What is the worst that could happen? The past, present and future of hyperinsulinaemia research

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New Zealand

I enei maunga
In these mountains

Tukua taku wairua kia rere ki ngā taumata
Let our spirits fly free

Hei ārahi i aku mahi me taku whai i hoa mahi.
So that we may learn from our colleagues

Kia mau, kia ita, Kia kore ai e ngaro
So that the knowledge is never lost, It does not disappear

Kia pupuri, Kia whakamaua
It is kept safe

E whakanui ana matou ki o matou tūpuna, ko Joseph Kraft
We acknowledge those that have gone before, especially Joseph Kraft.

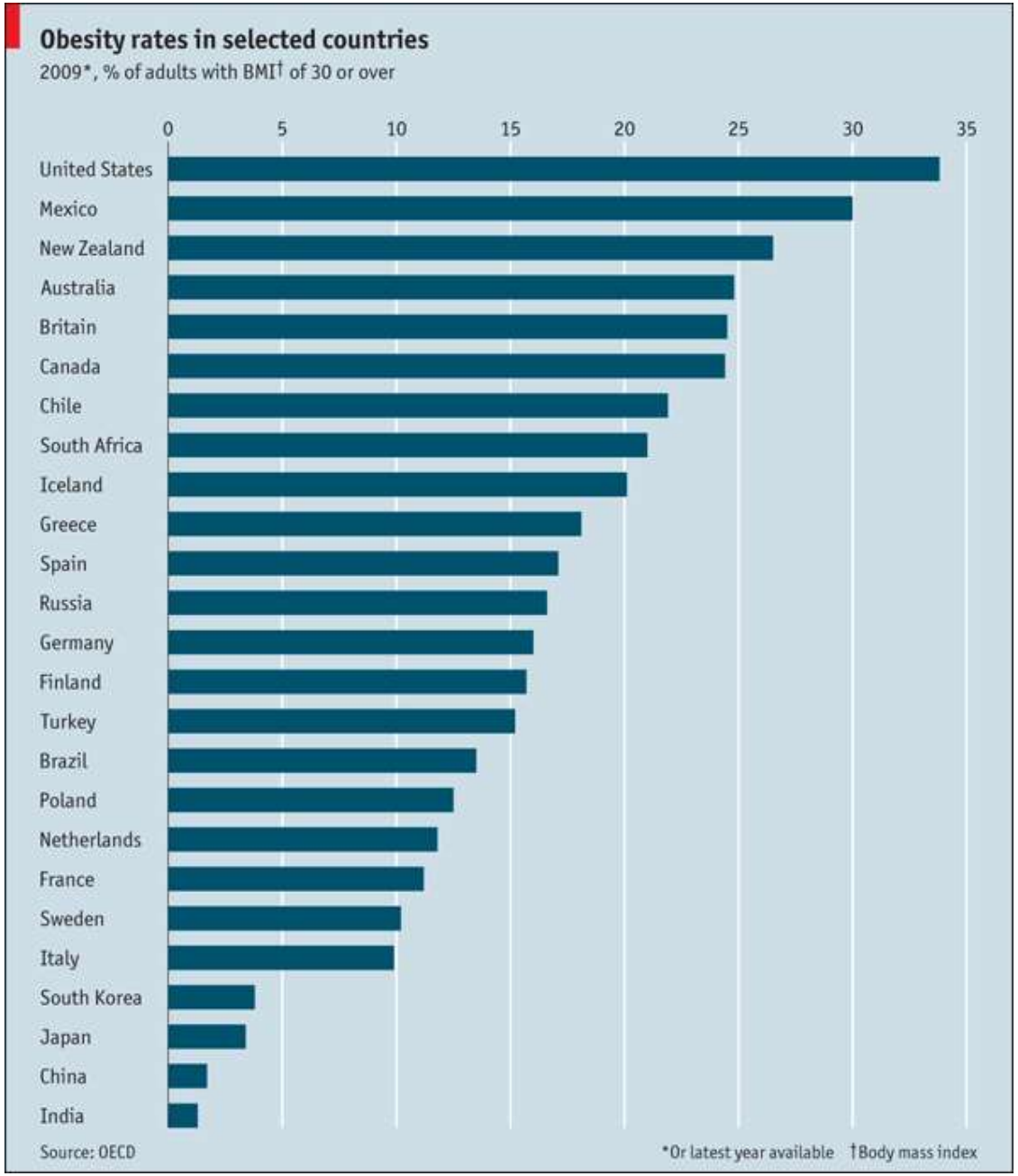
Ko Ranginui e tū ake nei
Ko Papatūānuku e takoto nei
We acknowledge the Sky Father above and the Earth Mother below

Kia tīna (TĪNA)
Haumi e, Hui e, Tāiki e
Let us be united in purpose and understanding

Disclaimer

- National Heart Foundation (NZ) PhD scholarship (Ref 1522) 2012-15
- I have started doing some consulting work for groups such as Vitality Works (NZ)
- I’m stubborn and hope to never to compromise my academic or professional integrity.

What is the worst that could happen: The Past



https://www.economist.com/node/17118939

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FINISH


WELCOME
MOREFM
triwoman
TRIATHLON SERIES


tummy
pure

Detection of Diabetes Mellitus

In Situ (Occult Diabetes)

by Joseph R. Kraft, M.D.

In recent years, further development and refinement of technique has permitted reproducible serum insulin determinations to become available for correlation with plasma glucose levels during tolerance testing. In earlier presentations,[1,2] five basic insulin patterns were identified indicating the absence or presence of diabetes through a wide range of insulin response (diabetic state).

In a number of cases, normal glucose tolerances were associated with abnormal insulin patterns. Such situations, in which the glucose tolerance curve was normal and correlated insulin pattern was abnormal, were considered indicative of prediabetes or occult diabetes. In order to focus greater attention upon this, the earliest detectable phase of diabetes mellitus, the term diabetes mellitus *in situ* has been proposed and used interchangeably with occult diabetes throughout this report.

It is the primary purpose of this paper to review basic insulin patterns which develop in the course of standard glucose tolerance testing and indicate the significance of each.

duplicate procedure precision of 1 Standard Deviation = ±5 microunits in measurements up to 150.

Each glucose insulin tolerance assay was plotted graphically and correlated with specimen collection time. The Wilkerson Point System for plasma glucose values as recommended by the American Diabetes Association[4] was used as reference base for classifying and grouping results (Table I).

Age, Obesity and Sex Distribution

Of 3650 glucose/insulin tolerances performed, there were 2345 females and 1305 males, ranging in age from 3 to 87 years (mean age of 46.52 years). Two hundred-nineteen were 20 years or younger (mean age = 16.37). There were 1825 in the 21-49 age group, with a mean age of 34.48. Of 1606 who were 50 years and older, the mean age was 63.87. Subsequent studies concerning age and detectable phases of diabetes mellitus are pending.

