URANIUM MINER LUNG CANCER STUDY

PROGRESS REPORT

For Period July 1, 1975 - July 1, 1976

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URANIUM MINER LUNG CANCER STUDYPROGRESS REPORTAbstract

This study was initiated in 1957 by the U.S. Public Health and many facets of this project are reaching final objectives. Many new studies have developed in the course of this study and will continue. The projects supported by The Energy Research and Development Administration are of utmost importance and consist of: (a) Collection of material from uranium miners known to have cancer of the lung into a tumor registry; (b) Manual on pulmonary cytology; (c) Regression study of sputum cytological findings in uranium miners who showed marked atypical squamous cell metaplasia and have quit smoking cigarettes, mining, or both; (d) Continuation of sputum collection and collection of lungs from deceased miners, and (e) Sensory development for localization of carcinoma in situ of the lung. Since we have examined approximately 75,000 sputum samples over the last 19 years in cases that showed normal cytology at the inception of study and subsequently developed carcinoma of the lung, we have an accumulation of material that is worthy of study and presentation.

PROGRESS REPORT

September 15, 1976

URANIUM MINER LUNG CANCER STUDY

The progress made in the last eight and one-half years is substantial. A summary of the accomplishments on each project is as follows:

I. Main Research Accomplishments:A. Tumor Registry

Two hundred seventy-three cases have been accumulated and include the following items:

1. All of the smears made from sputum on each case are properly recorded and filed. Over 200 sputum slides are part of the registry for some cases.
2. Slides from all tissue sections, including biopsies, and the autopsy material, including the serial sections of lungs which are prepared by Dr. Oscar Auerbach, are filed with each case.
3. Complete hospital charts, exclusive of the nurse's notes, are available with each case.
4. Autopsy reports, including the gross and microscopic, are a part of each case.
5. The tracheobronchial tree has been studied and recorded in 120 of the uranium miners who are in this registry.

B. The Manual on Pulmonary Cytology

The manual on pulmonary cytology has progressed considerably this year, and is in its manuscript phase. Nineteen plates of photographs have been prepared. A copy of the final product showing two pages has been to the printer (Citron Printing, Denver) for quality of color and cell detail and is included as Figure 3 in our research proposal. We are progressing and hope to reach the 50 pages of color by Christmas. We may contact the American Society of Clinical Pathology or some other agency, or we may elect to have Citron Printing Company do an advertising flyer and distribute privately through this company. The quality of our material is excellent, and we should have no problems.

C. Regression Study (Detailed findings in Charts 1, 2, 3, & 4)

The original study started with 385 men who had quit mining, cigarette smoking, or both. We are still following 171 of these men plus 141 men from a list of 238 that were added since 1970. We have lost some of the men to follow-up due to no current address, so therefore are on an inactive status at this time. We are now making a special effort to locate these men and return them to our active list. We have lost 91 by death. As you will note on the charts, there appears to be some regression in all but the malignant lesions.

Approximately 50 cases of carcinoma in situ have been followed many years. Thirty-one have been followed from non-malignant atypias progressively over the years to invasive carcinoma, proven histologically. Eight new cases of carcinoma of the lung and ten suspicious cases have been discovered during this last year of study. The analysis of these findings has been published, "Early Indices of Cancer Risk Among Uranium Miners with Reference to Modifying Factors". A reprint is enclosed.

D. Sputum Collection and Lung Collection

During the period July 1, 1975, to July 1, 1976, 1870 sputum specimens have been collected and processed on uranium miners and mill workers. During this same period, 11 lungs were collected and processed. As stated above, eight cases of malignancy and ten suspicious cases have been diagnosed from sputum smears. This data is being evaluated as to findings of atypia in each category compared to house cases to determine if there are any significant differences in the findings of the uranium miners.

The comparative studies of the lung findings on all the autopsied cases and non-smoker and smoker population are being done. These slides have been randomized and read by Dr. Oscar Auerbach. The computer printout is finished, and a manuscript is being prepared for publication.

