

Manufacturing Chemists Association

EPIDEMIOLOGICAL STUDY OF MORTALITY
IN VINYL CHLORIDE WORKERS

Objectives

- (1) To compare the mortality of individuals who have worked in vinyl chloride plants with that of the general population, corrected for area, age, and sex;
- (2) to compare mortality patterns within the population of vinyl chloride workers, based upon estimated occupational exposure; and
- (3) to compare mortality among vinyl chloride workers with the mortality of other occupational groups which TCA, Inc. has studied.

Study Design

In each plant, the study population will consist of all workers who were employed for at least one year, beginning at the earliest date for which records are available, and ending on December 31, 1972. It has been estimated that this group will consist of approximately 5,000 current employees. Experience of the contractor indicates that retirements, terminations, and deaths before December 1972 will increase the total study population to about 7,500.

For each person, age, date of employment, nature and duration of employment, and ethnic origin (if possible) will be determined. For those who have died, copies of the death certificates will be obtained, either from plant records or from the public health authorities. These will be classified by cause of death, using the same rules as are used in national death statistics.

Those who left employment will be traced to establish their present status, using post office notification, drivers license records, and other methods which in the past have enabled tracing over 96 percent of our study population.



Data Analysis

Depending on the actual population size and the duration of follow-up activities, it appears probable that about 800 to 1,000 deaths will be covered in the study group.

The basic mortality analysis will begin with a calculation of the number of person years of observation contributed by the study group at each year of age and at each point in time during the study period; using a computer program prepared specifically for this purpose. These data will be used together with the observed deaths at each age and each point in time to calculate mortality rates, which will be compared with the mortality to be expected in the comparable U. S. population, as obtained from national statistics. Techniques of this kind are well developed and have been used for some time in chronic disease studies. (See California Tumor Registry, Cancer Registration and Survival in California, California State Department of Public Health, 1963.)

The above analysis will be repeated for specific causes of death, paying particular attention to competing risks, or interaction among different causes of death.

In addition, analysis of general and cause-specific mortality will be repeated for subgroups of the study population identified as having high, medium, and low exposure. The resulting mortality figures will be interpreted not only in light of their statistical significance, but for their relevance to known and suspected mechanisms of action of vinyl chloride, and for their implications with respect to future studies of special areas and groups.

The contractor has a data bank of mortality profiles, which provide a realistic standard against which to compare vinyl chloride workers, and which furnish a second bench mark in addition to the general population statistics.

Program in effect as of
July 13, 1973

URL 22680

SUMMARY - Vinyl Chloride and Polyvinyl Chloride Industry

Vinyl chloride is a commodity used in very large quantities to make polyvinyl chloride resins (polymer and copolymer). The following estimated figures for 1972 illustrate the tremendous importance of this industry which has operated for 35 years in the United States and 40 years in Europe.

	<u>Vinyl Chloride</u>	<u>Polyvinyl Chloride</u>
U. S. Production	5.2 billion lbs (0.65 exported)	4.4 billion lbs
U. S. Capacity	5.9 billion lbs	
World Production	22 billion lbs	
Annual growth last 5 years	14%	
Projected annual growth, U. S.	11%	
U. S. Plants	14	37 (23 companies)
U. S. Workers	1500	5000
World Workers	10,000	

Virtually all (>99%) vinyl chloride is used in production of polyvinyl chloride and other polymers. It is difficult to estimate the number of workers employed in converting, molding, and fabricating these polymers but it is of the order of tens of thousands, working in thousands of plants. It has been estimated that the wholesale value of fabricated products is over \$3 billion.

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VC represent 20% of plastic production