Obesity was considered present in male patients whose actual weight exceeded 115% of their adjusted ideal weight, and in female patients whose actual weight exceeded 66.3 kg. (146 lb.).[5] Twenty-

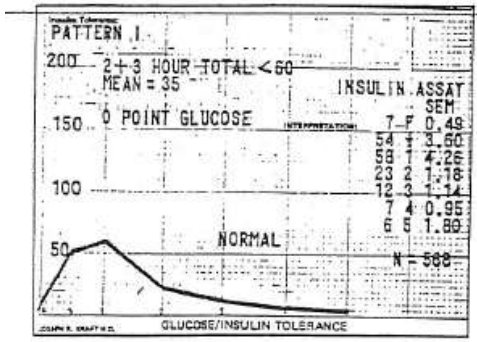


Fig. 2A. Normal 568 cases with: a. fasting level between 0 and 30 microunits; b. peak insulin at ½ or 1 hour; and c. return to fasting range at two to three hours.

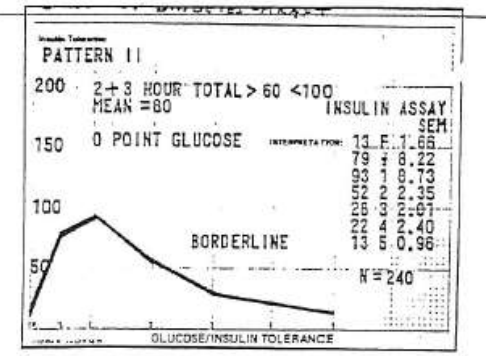


Fig. 2B. Of the 1713 zero point tolerances, 240 had borderline delay values with 2 plus 3 hour insulin total values between 60 and 100 microunits.

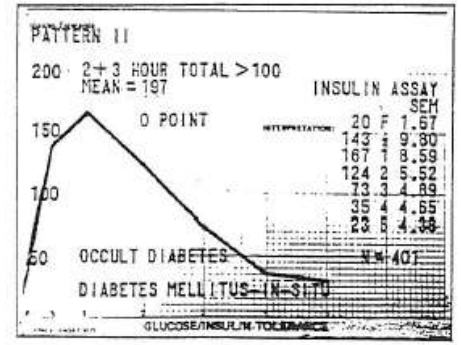


Fig. 3A. Pattern II—normal peak delayed return: a. demonstrates insulin delay with 2 plus 3 hour insulin total greater than 100 microunits; b. identifies 401 occult diabetics with normal zero point tolerances.

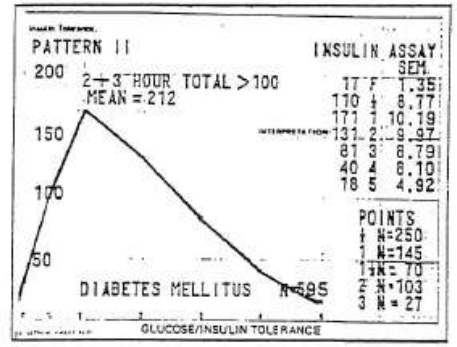
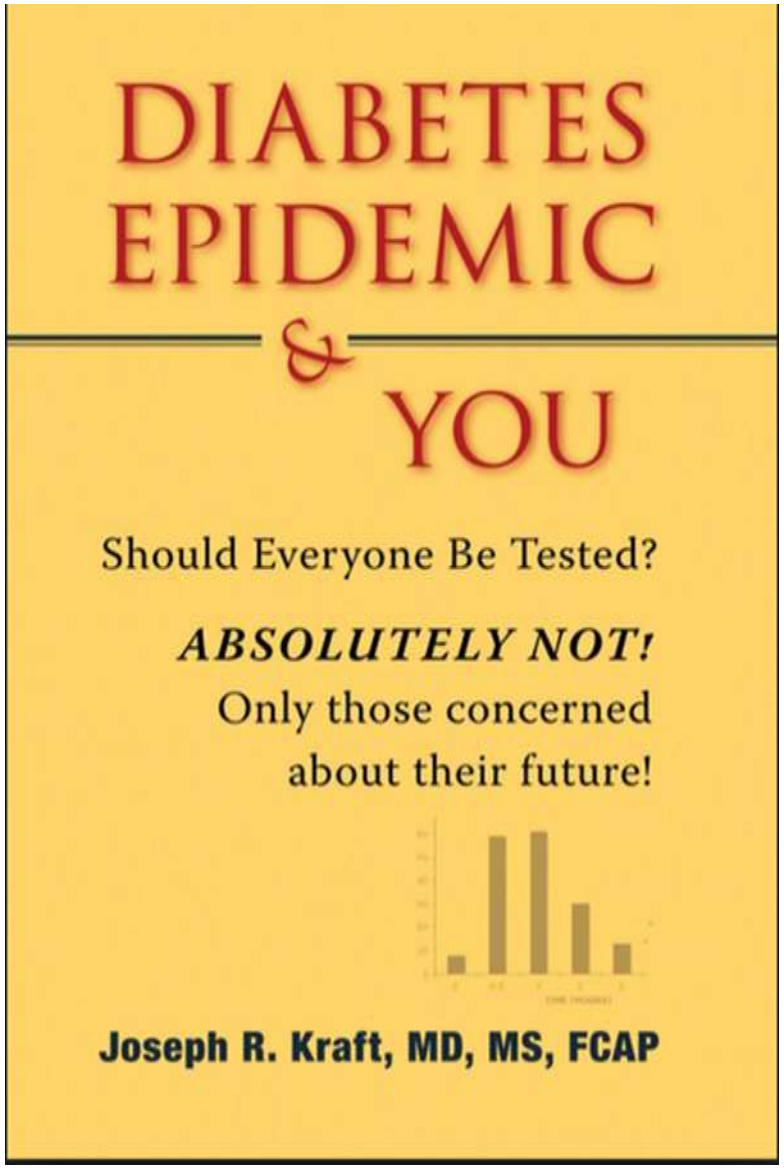
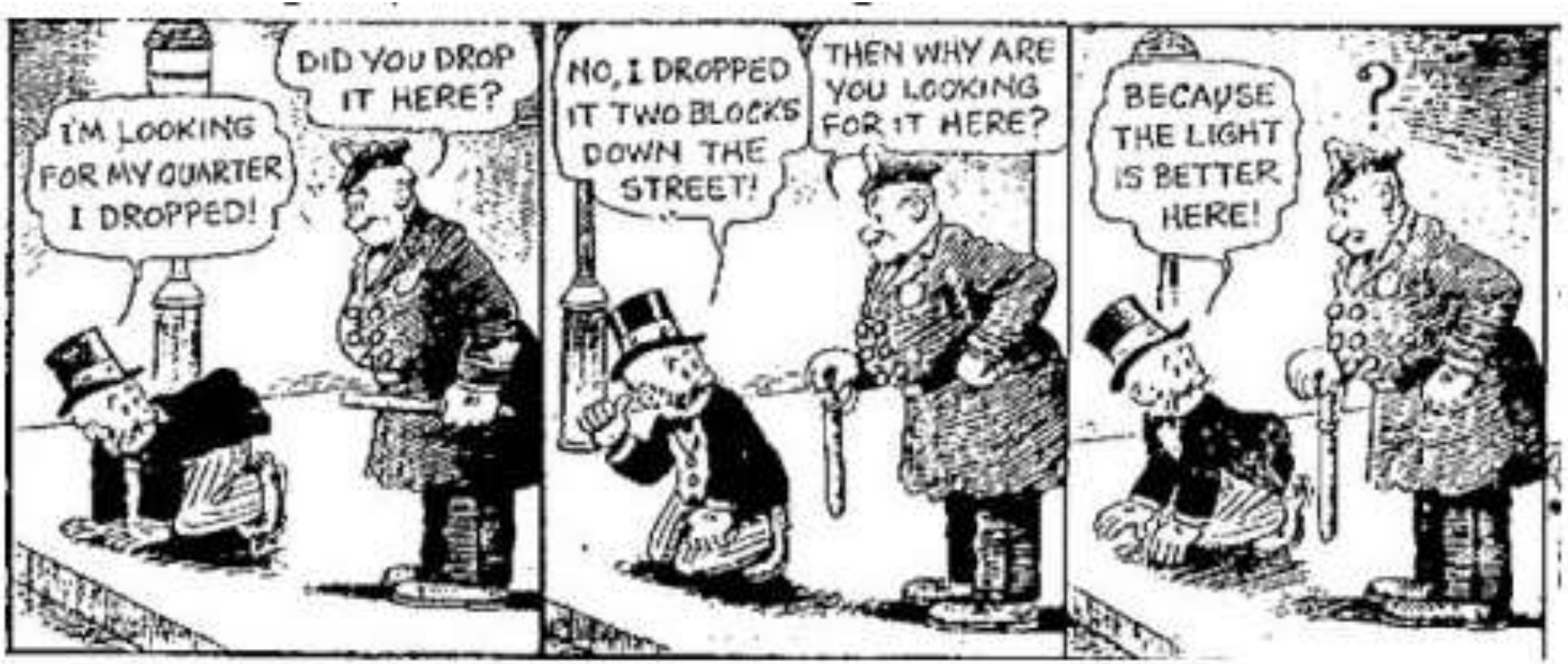