E. The Sensory Development for Localization of Carcinoma in Situ

Doctors Huth and Profio have designed the ultraviolet light fiberoptic bronchoscope. Some problems of apparent curvature of the fibers is presently causing some concern, and it may be necessary to design a new tungsten fiberoptic system that will conduct the ultraviolet light around curves. The Mayo Clinic physicians (Doctors Sanderson, Fontana, and Woolner) have indicated that their foundation will furnish us with the fluorescent hematoporphyrins with their I.D. drug approval. As soon as these materials and equipment are available, they will be tested here at St. Mary's Hospital and Medical Center.

II. Students Trained

Thirty-nine students have been trained in our AMA Approved School of Cytotechnology, and eight students are currently enrolled.

III. Summary

These studies are being integrated and yielded new data and knowledge in the field of lung cancer that will ultimately relate to better patient care and treatment of this disease in man, which presently is the number one killer after heart disease.

CHART I
REGRESSION STUDY

The Uranium Miner List for the Regression Study (miners with marked atypia or higher sputum) was received from Dr. Victor Archer on January 14, 1969. The 415 miners on the original list were all reviewed, and some were reclassified.

1. Original population for study (Doctor Archer's list)	415
a. Total number of miners reviewed that met the criteria of study	246
b. Total number of miners discarded because they didn't meet the criteria of the study	169
c. Total number of miners fulfilling the criteria of the original population and added to the above miners (a) during 1969	139
d. This group was then considered to be the regression study group as of Dec. 31, 1969	385
e. Total number of miners being currently followed	171
f. Total number of miners now inactive (no response, no address, inadequate information, etc., but worked up as much as possible and filed)	151
g. Total number of miners expired since the beginning of the study	63
Total	385

CHART II

REGRESSION STUDY

Irritant Status	Total # Cases	Improved	CIS & Invasive	Last Info. (Inactive)	Expired	Total
UGU Mining Non-smoker	12	6		15		
UGU Mining Smoker (Control)	36	18	1	42		
Quit UGU Mining Quit Smoking	19	16	1	11		
Quit UGU Still Smoking	42	25	2	31		
Quit Smoking Still UGU Mining	24	18		15		
Non-smoker Quit UGU Mining	7	5		10		
O.P. U Miner Smoker (Control)	4	4		12		
O.P. U Miner Non-smoker	0			1		
Quit O.P. U Still Smoking	1	1		3		
O.P. U Miner Quit Smoking	3	2				
Miscellaneous	23					
Smokers 16		14		8		
Non-smokers 1		1		1		
Qt smoking 6						
Totals	171	113	4	151	63	385

The above group of uranium miners is the original group selected by Doctors Archer and Saccomanno during the year 1969. All of the above qualified for this study by sputum analysis showing marked atypia or above.

CHART III

ADDITIONS 1970 TO PRESENT TIME

(Not Regression Study, but showing marked atypia and being followed on a three-month repeat basis)

Total number of miners added 1970 to present, active	141
Total number of miners added 1970 to present, inactive (No response, no address, inadequate information, etc., but worked up as much as possible and filed.)	69
Total number of miners who have expired from this group	28

CHART IV
ADDITIONS 1970 TO PRESENT TIME

Irritant Status	Total # Cases	Improved	CIS & Invasive	Last Info. (Inactive)	Expired	Total
UGU Mining Non-smoker	18	9	3	12		
UGU Mining Smoker (Control)	34	15	3	21		
Quit UGU Mining Quit Smoking	17	4	6	4		
Quit UGU Still Smoking	13	3	3	6		
Quit Smoking Still UGU Mining	18	9	1	10		
Non-smoker Quit UGU Mining	2			1		
O.P. U Miner Smoker (Control)	8	4		2		
O.P. U Miner Non-smoker	1			1		
Quit O.P. U Still Smoking	1	1				
O.P. U Miner Quit Smoking	3	1				
Miscellaneous	26					
Smokers	15	6	2	7 (1 malignant)		
Non-smokers	1			1		
Qt Smoking	10	5		4		
Totals	141	57	18	69	28	238

The above group of uranium miners have been selected for follow-up because of sputum studies showing marked atypia or above. These miners do not qualify for the original Regression Study because they entered the study after 1969.