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Description Notes   Handwritten notes and calculations by Alvin L. Young.

Determinations of 2,3,7,8-TCDD in Human Adipose Tissue

	total # of samples	no. of sample above detection limit	Range (ppt)	mean ± s.p.
Canada	23.	22	4.1 – 130	10.7 ± 5.4 +
Veterans Administration	33	25	3 – (81)	7.1 ± 5.5
a. Biopsy Volunteers who served in Vietnam	21.	14	3 – 13, 29, 81 / 3 – 29, 81	8.3 ± 6.9 ⎫ N.S.
b. Biopsy Volunteers who did not served in Vietnam	12	11	3 – 14	5.7 ± 3.1 ⎭
EPA	20 / 6. 29	8 (adults) / 6	5 – 12	~10 ppt —

64 / 5 / 6   83%

53 / 4   TCDF – 28 ppt

6 PCDT HxlP 2 – 60 / 17 ppt

3 – 120 ppt

HxTP 282 ND
283 ND
284 10
285 19 *

Exact Masses

PCB in Adipose 3.5 ± 4.2 (n = 23)

$$t = \frac{\bar{x}_1 - \bar{x}_2}{S_p \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} = \frac{8.27 - 5.68}{5.47 \sqrt{\frac{1}{13} + \frac{1}{11}}} = \frac{2.59}{2.24}$$

$$= 1.156$$

$$S_p^2 = \frac{(N_1 - 1) S_1^2 + (N_2 - 1) S_2^2}{N_1 + N_2 - 2}$$

$$P > 0.1$$

$$\frac{0.0769}{0.0}$$

$$= \frac{(12 \times 47.1) + (10 \times 9.4)}{13 + 11 - 2} = \frac{565.2 + 94}{22} = 29.96$$

$$S_p = 5.47$$

overall $\frac{107.5 + 62.5}{13 + 11} = 7.08$

$$\frac{1903.6 - (170)^2 / 24}{24 - 1} = 30.4$$

$$S^2 = 5.5$$

A. Volunteers who served in Vietnam

X_{1i}	X_{1i}^2
29	841
~~81~~	~~(6561)~~
7.5	56.3
5	25
5	25
5	25
3	9
9	81
4	16
5	25
11	121
13	169
5	25
6	36

$$\Sigma X_{1i} = 107.5 \quad \Sigma X_{1i}^2 = 1454.3$$

$N_1 = 13$

$$\overline{X_1} = \frac{107.5}{13} = 8.27$$

$$S_1^2 = \frac{1454.3 - (107.5)^2/13}{13 - 1}$$

$$= \frac{1454.3 - 888.9}{12}$$

$$= 47.1$$

$$S_1 = 6.86$$

B. Volunteers who did not served in Vietnam

4	16
>	1
3.5	12.3
5	25
6	36
7	49
7	49
4	16
14	196
r	25
4	16
62.5	449.3

$N_2 = 11$

$$\overline{X_2} = \frac{62.5}{11} = 5.68$$

$$S_2^2 = \frac{449.3 - (62.5)^2/11}{11 - 1}$$

$$= 9.4$$

$$S_2 = 3.07$$

Ryan 1979·1981

· Sex

Age

Residence

Cause of Death (Stroke, HD, Ca, Acc)

Origin

Kingston 13

Ottawa 10

PCB

Kingston ~~8.9~~
~~80~~

Ottawa

12.4 ± 5.8 (12)   8.6 ± 4.4 (10)
21.3 ± 33.1 (13)

fr-f   TOTAL 10.
8.0
4.1
10.1
21.8   SAMPLE   TCDF   PCDF
14.0   1   1.4   20   18.6
8.9   2   12.2   46
21.4   7.2
18.6   V   1.8   59.3
10.4   5   3.2   16.4
15.4   6   < 1.0
                         7   2
130   8   6.1   4.4

How much fat in a normal (70 kg man?

Fat 5% = 3.5 kg

if adipose contained 10 ppt

$\therefore$ 10 ng/kg $\times$ 3.5 = 35 ng in a 70 kg man.?

