

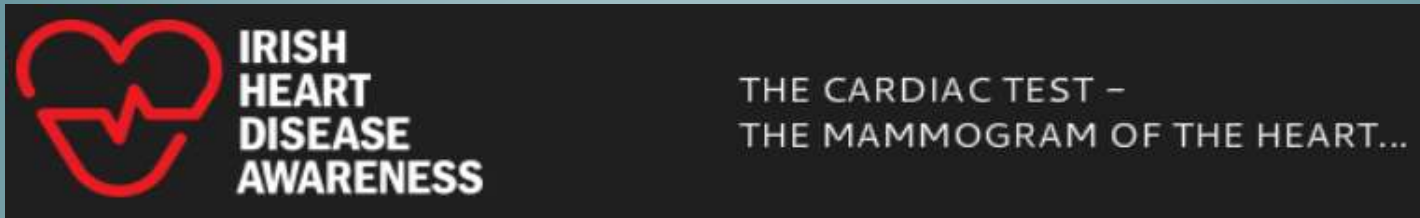




# **An Engineering View of Modern Chronic Disease Prevention**

*From “Bad Cholesterol” to Hyperinsulinemia and CAC*

# Disclosure



1. My work is directly supported by David Bobbett and his Irish Heart Disease Awareness charity (<http://www.IHDA.ie/>)
2. No financial ties to the heart imaging industry (!)

# PART 1

## Engineering Problem Solving *- Just a Primer*

# Contrasting Worlds...



- Massive research effort to understand key root causes and **prevent** failures. Stunning progress in face of increasing complexity: ***outcomes improved by factor of ~60***
- Imperative that RC is found and resolved. **Resolution is crucial for good business.**

# Contrasting Worlds...



- Massive research effort to understand key root causes and **prevent** failures. Stunning progress in face of increasing complexity: **outcomes improved by factor of ~60**
- Imperative that RC is found and resolved. **Resolution is crucial for good business.**

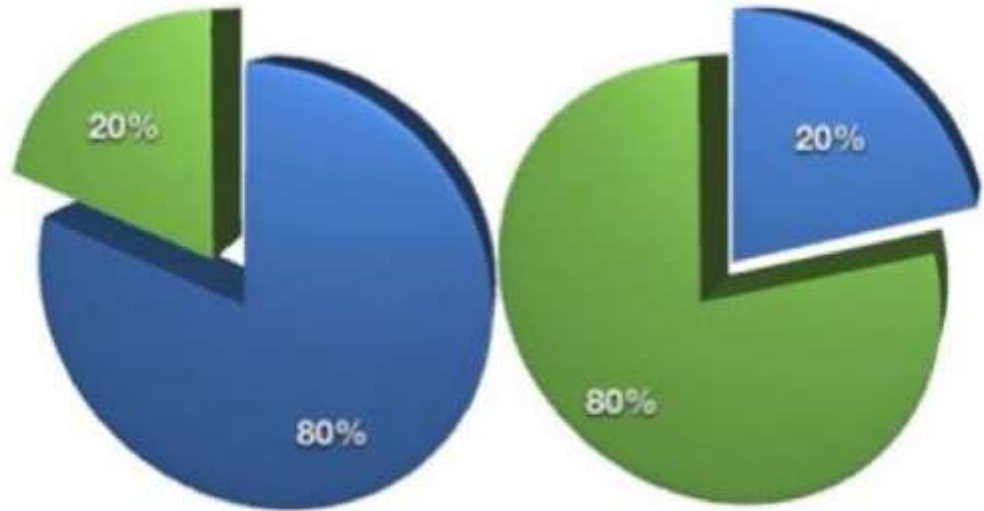


- Massive research effort to understand root causes and **mitigate** failures. Some notable wins. But CVD morbidity is rising. Obesity & Diabetes exploding
- RC is not the focus - resolution neglected. **Patching-up Strategy is excellent for business.**

