

## เอกสารอ้างอิง

- กัลยา วานิชบัญชา. การใช้ SPSS for Windows ในการวิเคราะห์ข้อมูล. กรุงเทพฯ: ซีเคแอนด์เอส โฟโต้สตูดิโอ; 2543.
- จิราพร เขียวอยู่. การออกแบบและการทดสอบเครื่องมือ. ขอนแก่น: มหาวิทยาลัยขอนแก่น; 2549.
- ชาญชัยณรงค์ ทรงศาศรี. การจำแนกผู้ป่วยโรคเลปโตสไปโรซิส จากผลการตรวจทางห้องปฏิบัติการและลักษณะทางคลินิก. [วิทยานิพนธ์ปริญญาสาธาณสุขศาสตรมหาบัณฑิต สาขาวิชาชีวสถิติ]. ขอนแก่น: บัณฑิตวิทยาลัย มหาวิทยาลัยขอนแก่น; 2546.
- บัณฑิต ถิ่นคำรพ. การวิเคราะห์ข้อมูลการวิจัยวิจัยทางวิทยาศาสตร์สุขภาพโดยใช้การถดถอยลอจิสติก. ขอนแก่น: มหาวิทยาลัยขอนแก่น; 2543.
- เลี้ยง หุยประเสริฐ. นิติเวชศาสตร์สำหรับพนักงานสืบสวนสอบสวน. กรุงเทพฯ: สูตรไพศาล; 2549.
- Sirima M, Jhuraluck K. Ordinal Logistic Regression Model (Proportional Odds Model). *DMBN E Journal* 2548; 1(3): 75-84.
- Asala SA. Sex determination from the head of the femur of South African whites and blacks. *Forensic Science International* 2001; 117: 15-22.
- Barrier LO, L'Abbe EN. Sex determination from the radius and ulna in a modern South African sample. *Forensic Science International* 2008; 179: 85.e1-85.e7.
- Benazzi S, Maestri C, Parisini S, Vecchi F, Gruppioni G. Sex Assessment from the Sacral Base by Means of Image Processing. *Forensic Science International* March 2009; (4): 2.
- Boonkaew K. Accuracy for sex determination by using cranoscopy and craniometry [Master Thesis in Anatomy]. Bangkok: The Graduate School, Mahidol University; 2005.
- Davivongs V. The pelvic girdle of the Australian aborigines—Sex difference and sex determination. *American Journal of Physical Anthropology* 1963; 21: 443-455.
- Flander LB. Univariate and multivariate methods For sexing the sacrum. *American journal of Physical Anthropology* 1978; 49(1): 103-110.
- Frutos LR. Metric determination of sex from the humerus in a Guatemalan forensic sample. *Forensic Science International* 2005; 147: 153-7.

- Hsieh FY, Daniela A, Bloch, Michaeld. A Simple Method of Sample Size Calculation for linear and logistic Regresstion. **Statistic Medicine** 1998; 17: 1623-34.
- Hosmer DW, Lemeshow S. **Applied Logistic Regression**. 2<sup>nd</sup> ed. New York: John Wiley & Sons; 2000.
- Kimura k. A base-wing index for sexing the Sacrum. **Journal Anthropology Society Nippon** 1982; 153-162.
- King CA, Iscan MY, Loth SR. Metric and Comparative Analysis of Sexual Dimorphism in the Thai Femur. **Journal of Forensic Sciences** 1998; 43(5): 954-8.
- Krogman WM, Iscan YM. **The Human Skeleton in Forensic Medicine**. 2<sup>nd</sup> ed. Springfield, Illinois, U.S.A: Charles C. Thomas Pub; 1986.
- Morris. **Human Anatomy**. 11<sup>th</sup> ed. The Blakiston: Philadelphia; 1953.
- Moore KL, Dalley AF. **Clinical Oriented Anatomy**. 4<sup>th</sup> ed. Lippincott: Williams & Wilkins; 1999.
- Mahakkanukrauh P. Thai Sternum and sexing. **Journal Science Faculty Chiang Mai University** 2001; 28(1): 39-43.
- Mishra SR, Singh PJ, Agrawal AK, Gupta RN. Identification of sex of sacrum of Agra region. **Journal of Anatomical Society of India** 2003; 52(2): 132-6.
- Patel MM, Gupta BD, Singel TC. Sexing of Sacrum By Sacral Index And Kimura's Base-Wing Index. **Journal of Indian Academy of Forensic Medicine** 2005; 27(1): 5-9.
- Roger W, Peter LW. **Gray's Anatomy**. 35<sup>th</sup> ed. London: Longmans; 1973.
- Stewart TD. Sex determination of the Skeletal. **American Journal of Physical Anthropology** 1954; 12: 385-392.
- Stradalova V. Determination from metrical characteristics of the sacrum. **Folia Morphological** 1974; 22: 408-12.
- Suwanlikhid N, Mahakkanukrauh P. Northern Thai radius and sexing. **Bull Chiang Mai Association Medicine Science** 2003; 37: 97-105.
- Steyn M, Iscan MY. Sex determination from the femur and tibia in South African whites. **Forensic Science International** 1997; 90: 111-9.
- Steyn M, Iscan MY. Osteometric variation in the humerus: sexual dimorphism in South Africans. **Forensic Science International** 1999; 106: 77-85.

- Sing KP, Prasad R, Chari PS, Dash RJ. Human growth hormone (HCG), testosterone and male menopause (andropause) medical information. **Burns** 1998; 24(8): 500-12.
- Tanner JM. **Foetus into Man**. 2<sup>nd</sup> ed. Castlemead: Ware; 1989.
- Uesugi Y, Taguchi O, Noumura T, Iguchi T. Effects of sex steroids on the developmental of sex dimorphism in mouse innominate bone. **The Anatomical Record** 1992; 234: 541-8.
- Wilson JD, George FW, Griffin JE. The hormonal control of sexual development. **Science** 1981; 211: 1278-84.
- William PL, Warwick R. **Gray's Anatomy**. 36<sup>th</sup> ed. Edinburgh: London Churchill Livingstone; 1989.

ภาคผนวก

ภาคผนวก ก  
การวิเคราะห์ข้อมูลเพิ่มเติม

### 1. การวิเคราะห์ Multiple logistic regression

Initial model included all variables which had p-value  $\leq 0.25$  from bivariate analysis

Modeling using backward elimination

Statistical analysis using STATA version 10.0 for Windows

#### Initial model

Enter 5 potential significant variable into the initial model

Variables in the Equation							
		B	S.E.	Wald	df	Sig.	Exp(B)
Step	width	1.878	.913	4.234	1	.040	6.540
a							
1	AP_S1	-4.752	1.376	11.930	1	.001	.009
	T_S1	-1.197	.939	1.625	1	.202	.302
	T_ala_R	-.050	1.007	.002	1	.961	.952
	T_al_L	.519	1.066	.237	1	.626	1.681
	Constant	-1.224	4.955	.061	1	.805	.294

a. Variable(s) entered on step 1: width, AP\_S1, T\_S1, T\_ala\_R, T\_al\_L.