Fig. 3B. Pattern II—normal peak delayed return: a. demonstrates 2 plus 3 hour insulin total greater than 100 microunits; b. identifies 595 cases of diabetes mellitus with abnormal tolerances (½ to 3 Wilkerson points); c. basic pattern displayed by 996 of 3650 tolerances.


DIABETES
EPIDEMIC
&
YOU
Should Everyone Be Tested?
ABSOLUTELY NOT!
Only those concerned
about their future!
Joseph R. Kraft, MD, MS, FCAP

What is the worst that could happen: The Present

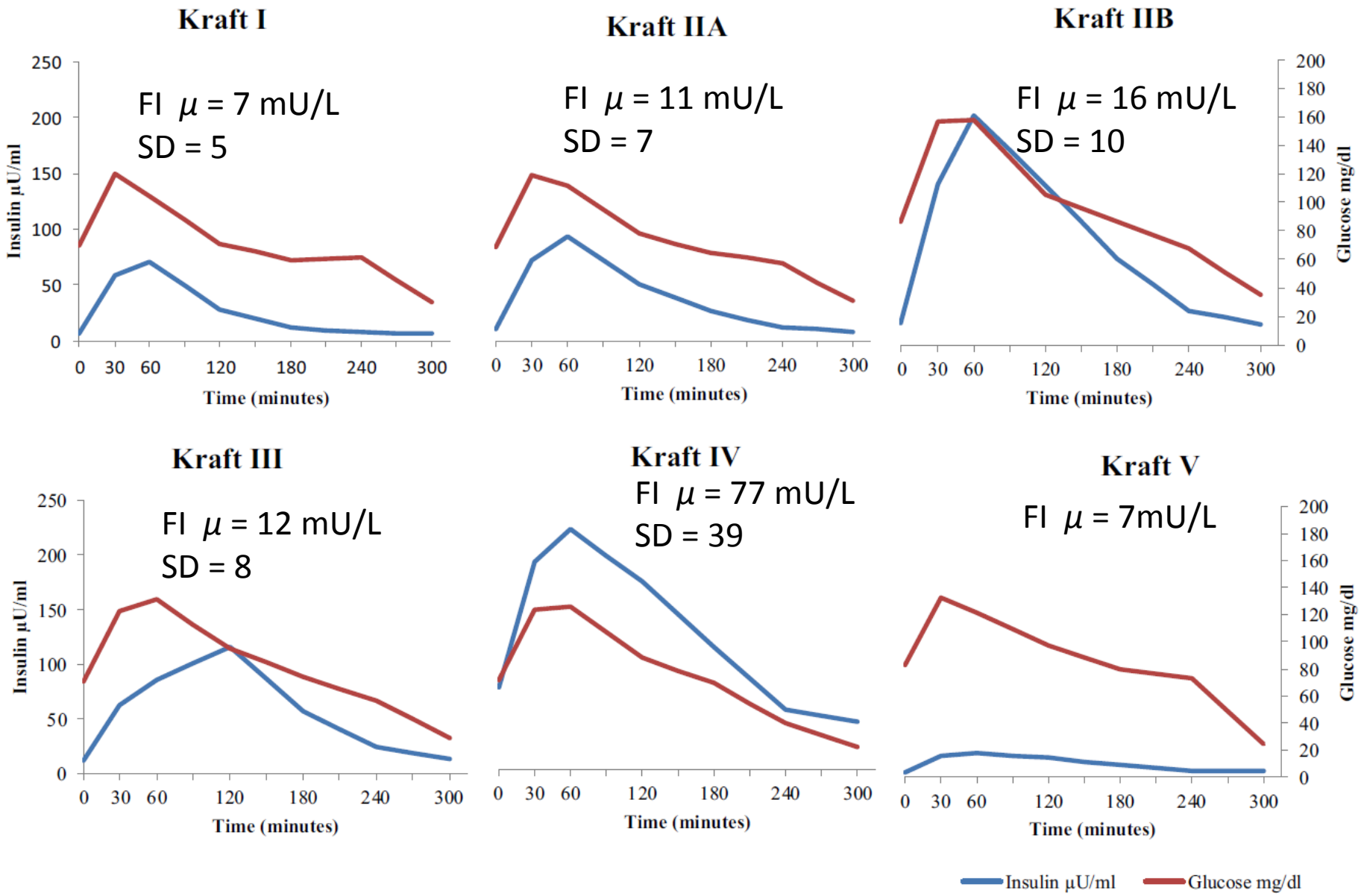
Streetlight effect:



