[c]	1.0	-
Indoor and outdoor activities	0.6[e]	0.4 - 0.7
Mostly outdoor activities	1.6[e]	1.2 - 2.2
Overall Sun Exposure		
None	0.8	0.3 - 2.5
Little	0.8	0.6 - 1.1
Moderate[c]	1.0	-
Much	0.9	0.7 - 1.2
Ability to Tan		
None	1.6[d]	1.0 - 2.6
Light	1.4[d]	1.1 - 1.9
Average[c]	1.0	-
Dark	0.6[e]	0.4 - 0.8
Linear trend: p < .001		
Tendency to Burn		
None	1.5	1.0 - 2.4
Mild redness	1.2	0.9 - 1.6
Moderate burn	1.3[d]	1.0 - 1.8
Painful burn[c]	1.0	-
Linear trend: p = .05		
Oral Contraceptive Use (Women only)		
No[c]	1.0	-
Yes	0.8	0.5 - 1.2
Estrogen Use (Women only)		
No[c]	1.0	-
Yes	1.3	0.8 - 2.2
Gonadal Surgery		
No[c]	1.0	-
Yes	1.5	0.9 - 2.5

Table 5. Relative Risk of Malignant Melanoma for Study Factors (Cont'd)

	Odds Ratio[a]	95% C.I.[b]
Steroid Use		
No[c]	1.0	-
Yes	0.7	0.5 - 1.1
Thyroid Hormone Use		
No[c]	1.0	
Yes	1.2	0.7 - 2.1
Sulfonamide, Thiazide Diuretics or Other Sulfa Derivatives Use		
No[c]	1.0	-
Yes	2.3[e]	1.7 - 3.4
Phenothiazine Use		
No[c]	1.0	-
Yes	1.2	0.6 - 2.2
Melanoma in Family		
Not reported[c]	1.0	-
Yes	1.8	0.8 - 3.8
Other Skin Cancer in Family		
Not reported[c]	1.0	-
Yes	1.4	0.9 - 2.1
Other Cancer in Family		
Not reported[c]	1.0	-
Yes	1.2	0.9 - 1.5

	Odds Ratio[a]	95% C.I.[b]
Freckles		
No[c]	1.0	-
Yes	5.8[e]	4.5 - 7.6
Congenital Nevi		
No[c]	1.0	-
Yes	0.8	0.6 - 1.2
Solar Keratosis		
No[c]	1.0	-
Yes	4.4[e]	2.2 - 9.8
Eye Color		
Blue	3.3[e]	2.5 - 4.8
Green	0.9	0.6 - 1.3
Grey	0.5[e]	0.3 - 0.8
Light Brown	1.2	0.8 - 1.8
Dark brown[c]	1.0	-
Natural Hair Color		
Blond	1.2	0.8 - 1.7
Red	5.8[e]	3.3 - 13.9
Light brown	0.9	0.7 - 1.2
Dark brown[c]	1.0	-
Black	0.4[e]	0.2 - 0.6
Skin Color		
Pale	0.5[e]	0.4 - 0.6
Medium[c]	1.0	-
Dark	1.3	0.5 - 3.4
Linear trend: $p < .001$		

a) Calculated by the Mantel-Haenszel procedure, corrected for continuity: Age adjusted for sex, sex adjusted for age; and all other factors adjusted for age and sex. b) Confidence intervals obtained by the asymptotic maximum likelihood method. c) Baseline exposure category. d) $p \leq .05$, corrected for continuity. e) $p \leq .01$, corrected for continuity. f) Logrank test using as weights equally-spaced linear increments or, where appropriate, median values within a category.