Remove T\_ala\_R which had p-value = 0.961

Variables in the Equation							
		B	S.E.	Wald	df	Sig.	Exp(B)
Step	width	1.856	.796	5.438	1	.020	6.397
a							
1	AP_S1	-4.754	1.375	11.953	1	.001	.009
	T_S1	-1.181	.884	1.785	1	.182	.307
	T_al_L	.514	1.061	.234	1	.628	1.671
	Constant	-1.197	4.923	.059	1	.808	.302

a. Variable(s) entered on step 1: width, AP\_S1, T\_S1, T\_al\_L.

Remove T\_al\_L which had p-value = 0.628

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step	width	2.131	.564	14.303	1	.000	8.424
a							
1	AP_S1	-4.796	1.366	12.326	1	.000	.008
	T_S1	-1.372	.797	2.963	1	.085	.254
	Constant	-1.487	4.857	.094	1	.760	.226

a. Variable(s) entered on step 1: width, AP\_S1, T\_S1.

Remove T\_S1 which had p-value = 0.085

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step	width	1.764	.495	12.724	1	.000	5.837
a							
1	AP_S1	-5.502	1.313	17.561	1	.000	.004
	Constant	-1.560	4.699	.110	1	.740	.210

a. Variable(s) entered on step 1: width, AP\_S1.

Final model เหลือตัวแปรในสมการสองตัวที่ยังมีนัยสำคัญทางสถิติที่ความเชื่อมั่นร้อยละ 95 ได้แก่ Width และ AP\_S1



## 2. การตรวจสอบความเหมาะสมทางสถิติ (Overall goodness-of-fit)

. lfit

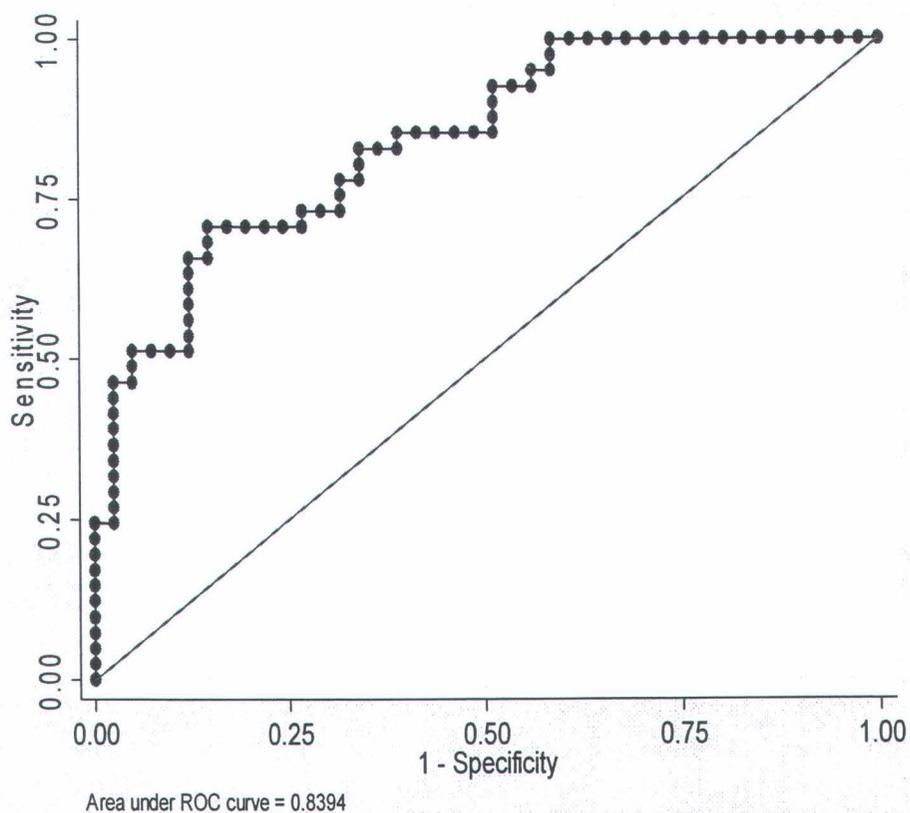
Logistic model for female, goodness-of-fit test

number of observations =	82
number of covariate patterns =	82
Pearson chi2(79) =	72.94
Prob > chi2 =	0.5810

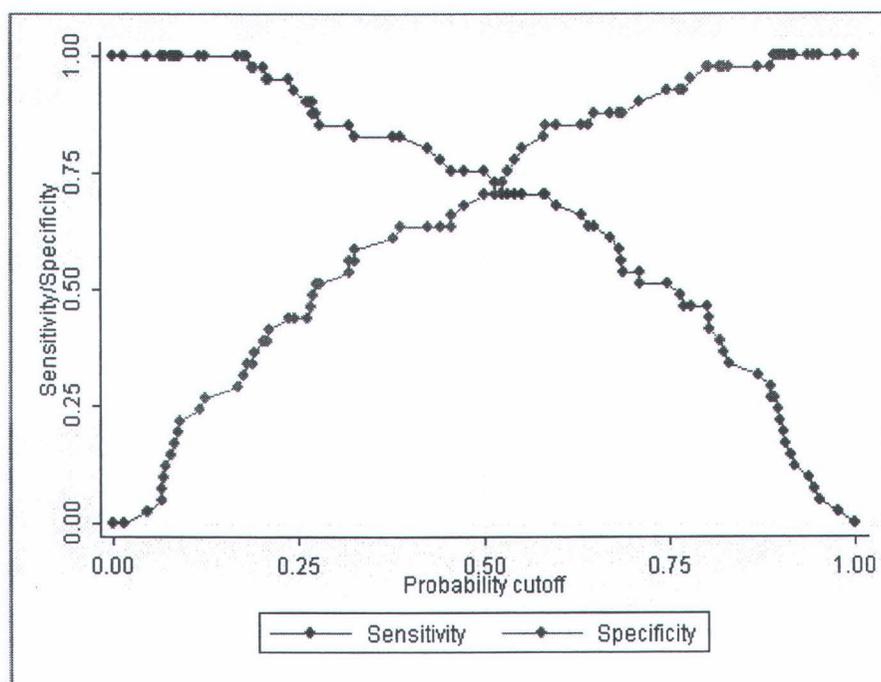
. lroc

Logistic model for female

number of observations =	82
area under ROC curve =	0.8394



หาจุดตัดที่เหมาะสมที่ให้ sensitivity และ specificity สูงที่สุด ด้วยคำสั่ง lsens



จุดตัดที่เลือกใช้ คือ 0.5

### 3. การทดสอบโมเดลทำนาย (validating the final model)

```
. logit female width ap_s1
```

```
Iteration 0: log likelihood = -56.838069
```

```
Iteration 1: log likelihood = -51.088015
```

```
Iteration 2: log likelihood = -50.968886
```

```
Iteration 3: log likelihood = -50.968534
```