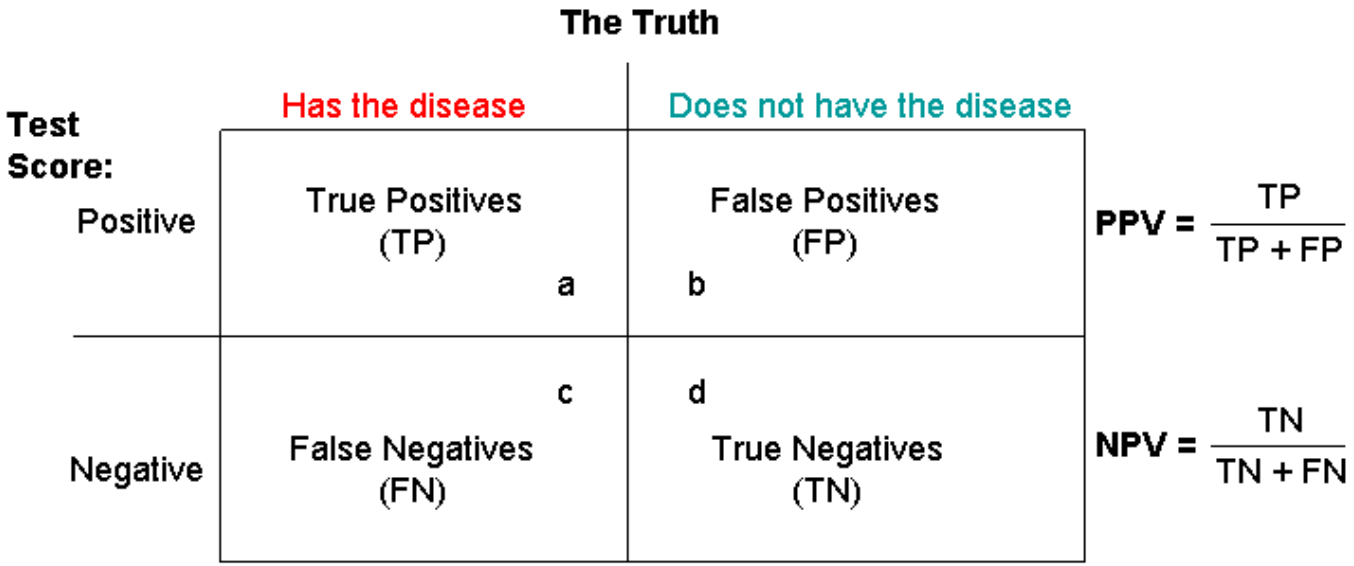
Are we at risk of doing this with Fasting Insulin Levels?

Table 7: Kraft pattern criteria 2014

Kraft Pattern	Description
Pattern I Normal insulin	• Fasting insulin ≤ 30 µU/ml • 30 min or 1-hour peak • 2-hour + 3-hour sum < 60 µU/ml
Pattern IIA Borderline	• Fasting insulin ≤ 50 µU/ml • 30 min or 1-hour peak • 2-hour + 3-hour sum ≥ 60, < 100 µU/ml OR • Fasting insulin 31-50 µU/ml • 30 min or 1-hour peak • 2-hour + 3-hour sum < 60 µU/ml
Pattern IIB Hyperinsulinaemia	• Fasting insulin ≤ 50 µU/ml • 30 min or 1-hour peak • 2-hour + 3-hour sum ≥ 100 µU/ml
Pattern III Hyperinsulinaemia	• Fasting insulin ≤ 50 µU/ml • Delayed peak (2-hour or 3-hour)
Pattern IV Hyperinsulinaemia	• Fasting insulin > 50 µU/ml
Pattern V Hypoinsulinaemia	• All values ≤ 30 µU/ml


Kraft I
FI μ = 7 mU/L
SD = 5
Kraft IIA
FI μ = 11 mU/L
SD = 7
Kraft IIB
FI μ = 16 mU/L
SD = 10
Kraft III
FI μ = 12 mU/L
SD = 8
Kraft IV
FI μ = 77 mU/L
SD = 39
Kraft V
FI μ = 7mU/L
Insulin µU/ml
Glucose mg/dl
Time (minutes)
0 30 60 120 180 240 300
0 50 100 150 200 250
0 20 40 60 80 100 120 140 160 180 200
Insulin µU/ml
Glucose mg/dl

Sensitivity and specificity calculations



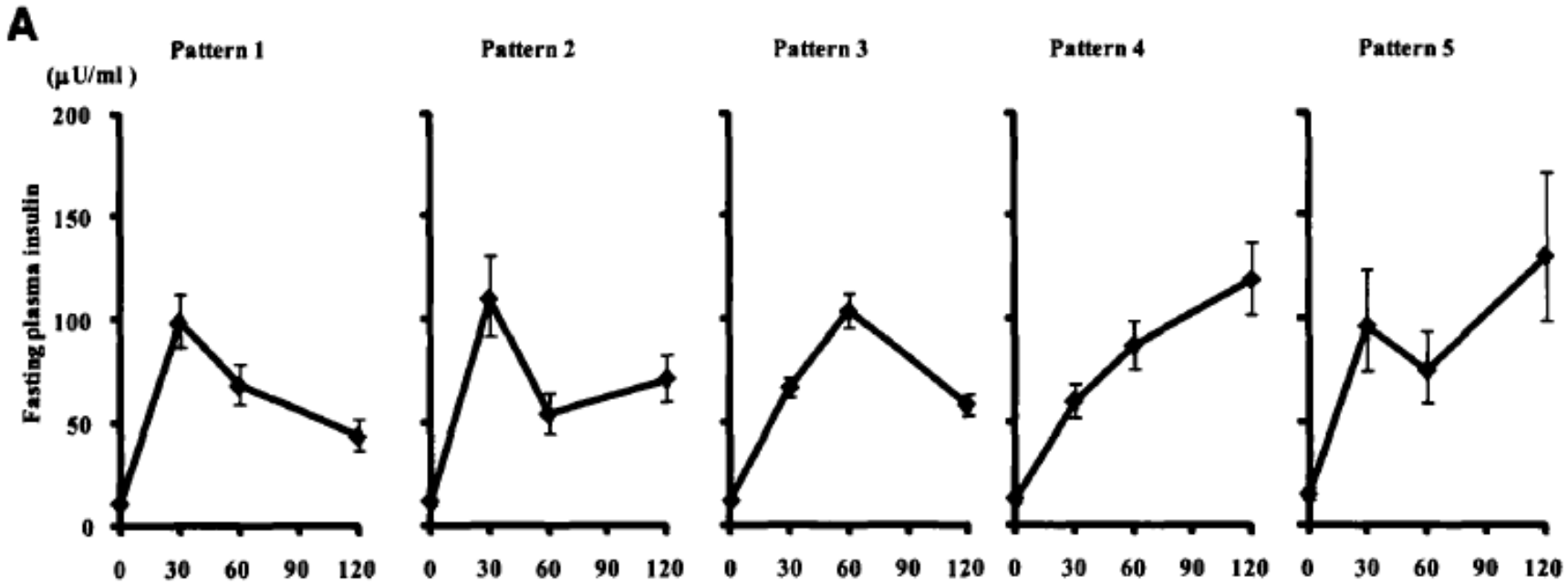
Sensitivity $\frac{TP}{TP + FN}$ **Specificity** $\frac{TN}{TN + FP}$

