

POTTSWOM
VINYL CHLORIDE
MEDICAL SURVEY
RESULTS

AUGUST 4, 1975

NOT FOR PUBLICATION

21473001

BFG14076

TABLE 1

OCCUPATIONAL GROUPINGS OF STUDY PARTICIPANTS
IN POTTSTOWN HEALTH SURVEY

	<u>Number of Individuals Tested</u>	<u>Number of Individuals Possible</u>	<u>Percent Tested</u>
I. Acute Model (Based on Present VC Exposure)			
A. Current Rubber Workers	134	216	62%
B. Current Plastics	80	105	76%
34 Remaining Plastics C. Current Chemical Workers	126	164	77%
High Exposure	71		
Medium Exposure	19		
Low Exposure	36		
D. Current Salaried Chemical Workers	50	120	42%
E. Former Chemical Workers now elsewhere in Plant	71	101	70%
F. Maintenance	66	131	50%
G. Miscellaneous	6	-	-
Total	533		

C* - All Current Chemical Plant
Employees (Groups C+D+E+F)

II. Chronic Model (Based on Total VC Exposure)

1. High Exposure Current Chemical Workers	35
2. Medium Exposure Current Chemical Workers	44
3. Low Exposure Current Chemical Workers	47
	126

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TABLE 2

ESTIMATES OF AVERAGE OF VC EXPOSURE (PRE 1974)
AMONG CHEMICAL WORKERS

High Average Exposure (250 ppm)

Service Utility
Reactor Operators
Relief Operators
Strippers
Senior Operator
"A" Operator
Coagulator Operator
Stabilizer Operator

Medium Average Exposure (75 ppm)

Centrifuge Operators
Tank Farm
Supply Men
Pilot Plant

Low Average Exposure (25 ppm)

Dryer Operators
Baggers
Truckers
Janitors

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TABLE 3

Pottstown Alcohol Consumption
Classification

	<u>Beer</u>	<u>Wine</u>	<u>Mixed Drinks</u>
None	0	0	0
Average	≤ 3 cans/day (1.8 μ /day)	≤ 1 bottle/wk (2.76 μ)	≤ 5 drinks/wk (3.25 μ)
Above Avg.	4-6 cans/day (2.4-3.6 μ)	1.1-2 bottles/wk (3.0-5.5 μ)	6-8 drinks/wk (3.9-5.2 μ /wk)
Excessive	> 6 cans/day	> 2 bottles/wk 1.10	> 8 drinks/wk

Score Overall for an Individual

0	no drinking at all
1	all three categories are average or below
2	above average in any one category
3	excessive in any one category

1 point x amount

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TABLE 4

DEMOGRAPHIC PARAMETERS OF OCCUPATIONAL GROUPS

	<u>Mean Alcohol Consumption Score</u>	<u>Heavy Drinkers</u>	<u>Mean Age (Yr.)</u>	<u>Females</u>	<u>Non-Whites</u>
<u>ACUTE GROUPS</u>					
A. Current Rubber Workers	1.38	11(8%)	40.3	0	5(4%)
B. Current Plastics Workers	1.34	6(8%)	44.4	2(3%)	2(3%)
C. Current Chemical Workers	1.34	11(9%)	42.3	0	4(3%)
Low Exposure	1.25	1(3%)	41.4	0	2(6%)
Medium Exposure	1.42	3(16%)	45.5	0	1(5%)
High Exposure	1.37	7(10%)	41.3	0	1(1%)
D. Current Chemical Salaried	1.14	1(2%)	36.4	0	1(2%)
E. Former Chemical	1.41	12(17%)	42.4	0	0
F. Maintenance	1.26	5(8%)	47.1	0	0
<u>CHRONIC GROUPS</u>					
Low Exposure	1.34	6(17%)	30.8	0	0
Medium Exposure	1.30	2(11%)	48.0	0	0
High Exposure	1.39	3(4%)	49.5	1(3%)	4(9%)

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TABLE 5

HISTORY OF PREVIOUS LIVER
OR GALL BLADDER DISEASE

ACUTE GROUPS

	<u>A</u> <u>Current</u> <u>Rubber</u>	<u>B</u> <u>Current</u> <u>Plastics</u>	<u>C</u> <u>Current</u> <u>Chemical</u>	<u>D</u> <u>Chemical</u> <u>Salaried</u>	<u>E</u> <u>Former</u> <u>Chemical</u>	<u>F</u> <u>Maintenance</u>	<u>C*</u>	<u>Total</u> <u>Tested</u>
Number of Persons Having a History of:								
1. Hepatitis	3 (2%)	1 (1%)	5 (4%)	0	4 (6%)	1 (2%)	10 (3%)	14 (3%)
2. Cirrohsis	0	0	1 (1%)	0	0	0	1 (0%)	1 (0%)
3. Gall bladder Disease	4 (3%)	3 (4%)	3 (2%)	1 (2%)	3 (4%)	1 (2%)	8 (3%)	15 (3%)