Logistic regression

Number of obs = 82

LR chi2(2) = 11.74

Prob > chi2 = 0.0028

Log likelihood = -50.968534

Pseudo R2 = 0.1033

female	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
Width	.0714863	.0415648	1.72	0.085	-.0099792 .1529518
ap_s1	-.2802975	.0927698	-3.02	0.003	-.4621229 -.0984721
_cons	1.283614	4.218094	0.30	0.761	-6.983698 9.550925

```
. lfit
```

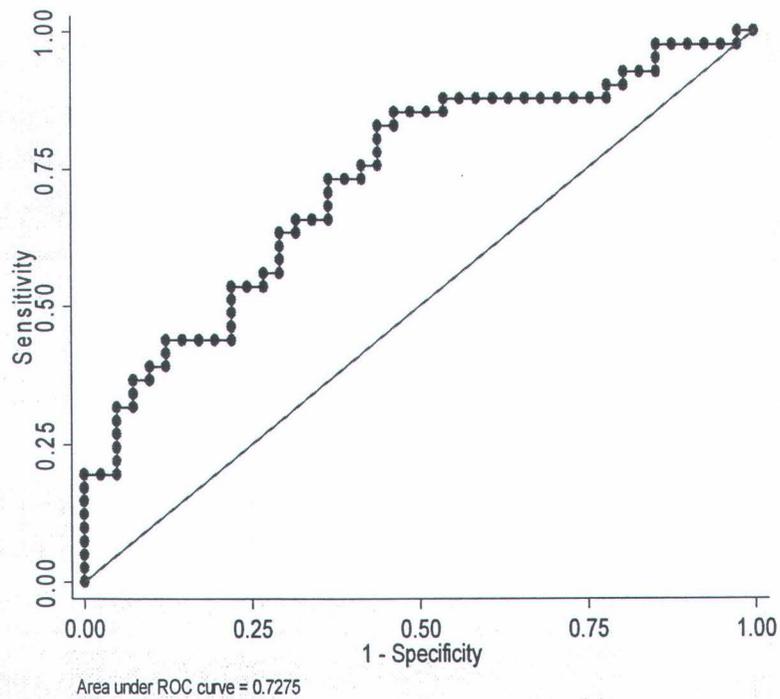
Logistic model for female, goodness-of-fit test

```
number of observations = 82  
number of covariate patterns = 82  
Pearson chi2(79) = 87.47  
Prob > chi2 = 0.2408
```

```
. lroc
```

Logistic model for female

```
number of observations = 82  
area under ROC curve = 0.7275
```



. lstat,cutoff(.50)

Logistic model for female

		True		
Classified	D	~D	Total	
+	26	13	39	
-	15	28	43	
Total	41	41	82	

Classified + if predicted  $\Pr(D) \geq .50$

True D defined as female  $\neq 0$

Sensitivity	$\Pr(+ D)$	63.41%
Specificity	$\Pr(- \sim D)$	68.29%
Positive predictive value	$\Pr(D +)$	66.67%
Negative predictive value	$\Pr(\sim D -)$	65.12%

False + rate for true $\sim D$	$\Pr(+ \sim D)$	31.71%
False - rate for true D	$\Pr(- D)$	36.59%
False + rate for classified +	$\Pr(\sim D +)$	33.33%
False - rate for classified -	$\Pr(D -)$	34.88%

Correctly classified		65.85%
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ตารางแสดงค่า Probability ในกลุ่มที่ใช้ทดสอบสมการ ซึ่งผลจากโมเดลทำนายเพศจาก  
กระดุกกระเบนเหน็บดังในตาราง

No	Predicted probability	Predicted gender ( $\geq 0.5$ female, $< 0.5$ male)
1	0.613	female
2	0.729	female
3	0.479	male
4	0.747	female
5	0.749	female
6	0.502	female
7	0.759	female
8	0.541	female
9	0.695	female
10	0.410	male
11	0.754	female
12	0.581	female
13	0.544	female
14	0.517	female
15	0.568	female
16	0.238	male
17	0.816	female
18	0.639	female
19	0.815	female
20	0.793	female
21	0.580	female
22	0.069	male
23	0.500	female
24	0.542	female
25	0.717	female
26	0.466	male
27	0.424	male

No	Predicted probability	Predicted gender ( $\geq 0.5$ female, $< 0.5$ male)
28	0.671	female
29	0.672	female
30	0.299	male
31	0.865	female
32	0.729	female
33	0.282	male
34	0.617	female
35	0.495	male
36	0.707	female
37	0.442	male
38	0.235	male
39	0.432	male
40	0.549	female
41	0.580	female
42	0.295	male
43	0.415	male
44	0.363	male
45	0.381	male
46	0.597	female
47	0.609	female
48	0.643	female
49	0.493	male
50	0.425	male
51	0.549	female
52	0.565	female
53	0.562	female
54	0.068	male
55	0.733	female
56	0.480	male

No	Predicted probability	Predicted gender ( $\geq 0.5$ female, $< 0.5$ male)
57	0.200	male
58	0.394	male
59	0.392	male
60	0.367	male
61	0.410	male
62	0.590	female
63	0.676	female
64	0.368	male
65	0.355	male
66	0.350	male
67	0.517	female
68	0.629	female
69	0.329	male
70	0.594	female
71	0.336	male
72	0.208	male
73	0.184	male
74	0.512	female
75	0.271	male
76	0.193	male
77	0.167	male
78	0.735	female
79	0.475	male
80	0.422	male
81	0.258	male
82	0.520	female



## ตารางเปรียบเทียบวิธี sacral index

	Male (mm.)		Female (mm.)	
	Patel(2005)	Present study(2009)	Patel(2005)	Present study(2009)
Range	905-106	86.21-124.80	104.8-131	89.48-135.21
Mean	96.25	102.73	113.25	107.65
S.D	4.6	9.62	96.03-130	9.90
Mean $\pm$ 3 S.D.	82.45-110.05	73.86-131.58	5.74	77.98-137.32
Demarking point	<96.03	<77.98	>110.05	>131.58
Percentage of bone identified by demarking point	62.5% n=20 readings N=32	0.0% n=0 reading N=41	68.75% n=22 readings N=32	4.87% n=2 readings N=41