Or, $\frac{a}{a + c}$ $\frac{d}{d + b}$

Table 20: Sensitivity and specificity calculations

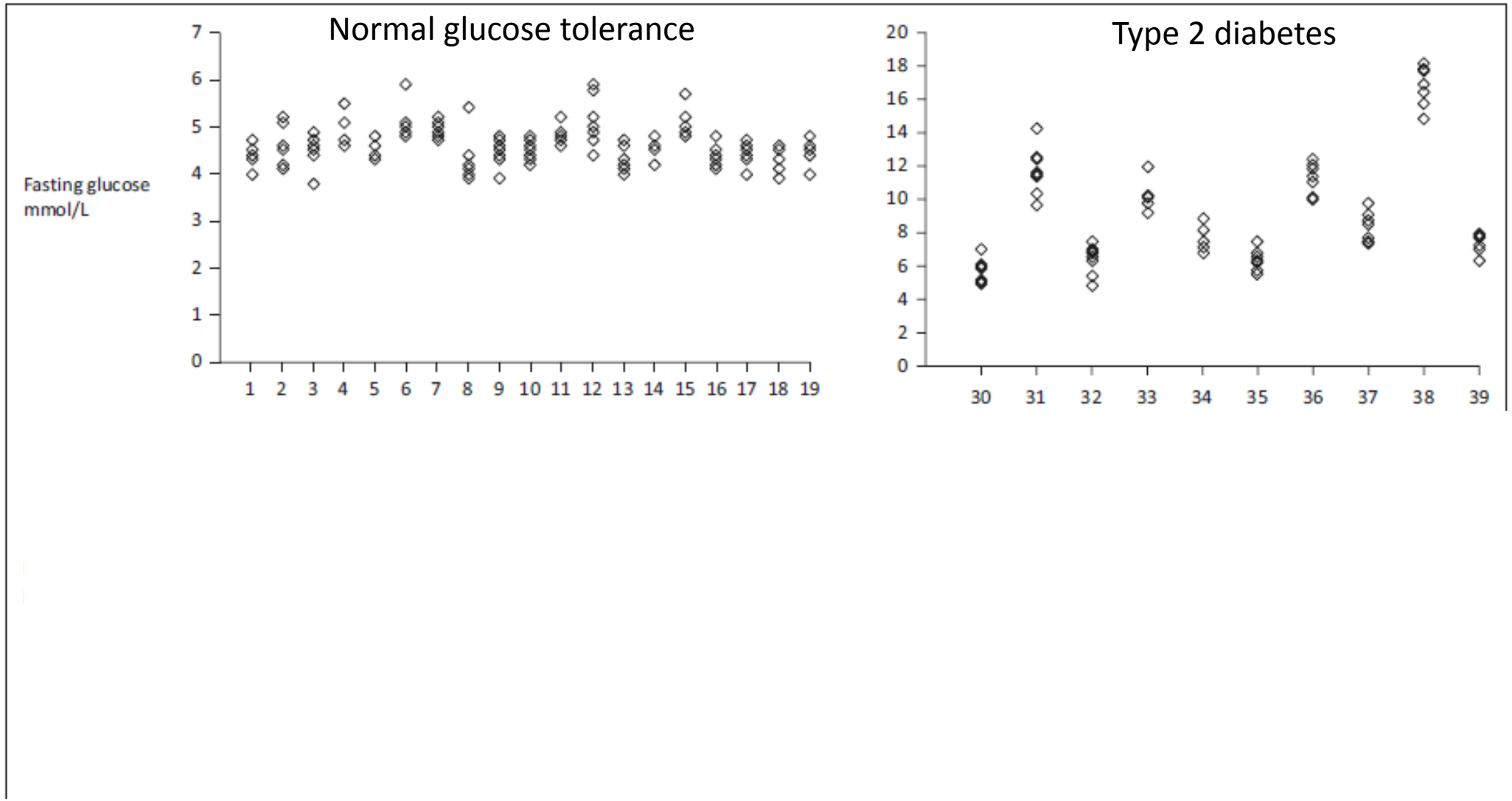
Test variable	Sensitivity	Specificity	Sum SS
2-hr insulin <30 μU/mL	0.98	0.62	1.60
OGIS < 600 mL.min^{-1}.m^{-2}	0.95	0.34	1.30
2-hr insulin - fasting insulin > 30 μU/mL	0.90	0.83	1.73
2-hr glucose > 80 mg/dL	0.90	0.38	1.28
HOMA2 %B > 20	0.87	0.40	1.27
1-hr insulin > 50 μU/mL	0.86	0.49	1.36
2-hr insulin > 45 μU/mL	0.85	0.95	1.80
Age > 35 years	0.85	0.24	1.09
2-hr insulin - fasting insulin > 35 μU/mL	0.84	0.92	1.76
2-hr glucose - fasting glucose > 0 mg/dL	0.83	0.47	1.31
fasting insulin > 5 μU/mL	0.83	0.46	1.29
1-hr insulin > 60 μU/mL	0.80	0.61	1.40
2-hr insulin > 50 μU/mL	0.79	0.99	1.78
3-hr insulin > 20 μU/mL	0.79	0.85	1.64
2-hr insulin > 45 μU/mL and 2-hr glucose > 80 mg/dL	0.78	0.96	1.74
OGIS < 500 mL.min^{-1}.m^{-2}	0.70	0.84	1.54
2-hr insulin > 45 and 2-hr glucose > 90	0.69	0.97	1.67
2-hr glucose-fasting glucose > 10 mg/dL	0.68	0.67	1.35
2-hr insulin-fasting insulin > 50 μU/mL	0.65	1.00	1.64
2-hr glucose > 100 mg/dL	0.63	0.73	1.35
Age > 50 years	0.61	0.52	1.13
3-hr insulin > 30 μU/mL	0.60	0.99	1.58
fasting glucose > 85 mg/dL	0.56	0.46	1.02