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TABLE 6

SEVERITY OF OBSERVED LIVER FUNCTION ABNORMALITIES
ACUTE GROUPS

	Current Rubber	Current Plastics	Current Chemical	Chemical Salaried	Former Chemical	Maint.	Overcrowd of Chem put.	Total Tested
1. <u>SGOT</u>								
50 - 59.9	4(3%)	2(3%)	5(4%)	1(2%)	2(3%)	4(6%)	12(4%)	18(3%)
60 - 79.9	1(1%)	0	3(2%)	1(2%)	2(3%)	1(2%)	7(2%)	8(2%)
> 80	1(1%)	1(1%)	0	0	1(1%)	0	1(0%)	3(1%)
Total Abnormal Mean	6(4%) 31.6	3(4%) 32.1	8(6%) 32.6	2(4%) 30.7	5(7%) 34.5	5(8%) 32.6	20(6%)	29(6%)
2. <u>Total Bilirubin</u>								
1.1 - 1.4	6(5%)	4(5%)	4(3%)	4(8%)	3(4%)	5(8%)	16(5%)	26(5%)
1.5 - 1.8	2(2%)	4(5%)	4(3%)	1(2%)	1(1%)	0	2(1%)	5(1%)
> 1.9	0	0	0	1(2%)	0	0	1(0%)	1(0%)
Total Abnormal Mean	8(7%) .69	5(6%) .63	4(3%) .64	6(12%) .69	4(6%) .63	5(8%) .63	19(6%)	32(6%)

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TABLE 6

SEVERITY OF OBSERVED LIVER FUNCTION ABNORMALITIES (continued)
ACUTE GROUPS

3. LDH	Current Rubber	Current Plastics	Current Chemical	Chemical Salaried	Former Chemical	Maintenance.	C*	Total Tested
226 - 250	1(1%)	3(4%)	2(2%)	1(2%)	5(7%)	2(3%)	10(3%)	14(3%)
251 - 275	0	0	0	0	2(3%)	0	4(1%)	5(1%)
276	1(1%)	0	0	0	1(1%)	0	1(0%)	2(0%)
Total Abnormal Mean	2(2%) 170.9	4(4%) 173.8	4(3%) 169.8	1(2%) 61.3	69.3	2(3%) 68.8	19(6%)	32(6%)
4. Alkaline Phosphatase								
86 - 115	15(12%)	8(10%)	15(12%)	3(6%)	8(11%)	4(6%)	30(10%)	53(10%)
116 - 145	3(3%)	2(3%)	1(1%)	0	3(4%)	0	4(1%)	9(2%)
≥ 146	0	0	0	0	0	1(2%)	1(0%)	1(0%)
Total Abnormal Mean	18(15%) 66.8	10(13%) 65.8	16(13%) 66.1	3(6%) 61.3	11(15%) 69.2	5(8%) 68.8	35(11%)	63(12%)

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TABLE 7

SEVERITY OF OBSERVED LIVER FUNCTION ABNORMALITIES
CHRONIC GROUPS

	<u>Low</u>	<u>Current Chemical</u> <u>Medium</u>	<u>High</u>
<u>SGOT</u>			
50 - 59	0	3 (7%)	2 (6%)
60 - 79	2 (4%)	1 (2%)	0
≥ 80	0	1 (0%)	0
Total Abnormal	2 (4%)	4 (9%)	2 (6%)
Mean	30.8	35.0	32.1
 <u>Total</u> <u>Bilirubin</u>			
1.1 - 1.4	1 (2%)	1 (2%)	2 (6%)
1.5 - 1.8	0	0	0
≥ 1.9	0	0	0
Total Abnormal	1 (2%)	1 (2%)	2 (6%)
Mean	.63	.65	.65
 <u>LDH</u>			
226 - 250	1 (2%)	1 (2%)	0
251 - 275	1 (2%)	1 (2%)	0
≥ 276	0	0	0
Total Abnormal	2 (4%)	2 (5%)	0
Mean	164.8	176.6	168.4
 <u>Alkaline</u> <u>Phosphatase</u>			
86 - 115	7 (15%)	4 (9%)	4 (11%)
116 - 145	0	0	1 (3%)
≥ 146	0	0	0
Total Abnormal	7 (15%)	4 (9%)	5 (14%)
Mean	65.9	63.7	69.0

