Midland County Health Department Studies

Dow Chemical's website, *Dioxin Data*, indicated the following on May 16, 2003, "Numerous studies – including vital studies conducted by the Environmental Protection Agency, Midland County Public Health Department and Dow – show that the health of Midland residents is better than both the state and national averages."

In the section, "Vital Studies : US EPA", readers have already seen that Dow did not post any of these vitally important studies by the EPA on its website and that your author has had difficulty in locating these EPA . A request made to Dow for assistance in locating these "vital studies" has not been answered as yet.

There are many residents in the Midland area that are concerned about the health risk from dioxin exposure. The Midland County Department of Public Health (MCDPH) responded to these concerns and issued its own mortality and health studies that "all is well" in Midland County. Dow posted four of the MCDPH's studies on the *Dioxin Data* website.

The County's studies are not really epidemiology studies as they are open letters to the community. The methodology was flawed and the data normally collected and reported in a quality study was absent.

The higher risk from certain cancers has been one of the main health issues associated with dioxins exposure. One MCDPH report specifically dealt with this issue. The study reported the following information shown in Table 1 below.

Table 1

Midland County Cancer Deaths
(Deaths per 100,000 Population)

	Midland Country	Michigan	United States
Cancer Death Rate 1987 - 1995	~152	~175	
Cancer Death Rate, 1998	166.2	198.0	199.4
Ratio, Midland County versus:		0.84	0.83

Although the data appears to be re-assuring, there are several flaws in the studies.

1. Mortality of dioxin-exposed residents is diluted with the mortality of high numbers of non-exposed residents.

Midland County residents are primarily exposed to dioxins/furans in Midland Area soils. Very few Midland County residents are routinely exposed to dioxins in the floodplain of the Tittabawasssee since very few miles of the river are in Midland County.

The limited amount of sampling that has been carried in Midland indicates that the highest dioxin exposure probably occurred in an area that was no more than five miles away from Dow's waste incinerators. The sampling that has been carried out to date is based on the assumption that the incinerators were the only units that incinerated chemical wastes.

However, the MDEQ has been recently informed that Dow may have burnt approximately 25% of its chemical wastes in the Midland plant powerhouses from

1960 to possibly 1970. If so, the sampled area must be expanded to take into account these new sources of dioxin emissions. In addition, it is possible that the number of locations that should be sampled will be increased to improve the level of confidence that all areas of high dioxin contamination have been located. At the current time, there is less that a 1% probability that all high dioxin areas are know.

However, for the purpose of examining the County's health studies, let us assume that the most heavily contaminated areas in the city are located no more that 5 miles from Dow's waste incinerators.

Midland County has a current population of approximately 85,000. The city has a population of approximately 45,000. If we assume that the population of the city that lives within five miles of the incinerators is 15,000 , then the County health studies diluted possible dioxin effects by a ratio of 70,000 to 15,000 or 4.7 to 1. It is very probabe that adverse health effects in the within-5-mile residents may have been masked by the non-exposed residents that made up more than 80% of the studied population.

The County Health Department should not have conducted a review of the health of county residents as it should have conducted a review of the health of exposed residents living within the five mile radius. Dilution with high numbers of non-exposed residents invalidates the study as to whether dioxin exposure has impacted the health of the residents

In several mortality studies, Dow indicated that a total of 2,187 employees were potentially exposed to varying levels of TCDD and the other toxic dioxins/furans from 1940 to 1982. From 1940 to 1982, there were 81 deaths from All Cancers in the 2,187 cohort.

In another article, Dow indicated that approximately 56.8% of the Midland plant employees lived in Midland County. If we assume that, out of the 81 deaths, that 1.1 cancers/year (81 X 56.8%/42 years) were from Midland County, we can calculate the death rate based on the average number of Midland County residents. During 1940 to 1982, the average annual population of the county was 50,900.

The information contained in Table 2 demonstrates the impact of dilution by the general Midland County population. In addition, the impact of various Dow cohort on the death rates associated with the 81 dioxin-related deaths is also shown.

Table 2
Dioxin Related Deaths
(Deaths per 100,000 Population)

Cohort	No. Deaths	Population	Death Rate (Deaths per 100,000)
Midland County	1.1	50,900	2.2
Dow Midland Plant (1940-1982)	81	29,420	275.3
Dow Agchem Dept. (Midland, '40-'82)	81	2,963	2733.7
Dow employees exposed to dioxins (Midland, 40-82) (Dow estimate)	81	2,187	3703.7
Dow employees exposed to TCDD (Midland, 40-82) (Dow estimate)	81	1,594	5081.6

One of the most critical aspects of a mortality study is the selection of the cohort that will be studied. The larger the cohort, the more that significant health effects will be masked. The County Health department indicated that the county cancer

rate was approximately 150 to 170 deaths per 100,000 population (See Table 1) If we assume that the average dioxin-related death rate for county residents is 2.2 deaths per 100,000 (Table 2), this small number is easily lost in the overall death rate.

2. Dilution By Young Age Groups

The county study wanted to demonstrate that the death rate for all residents was no worse that the Michigan or US average. To do this, every county resident was counted, including that of children. Compared to adults, children have a very low death rate... the more children in the total population, the lower the total death rate... the more easily high death rates in elderly residents is masked.

The impact of age on the death rate from cancer can be seen in information that Dow provided on its Midland and Bay City employees, shown in Table 3.

Table 3
Cancer Death Rates With Age
(Dow Midland-Bay City Plants – Deaths per 100,000)

Cohort	Period	Cancer Deaths	No. Dow Employees	Death Rate
Male workers	’40 – ’82	1,666	37,682	4421.2
Male workers	’40 – ’94	3,615	42,076	8591.6
Midland County, as reference				152.0 to 166.2

As the Table 3 shows, an increase of 12 years in the age of the Dow male worker cohort increased the death rate/100,000 by almost 2X. The much smaller Midland county death rate indicates that the average age of the county resident is much younger than the average age of the Dow worker.

3. MCDPH Studies Did Not Include Deaths of Residents That Left County

One additional criticism of the Midland county studies. The various Dow studies maintained awareness of the deaths of its employees, regardless of location... the Midland county studies did not.

The county studies only examined the death rates of residents that died in Midland County. Any residents that may have been exposed to dioxins in earlier years when dioxin levels were much higher but left the county prior to death were not included in the county study.

In the study that tracked the mortality of the large number of Dow employees that worked in Dow's Midland and Bay City plants from 1940 to 1982, the study indicated that 66% of the employees left Dow employment prior to retirement. It is logical to assume that these ex-employees left the area to secure other employment.

Prior information has shown that 43.2% of Midland plant employees lived outside of Midland county. Based on preliminary information, 65% of Dow Midland location employees died outside of Midland county. It is very probable that these deaths were not included in the MCDPH mortality studies.

The MCDPH studies contained a number of epimediological defects. While the studies do indicate that the general health of the residents is better than the Michigan and US average, the studies can not be used to show that the Midland resident has not been adversely affected by dioxin/furan exposure.