Two-hour insulin bigger predictor of T2D

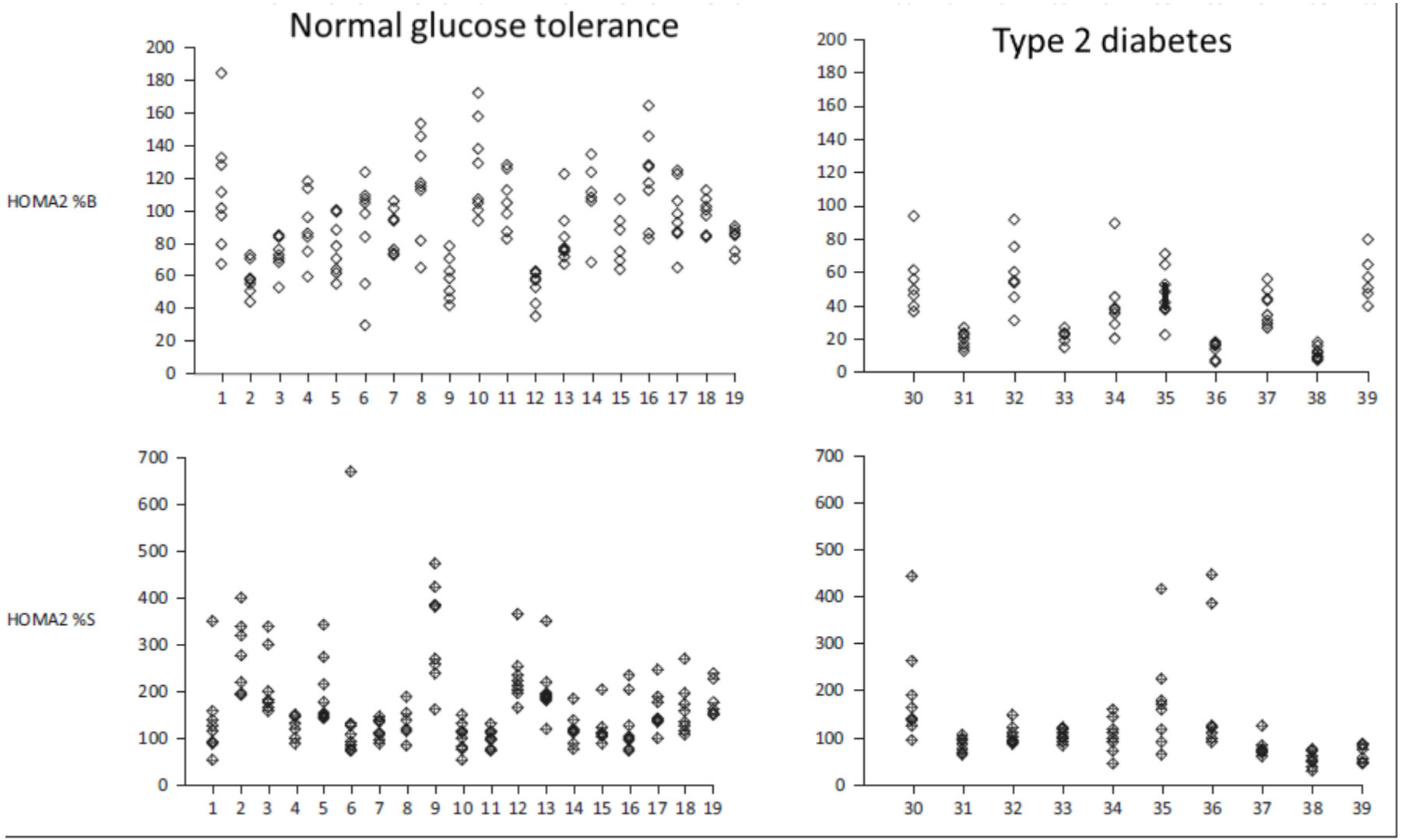


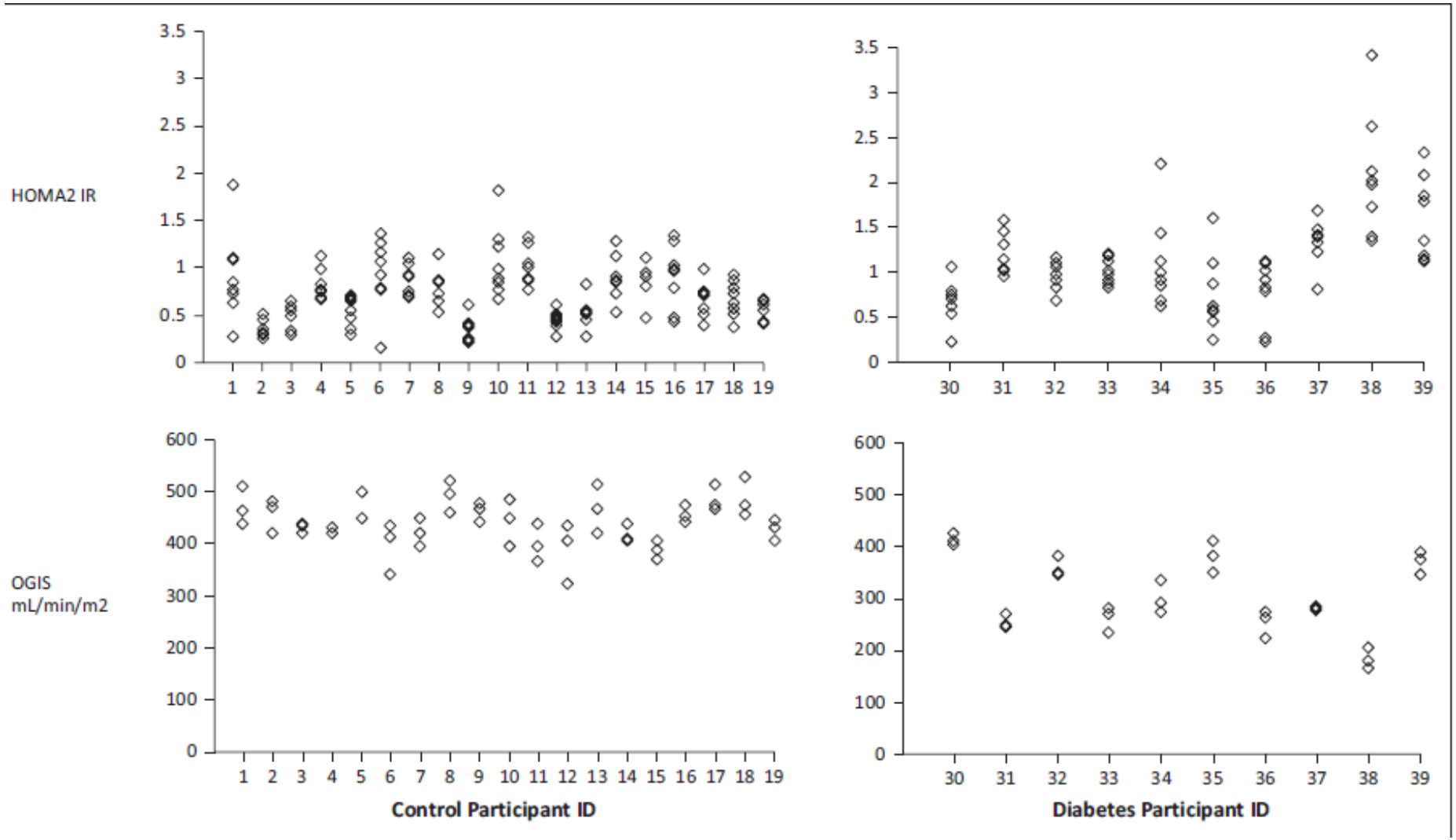
People with pattern 4 or 5 had > 37% chance of T2D over 10 years
People with pattern 1-3 had a <16% chance of T2D over 10 years