# Rule Zero: Always Honor Pareto



## Pareto Principle



20% of the input (time, resources, effort)  
accounts for 80% of the output (results, rewards)

# Know your ABC: Kepner Tragoie “Is - Is Not” Analysis





# Know your ABC: Kepner Tragoe “Is - Is Not” Analysis

**A**

---

**WHAT**

---

**WHERE**

---

**WHEN**

---

**EXTENT**

---

# Know your ABC: Kepner Tragoe “Is - Is Not” Analysis

**A**

	<i>IS</i>	<i>IS NOT</i>	<i>DISTINCTIONS</i>	<i>INFERENCES</i>
<i>WHAT</i>				
<i>WHERE</i>				
<i>WHEN</i>				
<i>EXTENT</i>				

# Know your ABC: Kepner Tragoe “Is - Is Not” Analysis

**A**

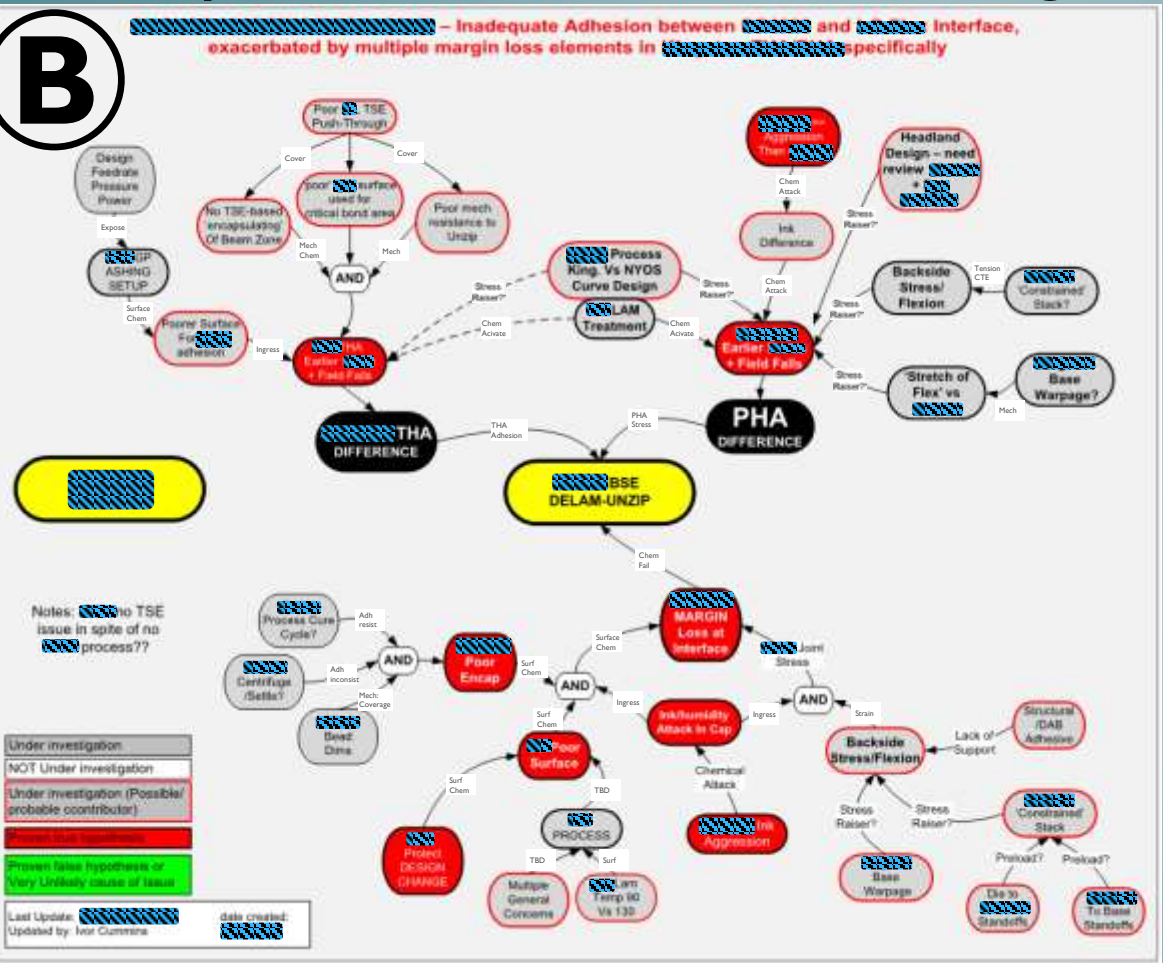
	<i>IS</i>	<i>IS NOT</i>	<i>DISTINCTIONS</i>	<i>INFERENCES</i>
<i>WHAT</i>				
<i>WHERE</i>				
<i>WHEN</i>				
<i>EXTENT</i>				