ภาคผนวก ข

แบบบันทึกข้อมูลและตารางการสุ่มเลือกกระดุกกระเบนเหน็บ

## บันทึกข้อมูลกระดูกกระเบนเหน็บกลุ่มที่ 1

1 คือ เพศหญิง 42 ชั้น

2 คือ เพศชาย 42 ชั้น

Id	Code	Sex	Age	Sacral width (mm)	Sacral height (mm)	AP-width S1 (mm)	Trans-vers width S1 (mm)	Rt. alar width (mm)	Lt.alar width (mm)
1	40/1541	1	59	103.6	94.0	28.0	41.7	31.0	30.0
2	43/4360	1	57	108.5	90.5	28.3	38.6	33.3	34.7
3	48/0241	1	48	113.0	109.2	29.4	48.5	35.8	34.3
4	42/1205	1	57	109.7	101.7	31.2	43.8	30.0	33.6
5	38/771	1	42	116.0	111.0	27.4	41.5	39.0	41.0
6	42/2721	1	67	114.5	101.2	28.6	44.0	35.6	37.7
7	43/1033	1	54	106.8	111.4	27.6	48.2	30.3	33.0
8	48/0193	1	48	102.0	96.0	27.3	40.5	31.2	29.2
9	44/1760	1	47	112.6	109.0	28.3	47.5	37.0	34.0
10	42/421	1	40	111.4	105.0	28.5	41.0	38.0	40.6
11	42/3011	1	26	109.7	112.4	32.2	51.0	34.4	34.0
12	34/1007	1	84	110.6	93.7	35.0	45.5	31.2	33.7
13	43/2041	1	73	106.8	103.0	32.0	45.7	29.3	32.8
14	42/1748	1	73	107.4	108.0	28.8	40.0	40.3	32.2
15	39/1183	1	47	103.0	107.0	32.4	44.5	29.6	30.0
16	41/923	1	38	107.0	106.4	29.0	38.6	33.0	33.5
17	35/174	1	63	113.7	105.9	31.0	43.5	36.2	38.4
18	42/2904	1	57	96.8	106.0	28.5	43.3	27.3	27.7
19	41/1858	1	71	120.0	105.6	33.4	43.7	41.0	39.6
20	40/305	1	60	104.5	98.9	29.8	43.0	31.5	31.0
21	43/3097	1	52	103.5	97.2	29.2	45.3	27.2	33.0
22	37/1031	1	80	114.6	113.2	30.0	44.0	37.2	38.0
23	44/1808	1	62	110.0	96.1	30.8	49.3	29.9	30.0
24	28/199	1	50	109.8	109.3	27.0	40.0	33.5	34.2
25	33/189	1	58	113.0	83.9	30.6	45.0	32.0	34.5
26	37/665	1	65	110.0	95.2	31.0	45.3	34.4	29.3

Id	Code	Sex	Age	Sacral width (mm)	Sacral height (mm)	AP-width S1 (mm)	Trans-vers width S1 (mm)	Rt. alar width (mm)	Lt.alar width (mm)
27	36/629	1	50	110.0	108.8	29.0	45.9	39.3	33.0
28	39/1694	1	62	97.0	108.4	30.3	38.4	31.4	31.1
29	36/1143	1	48	98.4	91.2	27.6	37.3	30.0	33.2
30	25/37	1	75	109.0	93.3	31.5	41.3	33.8	33.4
31	41/1243	1	67	115.2	85.2	36.6	46.5	36.3	32.8
32	33/646	1	67	101.6	100.9	31.7	40.0	36.3	32.8
33	40/100	1	46	111.9	114.0	28.9	42.7	41.6	44.0
34	36/1035	1	80	108.5	99.7	33.3	49.8	37.3	28.8
35	37/598	1	58	109.4	100.9	28.0	44.5	41.9	32.8
36	43/1058	1	50	113.4	107.8	29.4	43.6	41.4	41.3
37	37/612	1	55	112.0	106.2	33.4	46.7	37.5	44.4
38	32/586	1	72	114.8	94.1	35.8	59.5	38.8	30.3
39	42/1689	1	70	114.4	93.5	34.5	47.4	37.0	40.3
40	42/3011	1	26	115.8	112.4	32.0	51.6	33.0	33.8
41	38/1731	1	50	122.3	109.2	35.3	45.2	44.6	41.0
42	43/3916	2	45	109.8	98.2	31.3	48.0	34.7	32.0
43	42/2838	2	58	95.7	90.0	31.0	39.2	26.5	26.7
44	42/3342	2	67	106.1	108.3	32.6	46.9	31.2	29.1
45	39/2153	2	40	100.6	90.3	32.0	42.7	27.7	29.0
46	41/855	2	56	90.6	100.0	27.0	40.6	27.8	24.0
47	44/1109	2	27	108.3	97.0	35.5	48.7	32.4	33.3
48	43/3448	2	48	107.4	108.0	39.3	51.6	33.0	31.4
49	35/1000	2	67	104.0	104.1	30.4	45.9	28.3	29.4
50	42/2510	2	43	98.5	105.6	30.8	46.4	27.5	28.0
51	42/337	2	50	107.4	88.7	33.4	46.0	35.1	33.3
52	30/274	2	70	106.0	102.2	32.5	42.2	36.7	29.0
53	43/1298	2	47	101.8	88.0	29.4	39.9	34.4	30.7
54	42/1192	2	40	122.3	98.0	36.2	55.0	36.9	31.6
55	39/456	2	81	121.6	100.0	34.4	55.1	33.0	35.6