Hayashi, T., et.al. (2013). Patterns of insulin concentration during the OGTT predict the risk of type 2 diabetes in Japanese Americans. Diabetes Care, 36(5), 1229-1235. doi:10.2337/dc12-0246

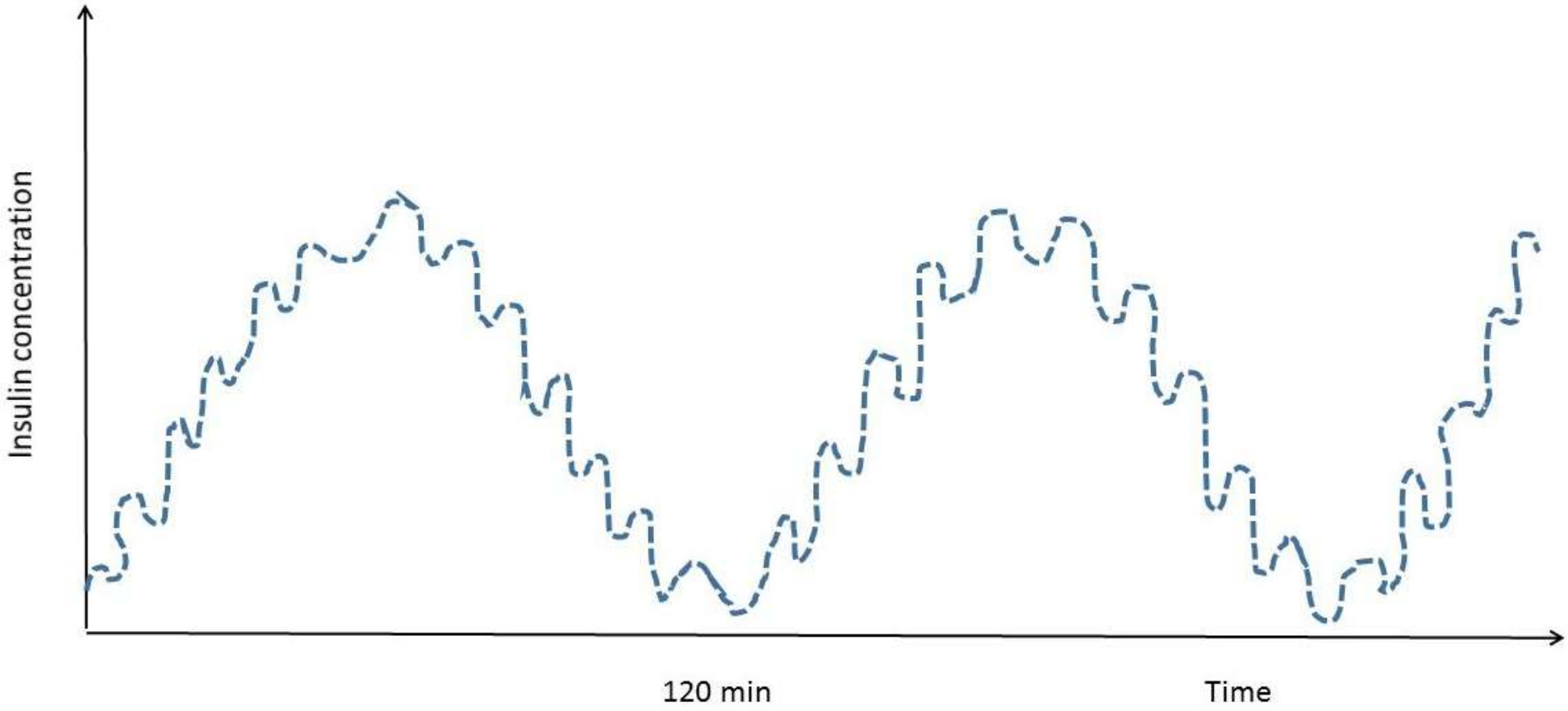


Crofts, C., Wheldon, M. C., Zinn, C., Lan-Pidhainy, X., Wolever, T. M., & Schofield, G. (2017). Assessing the test–retest repeatability of insulin resistance measures: Homeostasis model assessment 2 and oral glucose insulin sensitivity. *Journal of Insulin Resistance, 2*(1), 9.


Normal glucose tolerance
Type 2 diabetes
HOMA2 %B
HOMA2 %S


HOMA2 IR
OGIS
mL/min/m2
Control Participant ID
Diabetes Participant ID

Insulin oscillatory pattern conceptual model



What is the worst that could happen: The Future

Hello Catherine,

This is [redacted]. I am working on prediction of Diabetes. I wanted to develop a expert system for diagnosis of diabetes based on patients' symptoms, physical examinations, BMI, past & present history ,lab findings etc.

If you can provide me Dataset I will be highly obliged.

Waiting for a positive response.

Warm Regards!!!!!

	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	ID	DATE	month	day	year	AGE	SEX	HT	WT	GZERO	GHALF	GONE	GTWO	GTHREE	GFOUR	GFIVE	IZERO	IHALF	IONE	ITWO	ITHREE	IFOUR	IFIVE	KRAFT	PATTERN
3016	CD2292	04/12/74	04	12	74	37	M	69.0	204	82	0	74	84	88	75	0	22	0	55	62	41	20	0	3	
3017	FJ3843	04/12/74	04	12	74	36	F	63.0	97	72	152	146	94	106	102	79	9	26	29	46	35	37	2	3	
3018	BS1378	04/13/74	04	13	74	60	M	65.0	155	88	140	94	84	70	70	0	2	153	177	29	16	13	0	1	
3019	FG4007	04/13/74	04	13	74	29	F	62.0	160	104	0	123	72	84	78	0	45	0	113	44	89	31	0	2	
3020	MW9475	04/13/74	04	13	74	47	M	68.0	170	79	130	134	86	76	47	0	2	38	175	59	10	2	0	2	
3021	RM11251	04/13/74	04	13	74	62	F	61.0	130	76	146	98	88	85	56	0	2	165	139	59	45	6	0	2	
3022	JF6432	04/13/74	04	13	74	39	F	64.0	160	104	161	263	344	392	269	0	48	29	92	125	155	114	0	31	
3023	WM1472	04/15/74	04	15	74	77	M	63.0	128	80	184	228	206	102	70	53	2	14	9	69	58	14	15	3	
3024	CA2731	04/15/74	04	15	74	77	F	61.0	146	120	170	223	196	212	208	0	11	27	92	104	111	82	0	31	
3025	JA6196	04/15/74	04	15	74	43	F	65.0	112	84	110	126	105	88	65	0	2	117	93	82	156	45	0	31	
3026	SK12095	04/16/74	04	16	74	43	F	60.0	125	88	126	92	116	92	107	0	10	120	50	51	26	12	0	2	
3027	VR14279	04/16/74	04	16	74	53	M	65.0	175	90	105	158	134	132	153	0	18	19	97	76	89	62	0	2	
3028	SB12093	04/16/74	04	16	74	74	M	66.0	160	102	194	250	258	218	63	0	13	61	106	150	102	31	0	3	
3029	BR914	04/16/74	04	16	74	65	M	65.0	165	94	200	278	268	129	55	5	6	61	103	168	53	26	0	3	
3030	CA2540	04/17/74	04	17	74	54	F	65.0	192	80	138	164	134	126	148	0	17	85	117	105	66	62	0	2	