350,000

.5 ng/kg = .5 ppt

35,000 ppq

192.6⁰

DETERMINATIONS OF 2,3,7,8-TCDD IN HUMAN ADIPOSE TISSUE

	total # of samples	no. of samples above detection limit	Range (ppt)	mean ± S.D
Canada	23	22	4.1 - 130	10.7 ± 5.4 +
Veterans Administration	33	24	3 - (29) →	7.1 ± 5.5
a. Volunteers who served in Vietnam	21 } Biopsy	13	3 - 13, 29, 81 / 3 - 29, 81 → / 3 - 29 →	8.3 ± 6.9 } N.S.
b. Volunteer who did not served in Vietnam	12	11	3 - 14 →	5.7 ± 3.1
	20	8 (Adults)		~10 ppt
EPA	16, 29	6	5 - 12	(—)
	(64)	(53)	3 - 630 ppt	
	5	4 TCDF - 28 ff	KTP 282 ND	
	6 83%	6 PCDF 2-60 17 ppt	283 ND
			284 10
			285 19 *
			Exact Mass

PCB in Adipose 3.5 ± 4.2 (n=23)

A. Volunteers who served in Vietnam

X_{1i}	X_{1i}^2
29	841
81	(6561)
7.5	56.3
5	25
5	25
5	25
3	1
9	81
4	16
5	25
11	121
13	169
5	25
6	36

$\Sigma X_{1i} = 107.5 \quad \Sigma X_{1i}^2 = 1454.3$

$N_1 = 13$

$$\overline{X_1} = \frac{107.5}{13} = 8.27$$

$$S_1^2 = \frac{1454.3 - (107.5)^2/13}{13-1}$$

$$= \frac{1454.3 - 888.9}{12}$$

$$= 47.1$$

$$S_1 = 6.86$$

B. Volunteers who did not served in Vietnam

4	16
3	9
3.5	12.3
5	25
6	36
7	49
7	49
4	16
14	196
5	25

$N_2 = 11$

$$\overline{X_2} = \frac{62.5}{11} = 5.4?$$

$$S_2^2 = \frac{449.3 - (62.5)^2/11}{11-1}$$

$$= 9.4$$

$$S_2 = 3.07$$

$n = 14$

$$\bar{X} = \frac{188.5}{14} = 13.5$$

$$\Sigma X = 188.5$$
$$(\Sigma X)^2 = 35532.25$$
$$\Sigma X_i^2 = 8015.3$$

$$S^2 = \frac{8015.3 - 35532.5/14}{14 - 1}$$

$$= 421.2$$

$$S = 20.52$$

✓ A
(a) volunteer   21   14   3 - 81   13.5 ± 20.
served in Vietnam
(b)   12   11   3 - 14   5.7 ± 3.1
                             33   25   3 - 81

$$13.5 \pm 20.5$$

188.5   8015.3
62.5   449.3
─────   ──────
25.1   8464.6

$$\frac{25.1}{25} = 10.04 \qquad S^2 = \frac{8464.6 - \frac{6300.1}{25}}{24} = 247.7$$

$$t = \frac{\bar{X}_1 - \bar{X}_2}{S_p\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} = \frac{8.27 - 5.68}{5.47\sqrt{\frac{1}{15} + \frac{1}{11}}} = \frac{2.59}{2.24}$$

$$= 1.156$$

$$p > 0.1$$

0.0769

0.0

$$S_p^2 = \frac{(N_1-1)S_1^2 + (N_2-1)S_2^2}{N_1 + N_2 - 2}$$

$$= \frac{(12 \times 47.1) + (10 \times 9.4)}{13 + 11 - 2} = \frac{565.2 + 94}{22} = 29.96$$

$$S_p = 5.47$$

Overall $\dfrac{107.5 + 62.5}{13 + 11} = 7.08$

$$\frac{1903.6 - (170)^2/24}{24 - 1} = 30.4$$

$$S^2 = 5.5$$

555

290 hospitals

SSN   520 - 44 - 1612 ⎯⎯ BIRLS
                              DMDC

SSN

1969 -   1981

EPA Human Adipose Tissue Survey

15,000

1937 - 1952 - males

5 · 10 gms

No. of sample above Detection Limit	Range	mean ± S.D
$n = 25$	3 - 81	10.04 ± 15.7
$n = 24$	3 - 29	7.08 ± 5.5
$n = 14$	3 - 81	13.5 ± 20.5
$n = 13$	3 - 29	8.3 ± 6.9
$n = 11$	3 - 14	5.7 ± 3.1

$$8.3 \quad vs \quad 5.7 \quad NS \quad (p > 0.1)$$
$$13.5 \quad vs \quad 5.7 \quad NS \quad (p > 0.1)$$

$$t = \frac{\bar{x}_1 - \bar{x}_2}{sp\sqrt{\frac{1}{N_1} + \frac{1}{N_2}}} = \frac{13.5 - 5.7}{15.56\sqrt{\frac{1}{14} + \frac{1}{11}}} = \frac{7.8}{6.27} = 1.2$$

$$7.14 \times 10^{-2}$$

$$p > 0.1$$

$$sp^2 = \frac{(14-1)\,421.3 + (11-1)\,9.4}{14 + 11 - 2} = \frac{5570.9}{23} = 242.$$

$$sp = 15.56$$