Id	Code	Sex	Age	Sacral width (mm)	Sacral height (mm)	AP-width S1 (mm)	Trans-vers width S1 (mm)	Rt. alar width (mm)	Lt.alar width (mm)
56	42/4175	2	69	110.4	96.2	32.4	49.2	33.0	29.2
57	43/2012	2	45	100.4	105.1	31.4	41.8	31.2	30.0
58	33/016	2	74	104.3	92.8	35.1	44.4	29.7	30.9
59	33/572	2	55	101.5	106.4	30.2	54.6	28.0	25.7
60	43/4009	2	50	105.9	121.0	31.0	47.4	31.7	33.7
61	46/112	2	51	114.4	115.2	30.0	46.8	34.0	36.8
62	41/146	2	25	107.3	111.5	35.7	50.6	29.4	31.0
63	40/703	2	47	97.6	103.0	31.3	44.2	31.3	30.2
64	43/966	2	67	99.2	87.9	33.5	41.2	28.2	29.8
65	43/3886	2	52	113.0	100.3	38.0	46.8	47.0	32.2
66	39/1519	2	63	110.6	116.1	32.2	56.5	31.6	32.7
67	37/1323	2	42	105.0	112.5	31.8	41.4	36.3	36.3
68	29/192	2	75	108.7	107.6	34.6	44.0	32.8	32.2
69	34/004	2	65	108.2	100.0	36.0	44.4	35.0	31.4
70	41/149	2	59	111.5	108.5	30.6	45.6	41.0	32.4
71	23/134	2	54	99.8	99.9	34.0	43.0	27.6	31.7
72	43/277	2	76	111.4	115.0	31.2	49.6	35.5	36.1
73	29/27	2	74	114.3	114.1	36.4	54.0	33.3	36.5
74	41/3284	2	37	110.0	97.5	32.1	43.5	35.6	32.9
75	37/1421	2	74	110.9	116.9	35.0	54.9	32.3	32.2
76	43/489	2	61	101.9	118.2	34.7	45.8	31.3	29.4
77	43/818	2	78	100.6	102.5	35.0	43.8	29.8	26.6
78	22/139	2	65	102.3	98.5	34.8	44.8	30.0	28.6
79	24/131	2	70	109.2	108.9	30.0	42.4	35.9	39.7
80	30/37	2	67	104.7	108.9	34.3	55.0	30.4	22.1
81	35/770	2	43	114.5	111.6	35.4	43.2	33.9	37.8
82	42/1921	2	52	99.2	111.9	30.5	44.9	32.2	28.4

## บันทึกข้อมูลกระดูกกระเบนเหน็บกลุ่มที่ 2

1 คือ เพศหญิง 42 ชั้น

2 คือ เพศชาย 42 ชั้น

<b>Id</b>	<b>Code</b>	<b>Sex</b>	<b>Age</b>	<b>Sacral width (mm)</b>	<b>Sacral height (mm)</b>	<b>AP- width S1 (mm)</b>	<b>Trans- vers width S1 (mm)</b>	<b>Rt. alar width (mm)</b>	<b>Lt.alar width (mm)</b>
1	31/278	1	80	110.0	90.2	31	55.9	32.3	27.4
2	32/240	1	56	110.8	112.5	29.3	44.7	36.2	35.7
3	42/2386	1	54	98.9	109.3	30.1	48	30.3	32.8
4	42/1394	1	51	100.3	89.4	26.3	43.5	33.3	29.2
5	36/53	1	49	109.5	122.4	28.6	47.2	34.1	40.6
6	43/1818	1	57	98.6	90.0	29.7	39.1	31.7	33.6
7	46/189	1	43	108.3	110.5	28.1	45.2	40.5	42.2
8	31/342	1	45	100.0	98.5	29.5	43.5	38.6	35.1
9	28/1581	1	37	119.8	113.4	32.2	48.5	44.8	45.3
10	48/0888	1	70	102.8	108.6	32.1	50.4	29.5	32.5
11	47/1830	1	49	113.0	108.7	29.4	43.9	38.4	37.2
12	43/1830	1	61	116.4	100.5	33.1	49.1	31.6	37.0
13	50/2112	1	52	110.4	102.2	32.1	51.3	30.4	32.7
14	43/4357	1	80	117.1	78.4	34.2	59.3	32.2	35.9
15	36/368	1	58	107.8	107.2	31.1	40.4	35.5	35.3
16	44/2000	1	75	99.9	101.3	34.2	44.3	38.6	37.8
17	49/1427	1	54	117.4	106.7	29.2	46.8	36.2	35.4
18	41/3073	1	42	104.9	101.9	29.3	48.3	29.6	29.9
19	50/1453	1	37	105.5	88.1	26.2	40.4	31.7	34.7
20	34/271	1	41	111.4	96.5	28.2	44.8	34.2	35.8
21	43/3485	1	51	109.3	98.1	31.3	49.6	32.1	31.1
22	38/611	1	61	108.8	119.7	41.6	44.5	40.9	35.4
23	42/893	1	48	117.3	118.4	34.5	50.2	39.9	36.8
24	39/1376	1	57	104.4	100.4	30.6	44.4	35.7	36.1
25	39/959	1	82	117.0	97.7	31.1	51.2	36.3	32.5
26	41/2617	1	59	96.2	96.8	29.6	47.9	27.9	24.4
27	42/3153	1	51	109.9	102.9	33.7	50.3	28.4	29.7

Id	Code	Sex	Age	Sacral width (mm)	Sacral height (mm)	AP-width S1 (mm)	Trans-vers width S1 (mm)	Rt. alar width (mm)	Lt.alar width (mm)
28	36/559	1	70	110.8	89.8	30.3	44.7	35.8	33.9
29	30/92	1	68	109.7	107.1	30.0	47.1	33.9	34.2
30	44/2261	1	79	110.5	101.6	35.8	56.2	31.7	31.5
31	37/455	1	63	110.8	86.2	26.2	39.2	39.4	37.1
32	36/792	1	47	112.7	102.0	29.8	47.2	35.2	33.2
33	39/2143	1	48	110.9	106.8	36.2	51.8	35.7	31.3
34	43/1503	1	52	104.4	102.9	29.5	47.3	35.8	32.5
35	44/1363	1	42	104.9	89.7	31.4	42.9	35.3	32.4
36	41/1658	1	45	108.1	99.9	29	46.5	39.1	38.3
37	48/1323	1	51	111.7	102.4	33.9	45.3	40.8	35.9
38	40/1000	1	74	115.3	111.9	38.2	50.8	39.5	30.2
39	32/437	1	79	116.6	105.3	35.3	50.5	39.1	34.4
40	37/1664	1	53	109.1	101.3	31.7	54.3	31.6	34.2
41	34/83	1	48	113.2	92.3	32.3	41.8	36.9	40.7
42	30/799	2	63	113.0	121.2	36.5	62.6	33.7	27.9
43	38/1360	2	22	98.0	114.2	30.8	46.6	31.2	34.5
44	33/678	2	67	112.2	115.1	35.2	60.0	41.2	34.9
45	38/1580	2	67	107.4	109.2	33.7	50.5	31.5	40.0
46	46/882	2	38	114.6	113.7	32.4	51.2	34.3	33.3
47	42/4675	2	41	108.2	86.1	30.6	46.0	33.7	34.9
48	42/3734	2	43	114.2	102.4	31.6	50.4	39.7	38.7
49	22/94	2	76	104.4	101.7	31.3	43.8	30.3	31.3
50	40/2590	2	42	113.9	106.3	34.7	50.1	35.5	36.2
51	42/2387	2	63	107.9	121.8	31.4	45.7	36	34.9
52	39/1537	2	35	101.0	94.2	29.4	41.1	30.0	31.1
53	36/275	2	67	106.7	85.5	30.9	46.1	31.0	30.6
54	43/3697	2	83	102.3	104.6	40.0	53.1	27.3	24.5
55	43/4417	2	45	118.1	109.6	31.1	55.5	36.5	37.1
56	39/1460	2	61	116.6	109.7	34.6	51.5	33.6	36.6