Norm-
A 5%
National
Avg. are
lower as
different

could not
find a dose
response relationship

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TABLE 8

LIVER ABNORMALITIES
ACUTE GROUPS

	<i>Control a.p.</i> Current Rubber	Current Plastics	Current Chemical	Chemical Salaried	Former Chemical	Maint. <i>7 years older</i>	C*	Total Tested
Number Tested: <i>Large Liver</i> Hepatomegaly by Palpation	9 (7%) ✓	8 (10%)	17 (14%)	7 (14%) ✓	10 (14%) <i>2+</i> ✓	11 (17%)	45 (14%)	61 (11%)
Hepatomegaly by Percussion	4 (3%) ✓	5 (6%)	7 (6%)	2 (4%) ✓	1 (1%)	11 (17%)	21 (7%)	30 (6%)
Liver Size by Percussion								
<i>Acute = 11 cm</i> 12 - 13	3	4	4	1	1	8		
14 - 15	0	1	2	1	0	3		
≥ 16	1 ✓	0	1 ✓	0	0	0		
Hepatomegaly by Both Palpation and Percussion	1 (1%)	3 (4%)	6 (5%)	2 (4%)	1 (1%)	6 (10%)	15 (5%)	19 (4%)

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TABLE 9

LIVER ABNORMALITIES
ACUTE CHEMICAL GROUPS

	<u>Low</u>	<u>Medium</u>	<u>High</u>
Number Tested:			
Hepatomegaly by Palpation	4 (11%)	4 (21%)	9 (13%)
Hepatomegaly by Percussion	2 (6%)	1 (6%)	4 (6%)
Liver Size by Percussion			
12 - 13	1	0	3
14 - 15	0	1	1
≥ 16	1	0	0
Hepatomegaly by Both Palpation and Percussion	2 (6%)	1 (5%)	3 (4%)

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TABLE 10

LIVER ABNORMALITIES
CHRONIC GROUPS

	<u>Current Chemical Workers</u>		
	<u>Low</u>	<u>Medium</u>	<u>High</u>
Number Tested:	47	44	34
Hepatomegaly by Palpation	2 (4%) ✓	8 (18%) ✓	7 (20%) ✓
Hepatomegaly by Percussion	2 (4%)	2 (4%)	3 (9%)
Liver Size by Percussion			
12 - 13	1	2	2
14 - 15	0	0	1
≥ 16	1	0	0
Hepatomegaly by Both Palpation and Percussion	2 (4%)	2 (5%)	2 (6%)

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TABLE 11

HEPATOMEGALY AND TWO OR MORE ABNORMAL
LIVER FUNCTION TESTS

<u>Case</u>	<u>Acute Group</u>	<u>Chronic Group</u>	<u>Hepat. by Palp.</u>	<u>Hepat. by Perc.</u>	<u>SGOT (40)</u>	<u>LDH (225)</u>	<u>Alk. Phos. (85)</u>	<u>Total Bilirubin (1.00)</u>	<u>Age</u>
1	Maint.	-	Yes	Yes	57	246	83	1.10	46
2	Former	-	Yes	Yes	47	246	78	.40	70
3	Chem-H	Med.	Yes	Yes	46	256	45	1.00	55
4	Plastics	-	Yes	No	45	177	91	.60	53
5	Plastics	-	Yes	No	43	145	86	.60	59
6	Rubber	-	No	Yes	50	279	69	.60	48
7	Chem-M	High	Yes	Yes	47	201	88	.60	49
8	Chem-H	High	No	Yes	57	137	90	.60	48
9	Chem-M	Low	Yes	Yes	63	124	46	1.40	64

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Table 12

Liver Scans

Total number of liver scans performed in study. 123
 Normal to all 3 readers: 94
 Abnormal to 1 reader only: 25
 Abnormal to 2 readers: 4
 Abnormal to all 3 readers: 0

<u>Reader</u>	<u>Definitely Abnormal</u>	<u>Probably Abnormal</u>	<u>Focal Defect</u>	<u>Diffuse Disease</u>	<u>Other</u>
#1	-	13	2	7	4
#2	2	16	9	13	-
#3	-	2	2	-	-
	2	31	13	20	4