## Integrate the Logic

- Analyse “Correlations”
- Scrutinise “Coincidences”
- **Highlight the conflicts**
- **Prioritise the Likely Causes**

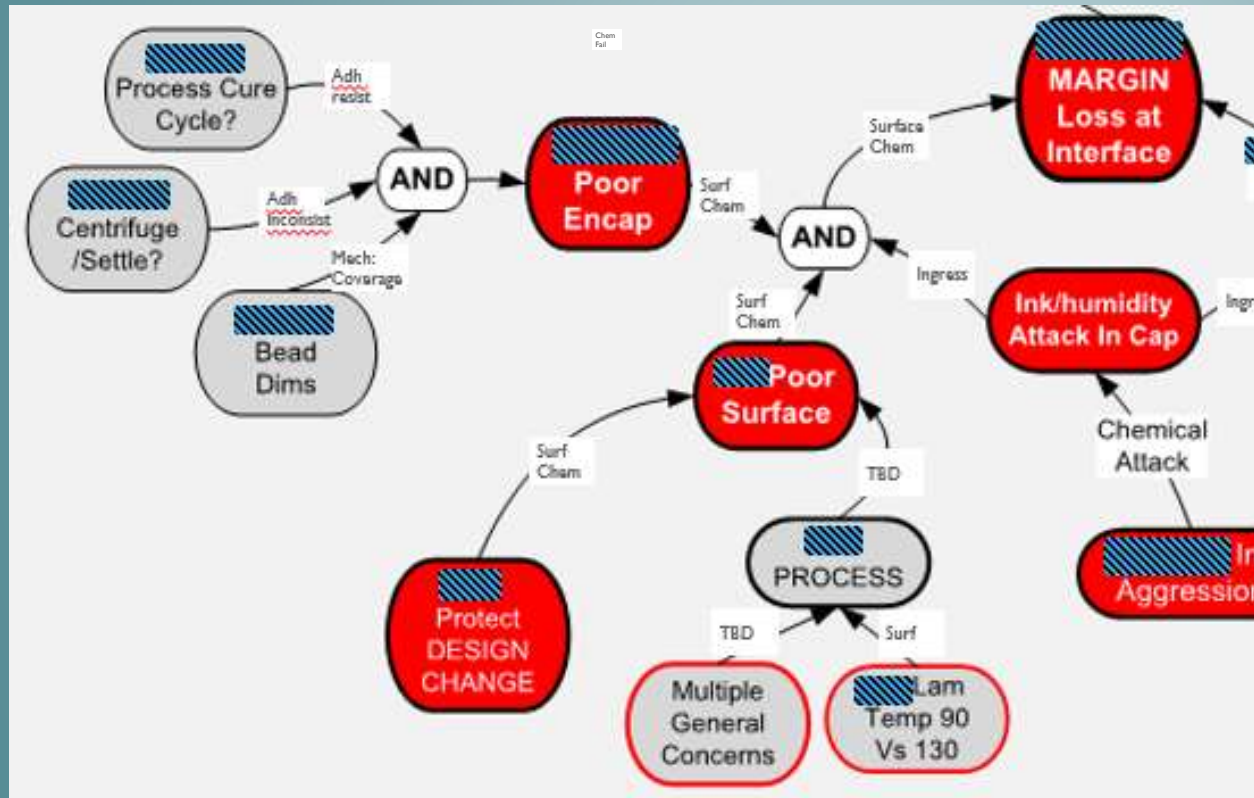
# Know your ABC: Root Cause Diagram (RCD)