<b>Id</b>	<b>Code</b>	<b>Sex</b>	<b>Age</b>	<b>Sacral width (mm)</b>	<b>Sacral height (mm)</b>	<b>AP-width S1 (mm)</b>	<b>Trans-vers width S1 (mm)</b>	<b>Rt. alar width (mm)</b>	<b>Lt.alar width (mm)</b>
57	31/197	2	78	105.0	107.2	36.3	55.8	27.9	30.4
58	42/3731	2	40	112.5	106.8	34.8	55.4	36.6	36.1
59	47/1262	2	49	90.0	90.4	29.1	41.8	29.5	27.5
60	33/315	2	76	105.8	100.0	33.5	48.3	31.6	33.6
61	43/733	2	47	99.7	108.1	31.3	51.3	32.0	31.4
62	42/2557	2	54	104.0	108.2	29.8	49.0	33.3	31.5
63	44/1305	2	52	119.0	108.4	32.3	59.4	33.2	34.1
64	37/126	2	74	103.9	101.8	33.0	43.8	33.8	33.2
65	41/2494	2	49	103.5	93.6	33.1	41.3	26.1	31.6
66	36/167	2	65	116.9	114.4	36.6	52.0	32.8	31.9
67	40/246	2	47	111.6	108.6	32.8	46.7	39.7	37.4
68	36/610	2	50	110.2	94.0	30.8	49.4	30.5	31.8
69	37/1058	2	42	116.0	103.8	36.7	54.8	38.2	33.0
70	36/1364	2	47	105.0	97.0	30.0	42.3	31.5	33.4
71	40/347	2	55	103.5	100.0	33.4	52.2	21.3	26.0
72	43/3782	2	84	108.8	112.9	37.1	54.1	33.1	32.2
73	45/990	2	71	107.5	92.9	37.3	45.9	35.2	32.6
74	47/1492	2	51	108.6	108.7	32.1	49.7	32.5	34.7
75	49/0028	2	61	112.5	105.7	36.8	49.9	27.3	29.3
76	41/2532	2	86	106.7	113.6	36.9	46.9	32.7	33.6
77	40/1910	2	81	107.0	112	37.6	52.5	29.9	31.6
78	50/0002	2	39	111.2	115.1	29.3	50.9	35.3	35.4
79	40/476	2	71	112.8	95.5	33.7	60.7	27.9	28.5
80	37/868	2	69	114.9	109.7	35.0	47.5	37.9	37.2
81	42/646	2	43	114.7	112.7	37.6	56.9	32.2	32.6
82	43/611	2	70	91.4	91.4	27.6	41.0	26.6	20.8

10,000 random numbers. Each digit is equally likely to occur. (Page 1 of 3)

	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50
1	19695	55904	50846	64105	42780	23965	36499	57893	05960	11026
2	59228	58296	70129	87139	56011	83256	99232	37848	20810	78885
3	83448	88340	60067	64903	53454	25872	79051	71984	34610	06655
4	65066	61315	57693	32754	99042	27714	98461	08470	68718	30391
5	92350	93445	92791	59767	06150	89188	69695	77993	65543	48868
6	54108	92466	37685	90961	85376	03107	36889	60444	15556	23016
7	48899	66837	96651	68584	59011	71585	05837	08242	74712	05065
8	89721	59836	81970	62542	57631	05800	08346	59428	85825	20406
9	72534	84860	25700	01781	80133	50991	68006	58908	62223	72602
10	10398	78868	90973	40785	10956	47322	91563	40402	41510	70893
11	89971	65487	51394	60186	39181	28395	18275	22633	08893	43145
12	47570	08194	02562	20992	56879	05693	88934	71911	94339	61254
13	55138	32828	10968	17700	52889	64544	75914	93440	42284	19973
14	03280	94391	50718	17890	31348	90965	73205	87428	43324	87974
15	26882	96710	82060	48647	79210	76937	46807	01830	29728	70792
16	49011	78358	61382	54542	97935	98840	11802	23473	90236	45036
17	20104	44627	66416	34023	76942	57201	84455	43747	68258	02495
18	27642	32036	08374	00271	87720	72927	90019	67482	08342	55381
19	80525	00890	49465	29132	05055	97384	78570	68724	69531	98881
20	91518	51593	80375	37083	95401	12059	69517	33806	64950	96553
21	66388	11317	10822	73959	72465	54346	12493	72173	28913	41596
22	46205	84091	80180	34859	11056	92598	49508	30201	61548	56777
23	21275	89005	91684	25166	18564	75675	85708	96208	15809	48300
24	24480	15944	80693	37474	82915	45320	90802	49606	40133	35479
25	44687	11327	53020	97344	49769	83601	53876	06976	75032	37790
26	96578	33353	33655	00745	86377	59011				
27	87625	70921	90065	24953	98297	97191				
28	79590	16311	12467	40424	94692	01204				
29	89696	63651	31390	72481	50129	87934				
30	86536	73618	82431	10758	39108	39664				
31	96080	54600	27031	09924	87125	15804				
32	33735	88263	28488	56953	87996	43404				
33	63516	79446	21215	23801	61204	65574				
34	29447	16001	55752	20575	48266	35944				
35	43587	96847	16487	71134	85237	80664				
36	11765	52250	97854	36846	80629	37404				
37	49013	94619	36084	43133	90100	80104				
38	06272	55941	20708	18167	86838	63004				
39	77729	26181	83307	76772	50238	33004				
40	97264	27329	93342	68374	83824	06984				
41	60129	52945	65912	12553	47496	40814				
42	59892	74599	21199	08936	07551	42204				
43	22379	50705	72965	72480	26610	58624				
44	70492	84591	89860	32141	00004	27272	95321	69730	12415	85988
45	50764	88881	88393	93807	88684	65361	64197	70538	38400	22641
46	00872	77751	92179	39284	90572	51004	91633	55146	69732	90057
47	64551	38464	64352	23309	32205	62738	72153	79366	55464	77543
48	79005	33902	93864	36982	49632	86301	23966	65465	36333	44269
49	94742	06961	27440	81104	05948	76330	25478	37578	82918	26005
50	19039	72676	09785	38374	13534	55197	26421	45426	87114	69106
51	82215	85502	32887	78827	59159	34959	04208	89240	26306	85042
52	60713	46311	68456	32114	73634	16246	37555	89905	44377	31408
53	58413	89629	80038	49094	43220	47587	96218	77776	40342	03022
54	95590	10880	02462	71482	60906	26636	02804	04242	51242	43610
55	01767	03398	86673	36557	25268	01658	23722	55682	24525	86880
56	44889	93365	74246	40710	92068	15549	94581	13980	09833	05810
57	26770	32389	81640	53985	00098	23194	18701	14761	77301	44517
58	80379	99904	93794	70757	60793	90617	07392	08027	81291	35894
59	36204	20514	60944	60708	77288	60685	59232	74416	84358	28293
60	73852	59198	24429	55655	54370	04792	45206	58105	12144	73418
61	73169	36101	13321	07692	28534	96953	06471	10601	89899	38511
62	18342	43666	63416	65789	45805	60271	14760	46543	55367	59661
63	34295	79821	77078	33512	14717	84165	18459	71940	03561	72497
64	08175	92677	94883	87566	80696	14551	99039	42261	05468	37101
65	93011	98954	72102	08436	99614	55277	30252	36988	06930	10279
66	15934	85343	93282	44512	16615	08556	42153	86613	67403	33250