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TABLE 13

SUMMARY OF LIVER ABNORMALITIES

<u>Liver Disease</u>	<u>Group A</u> <u>Current</u> <u>Rubber</u>	<u>Group C</u> <u>Current</u> <u>Chemical</u>
a) History of blood transfusion	4 (3.0%)	11 (8.7%)
History of hepatitis	3 (2.2%)	5 (4.0%)
Presence of hepatitis antigen (by lab)	5 (3.7%)	2 (1.6%)
b) History of liver disease in family	5 (3.7%)	5 (4.0%)
c) Hepatomegaly by percussion (>11 cm.)	4 (3.0%)	7 (5.6%)
Palpable liver edge	9 (6.7%)	17 (13.5%)
Splenomegaly	1 (0.7%)	0 (0)
Platelet count	0 (0)	0 (0)
d) SGOT ≥ 40	22 (16.4%)	25 (19.8%)
≥ 50	6 (4.5%)	8 (6.3%)
LDH ≥ 226	2 (1.5%)	4 (3.2%)
Alkaline phosphatase ≥ 86	18 (13.4%)	16 (12.7%)
≥ 116	3 (2.2%)	1 (0.8%)
Total bilirubin ≥ 1.1	8 (6.0%)	4 (3.2%)
≥ 1.6	2 (1.5%)	0 (0)
GGTP ≥ 26	4 (3.0%)	4 (3.2%)
≥ 41	1 (0.7%)	0 (0)
Sorbitol dehydrogenase ≥ 60	38 (28.4%)	36 (28.6%)
≥ 130	12 (9.0%)	12 (9.5%)
Ornithine carbamyltransferase ≥ 500	7 (5.2%)	9 (7.1%)
Total protein ≤ 6	1 (0.7%)	2 (1.6%)
Total in study	134	126

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TABLE 14

HYPERTENSION (ACUTE GROUPS)

1. Blood Pressure		<u>Rubber</u>	<u>Chemical</u>
a)	History of blood pressure medication or water pills	10(7.5%)	22(17.5%)
	Told of high blood pressure by physician in past	25(18.7%)	33(26.2%)
b)	Blood pressure reading: Systolic > 141	33(24.6%)	33(26.2%)
	> 151	15(11.2%)	15(11.9%)
	Diastolic > 91	20(14.9%)	33(26.2%)
	> 101	8(6.0%)	8(6.3%)
c)	Fundal arteriolar narrowing	16(11.9%)	19(15.1%)
	Fundal A-V crossing changes	10(7.5%)	16(12.7%)
	Fundal hemorrhages	0(0)	1(0.1%)
	Fundal exudates	0(0)	3(2.4%)
Total in Study		134	126
*p < 0.05			

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TABLE 15

HYPERTENSION (BORDERLINE AND DEFINITE)
ACUTE GROUPS

	A Current Rubber	B Current Plastics	C Current Chemical	D ✓ Chemical Salaried	E Former Chemical	F ✓ Maint.	C*
Systolic Hypertension (<u>≥</u> 140)							
141 - 160	25 (19%)	13 (16%)	26 (21%)	5 (10%)	14 (20%)	15 (23%)	60 (19%)
161 - 180	8 (6%)	6 (8%)	3 (2%)	2 (4%)	7 (10%)	6 (9%)	18 (6%)
181 - 200	0	2 (2%)	1 (1%)	0	2 (3%)	1 (2%)	4 (1%)
<u>≥</u> 201	0	1 (1%)	3 (2%)	0	0	0	3 (1%)
Total	33 (25%)	22 (20%)	33 (26%)	7 (14%)	23 (32%)	22 (33%)	
Diastolic Hypertension (<u>≥</u> 90)							
91 - 110	15 (11%)	20 (25%)	29 (23%)	5 (10%)	12 (17%)	16 (24%)	62 (20%)
111 - 130	3 (2%)	1 (1%)	3 (2%)	0	0	2 (3%)	5 (2%)
131 - 150	0	0	0	0	0	0	0
<u>≥</u> 151	0	0	0	0	0	0	0
Total	18 (13%)	21 (26%)	32 (25%)	5 (10%)	12 (17%)	16 (24%)	

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TABLE 16

CENTRAL NERVOUS SYSTEM SYMPTOMS (ACUTE GROUPS)

	<u>Group A</u> <u>Current</u> <u>Rubber</u>	<u>Group C</u> <u>Current</u> <u>Chemical</u>
History of severe, persistent headaches	11 (8.2%)	18 (14.3%)
History of losing consciousness or fainting	27 (20.1%)	32 (25.4%)
History of losing consciousness or fainting on job	<u>3</u> (2.2%)	<u>9</u> (7.1%)
Total in study	134	126

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