Create a Trust to hold the Kraft database

KRAFT Research EDIT LINKS

KRAFT Research

The purpose of this site is to provide a secure place to store Dr KRAFT's research data and documentation associated

Research Data

History

Dr Kraft is the author of "Diabetes Epidemic and You'. Kraft has carried out more than 14,000 oral glucose tolerance tests over a few decades. Normally we measure the glucose response to drinking glucose. This response can tell us the degree to which we metabolize and remove glucose from our blood. Very important for diabetes diagnosis and other metabolic issues. Kraft's test are different though. He is way more thorough than normal. First, rather than monitoring glucose for 2 hours post test, he monitors it for at least 5 hours. Second, he also measures insulin, as well as glucose, over the course of the test. From his test results and the other literature, as well as his pathology and direct autopsy observations, he concludes that:

1. We may be able to diagnose diabetes much much earlier than we do
2. Abnormal insulin levels (high) are directly and indirectly damaging to the vascular system, and therefore almost every organ in the body
3. This high insulin (hyperinsulinemia) is a condition in its own right and really the causal mechanism behind most of the metabolic and chronic diseases we experience today.

Joseph R. Kraft

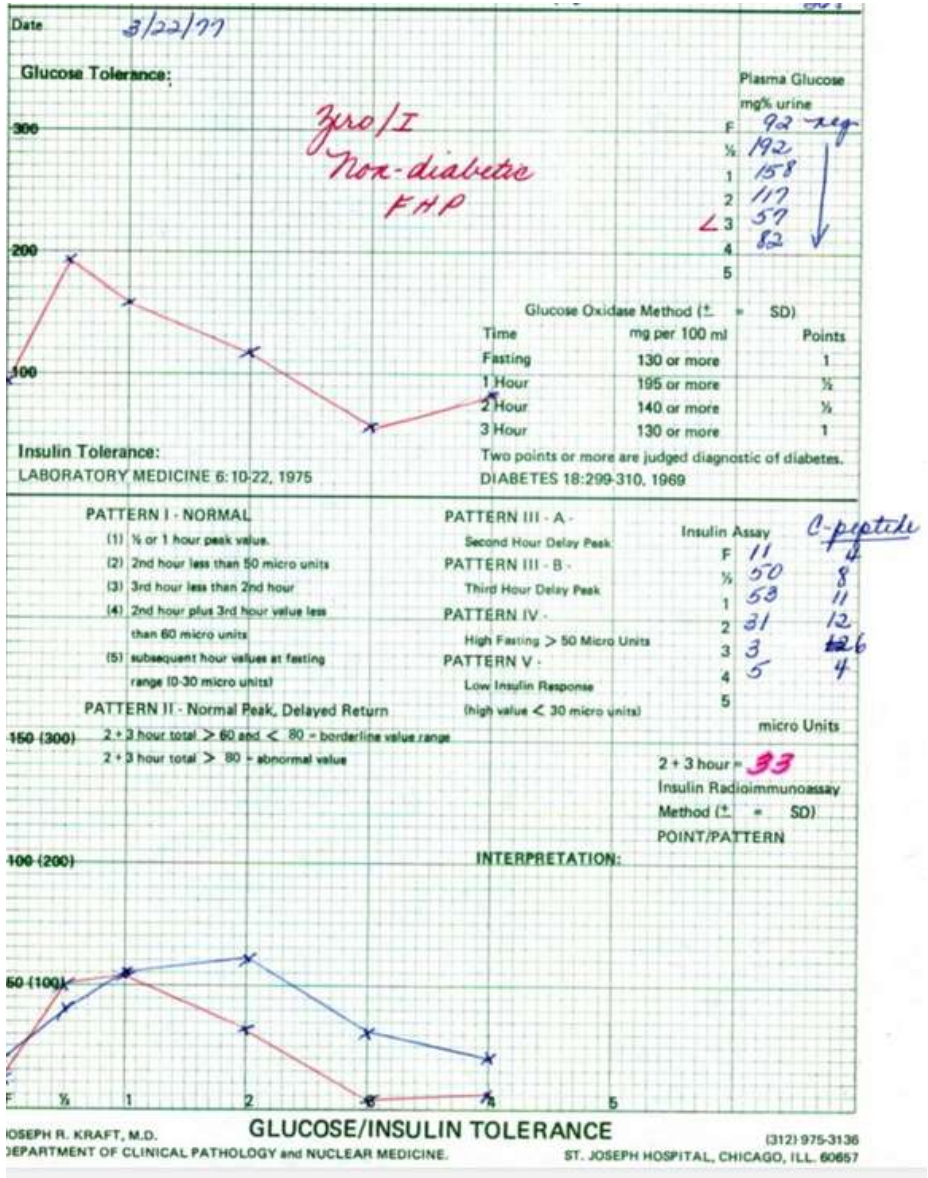
1922 – 2017

My current research: RACer

Maintaining the nasal cycle during CPAP treatment to maintain good HPA-axis health.

Crofts, C., et al. (in press) Sleep architecture, insulin resistance and the nasal cycle: Implications for positive airway pressure therapy. *Journal of Insulin Resistance.*

Optical character recognition for c-peptide data



Thank you

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Crofts, C., et al. (2017). Assessing the test–retest repeatability of insulin resistance measures: Homeostasis model assessment 2 and oral glucose insulin sensitivity. *Journal of Insulin Resistance, 2*(1), 9.

Crofts, C., et al. (in press) Sleep architecture, insulin resistance and the nasal cycle: Implications for positive airway pressure therapy. *Journal of Insulin Resistance.*

Hayashi, T., et al. (2013). Patterns of insulin concentration during the OGTT predict the risk of type 2 diabetes in Japanese Americans. *Diabetes Care, 36*(5), 1229-1235. doi:10.2337/dc12-0246