มีกล่องกระดาษทั้งหมด 900 กล่อง โดยใส่หมายเลขกล่องจาก 001-900 (เลข 3 หลัก)  
 ผู้มอบหมายได้จุดเริ่มต้นที่สี่คือเลข 3 ต้องการเลข 3 หลักหน้าไปทางขวา จึงได้เลข 309 เริ่มนับลงล่าง เลขต่อไปคือ เลข 982 ใช้ไม่ได้ เพราะเกินจำนวนประชากรของกล่องกระดาษ ดังนั้นเลขต่อไปจึงได้ คือ 104, 374, 827, 114, 094, 482, 557, 710 เลข 985 ใช้ไม่ได้ เพราะเกินจำนวนประชากรของกล่องกระดาษ จำนวนนี้ไปเรื่อยๆ โดยนับจากทิศทางการของกระดาษที่หาไว้ จนได้ตัวอย่างครบตามจำนวนที่ต้องการได้ คือ 164 ชิ้น และบันทึก Code, เพศ, และอายุของสมาชิกของกระดาษที่สุ่มได้ลงในแบบบันทึกข้อมูลในภาคผนวก ข. (ถ้าหมดแผ่นที่ 1 ก็เอาแผ่นที่ 2 และ 3 มาทำต่อ ถ้ายังมีไม่ครบก็วนกลับมาใช้แผ่นที่ 1 อีกครั้ง)

Reference: Machin D, Campbell MJ. Statistical tables for the design of clinical trials. St Louis: Blackwell Scientific Publication, 1987.

10,000 random numbers. Each digit is equally likely to occur. (Page 2 of 3)

	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50
1	12462	79221	03901	99851	92706	35731	12381	86041	79993	00186
2	69881	42631	91267	18691	13093	22570	55410	61567	99173	44602
3	48618	96772	70471	53672	53697	35435	70783	59050	63968	51650
4	15354	86197	20078	65067	71007	42604	86189	83678	94570	27136
5	06677	83627	28704	93706	64690	49381	98883	32437	61866	99152
6	99650	50217	98285	77220	24786	30346	93515	04538	61108	18362
7	41643	81483	43753	87976	82309	62796	85718	79610	53662	90835
8	46042	57283	50575	45998	83731	63936	81532	96381	75521	00335
9	15753	39862	59101	28374	54933	23475	00305	61071	19028	69078
10	26551	62338	53496	08707	98921	62422	18370	56179	90178	36676
11	58219	62189	31108	48888	12079	59814	19573	83878	07180	53657
12	23624	47799	49984	04423	27156	02513	93062	25317	81044	53562
13	91179	22121	96029	50293	07036	06208	08265	43431	44979	75005
14	52834	18951	71105	85383	24726	59826	49549	17302	63035	81937
15	52648	46847	33441	60780	89062	06275	47503	73398	76265	77194
16	84293	72038	68513	79769	08636	60502	88726	78208	31568	13172
17	45448	60712	38768	67721	35791	36334	93773	77642	20906	71106
18	20385	23842	48641	37809	17077	35575	88178	86352	01649	55437
19	15133	51593	46847	53959	81658	71898	06774	76049	35865	25888
20	39640	93349	59399	99139	87691	40591	40552	18045	46976	65541
21	14646	58605	98510	32745	35993	93665	77443	36114	27118	25554
22	49407	41924	91831	61532	95788	05937	56740	10144	19618	37605
23	69291	52332	89452	94929	76149	46369	26117	71146	60013	69906
24	62282	53969	50723	54983	93655	60757	18447	48790	90826	75347
25	23813	00912	23834	02071	74847	53181	71074	96593	41486	87597
26	95214	65353	16013	96543	69957	36571	02070	43358	44897	76978
27	93836	55639	31480	08670	80718	41746	00450	15348	03165	44323
28	41030	27068	52877	90698	55304	62015	70334	75673	58447	22336
29	08154	84442	69776	17338	93758	51413	57837	94414	67077	91634
30	92292	80326	91158	94904	59502	37678	37875	26913	83445	76098
31	46609	89295	83948	05329	47532	77675	61423	56344	26675	36358
32	84332	05232	85219	11532	68557	29376	11777	91888	01673	13959
33	60555	16518	62555	25948	19252	30492	66047	84466	02650	67274
34	47689	69843	61625	15148	35514	43133	88570	45117	43185	94735
35	65844	26200	04727	71539	66628	45052	62018	11708	48742	69068
36	80207	33446	57784	87108	10268	49346	75788	31162	58934	03122
37	13487	91008	01900	25295	44107	60293	13586	73558	55974	19599
38	36935	78255	46321	00219	31860	35558	26337	00115	54765	45939
39	19275	02240	71456	14336	43476	33028	88959	23362	82496	24893
40	35560	83364	22998	90659	08751	27981	52173	76316	93111	87613
41	03752	98831	77638	49285	62066	74713	21565	29280	81909	72158
42	81837	30172	04508	89071	62855	86324	06358	57117	76757	40291
43	99874	56369	05077	28725	64343	81289	49368	89824	07492	75785
44	47327	21427	49874	61534	89894	62261	90839	66899	84778	67134
45	67357	08825	76458	45108	17996	63511	83568	09568	69705	23086
46	79015	89239	14360	09587	44822	26949	49496	12175	26485	47178
47	14452	17714	25188	69313	77634	05696	61094	40330	53859	35021
48	92069	81043	37848	57331	39935	28147	06764	97004	66593	77229
49	50340	99088	61253	68136	29007	44507	24617	60046	84033	60656
50	91846	82337	26193	35571	35295	08252	74503	59943	24560	22374
51	93810	03714	50406	65699	18450	23170	40117	29354	80548	99877
52	11021	42326	85160	26011	40475	72222	21810	75732	89003	33924
53	06601	71764	02476	87112	90229	72586	61097	49386	66405	04539
54	48180	22602	71882	93942	57603	71269	04742	44440	23190	59719
55	47066	65926	26776	24462	55726	24327	74372	92890	04719	48818
56	33014	36442	16280	20680	38425	68293	48522	79765	61859	61066
57	62911	93772	86922	49796	55054	59808	75728	53113	91425	53369
58	69614	89513	30567	63322	84566	81552	62261	43956	00809	76291
59	96720	56308	54281	68204	59116	64149	46824	37176	53914	82257
60	55533	81214	73228	17760	11676	75740	94467	20320	52812	80008
61	20703	54346	62142	52713	27941	00436	35069	77948	93729	47949
62	88658	68178	76500	77522	51609	04763	88457	98665	49788	11336
63	03542	71590	51769	27994	45943	36487	24892	93979	63866	67614
64	28223	63293	70889	50017	18334	88083	12121	50741	17813	03705
65	17106	37074	39760	21545	80909	97657	86957	18994	81207	19108
66	25740	66793	09757	01564	30465	87608	20769	44855	80493	51133
67	26370	61078	55210	00642	98188	97197	11861	30767	77736	05131



10,000 random numbers. Each digit is equally likely to occur. (Page 3 of 3)

	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50
1	31123	29673	20649	35233	87798	45201	30228	26523	74318	72434
2	87699	16140	76297	35674	87089	63901	34730	13078	72090	92885
3	67425	24448	02933	52511	84552	52655	34894	29903	27328	95652
4	89270	11691	60037	20257	80787	95167	83268	13543	29583	72597
5	72622	48817	52954	03996	95738	47909	71694	15877	73377	75924
6	51774	88584	86697	13066	91050	49653	26735	64438	06469	36393
7	46309	99600	06214	51683	92480	34427	89140	41336	45583	27144
8	87597	57079	91766	92488	00289	77560	01421	81779	51894	82562
9	31646	57226	92937	93150	11344	39827	90260	72427	40824	07898
10	65302	69663	91004	44870	45905	34879	65968	86806	74176	79923
11	01577	71625	26774	57246	91613	07768	66347	80626	04460	58894
12	55634	71993	51160	22769	99912	47556	50567	28290	06554	60537
13	85512	93091	80037	69521	18523	14252	63117	07781	97167	52038
14	18866	39027	02543	76350	42750	83412	40894	22312	97887	06172
15	99669	87471	68675	96181	77472	62430	99488	36200	66822	92639
16	37479	15164	18679	79672	32567	94563	07617	21455	33382	09452
17	75140	57111	13664	91913	48505	40279	41529	45898	09166	28364
18	48363	66897	76768	85250	72098	66045	30728	33255	79288	32083
19	91791	31661	55011	43282	56782	71436	03002	83329	63492	66845
20	88551	03397	21971	10386	44973	92009	20743	69340	60607	26066
21	67369	27720	80190	40937	01623	34579	49770	05988	47388	58258
22	28783	12182	66338	91126	72584	54498	42086	01052	40377	72815
23	26241	83273	69559	40407	14443	29333	20876	29742	78308	50317
24	70633	54293	72527	35586	23033	26232	34429	24709	95497	11799
25	72495	70350	06422	98385	64926	71132	05204	16406	72123	65689
26	53543	91004	30200	77643	51598	91984	39404	95223	29527	21376
27	00882	02757	73330	86303	23218	19630	44572	65682	55202	60759
28	51545	69430	38495	83615	06349	30060	00072	98526	30601	08552
29	39877	34702	65214	34285	33858	82516	74122	88707	86412	35586
30	83519	54717	72198	86225	30562	26218	04539	19830	14236	99645
31	97954	70429	70913	37197	79284	33633	22498	42847	38627	17456
32	26569	90111	51495	27926	40401	23847	18162	85104	61245	09032
33	77769	89332	48094	25531	65874	18868	05954	12283	80627	20588
34	85268	38217	98991	31437	35204	01519	77043	62658	01284	98569
35	53260	52912	79063	33321	77747	22875	97211	78917	60833	32255
36	54604	57645	33482	12661	48860	10637	62200	30712	59933	66417
37	62916	57207	22686	21926	33200	00815	21315	95212	53600	80392
38	87455	37236	24657	44118	47952	08362	50751	52254	48662	97475
39	86468	02668	33286	73051	42155	96041	92439	43992	61509	13650
40	83389	05151	28091	91606	39899	46819	75737	36525	39289	16893
41	81177	12852	10449	71745	85282	09278	54991	90531	45197	41057
42	76896	74853	60262	08234	64399	14813	83353	92370	98900	57090
43	85516	01299	84969	15722	24320	89159	71453	84571	24566	33429
44	91397	47504	93285	76648	41823	52157	41564	61029	89468	31131
45	43792	99547	93027	30631	84162	06013	73752	61913	07411	79109
46	26015	20069	16498	95605	93859	65766	49439	33416	82862	50132
47	95512	08645	78663	25642	13942	08259	76612	02191	61680	35572
48	73754	28310	35170	82301	92847	88930	34491	53589	96240	42101
49	75298	59567	50881	34360	51194	14804	72812	21401	29218	09194
50	17302	51444	72863	34562	62575	59959	20950	93893	15665	28176
51	32961	36514	02548	42566	56408	45937	73377	56684	57996	08531
52	69245	60897	96547	17409	82300	54104	62695	69007	29324	59983
53	85209	54546	55487	05893	81524	64709	27136	20761	09671	25773
54	54914	75687	23563	08768	36671	08650	98082	99973	21967	20539
55	16857	35800	23087	45451	94788	89862	96548	19590	37045	13242
56	53246	15725	82742	41114	16860	52046	27253	67720	53924	03789
57	11437	35241	63696	47282	92215	09297	51943	34873	90340	79842
58	40181	05047	59688	82995	37630	81849	41888	66944	50392	87537
59	67978	49190	87861	81777	63840	23173	78560	91506	45852	39808
60	47868	64597	50638	71060	19003	17992	29486	48374	46187	15423
61	62115	25292	90772	05793	47022	42500	51269	86569	51482	85869
62	03124	68454	33644	47290	05076	43508	43307	43186	36021	29520
63	77932	06677	80016	24248	77543	90836	08359	79568	02889	38079
64	90914	89869	21239	57381	57977	98249	39164	09391	68098	75886
65	14996	59701	50020	61721	86297	14405	76298	62622	21162	71429
66	13293	25710	54883	13406	55861	48735	47286	78343	53914	40631
67	13690	45378	65594	88797	60585	48315	03587	35589	55237	53994

Reference: Machin D, Campbell MJ. Statistical tables for the design of clinical trials. St Louis: Blackwell Scientific Publication, 1987.