**B**



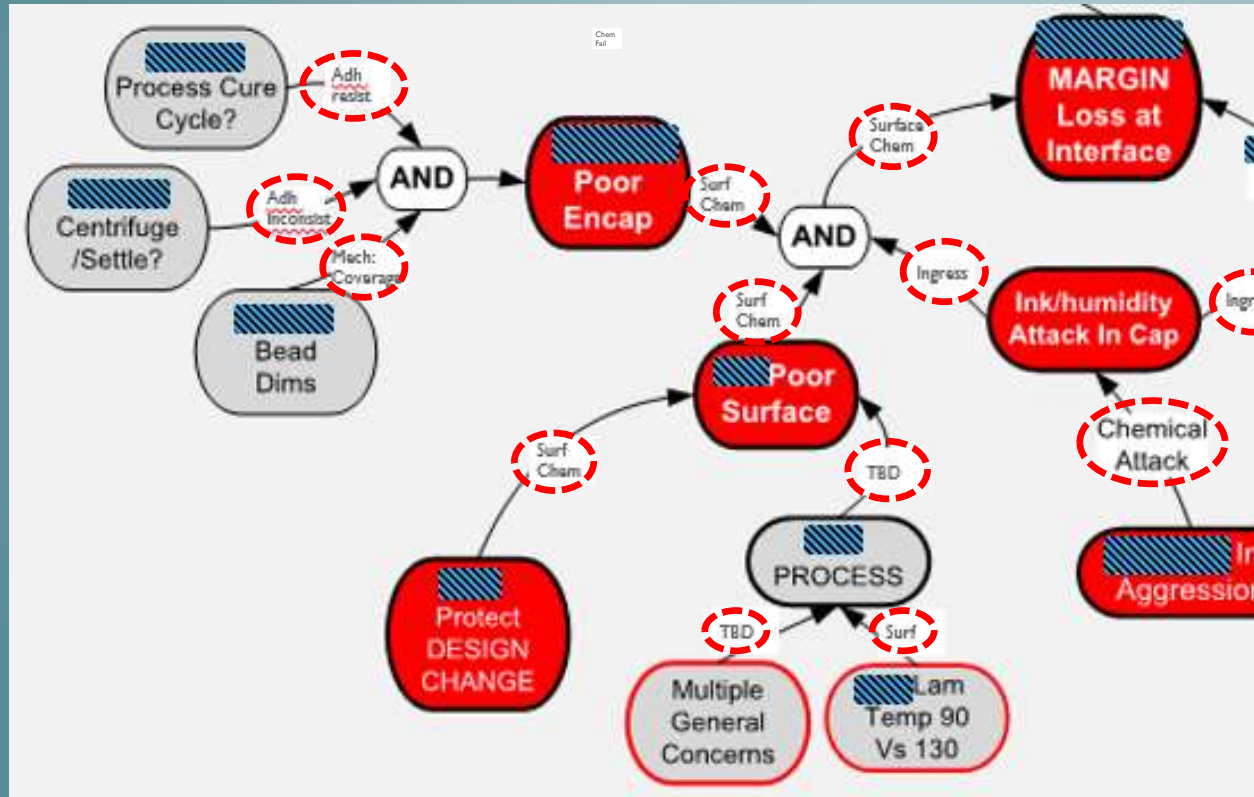
# Know your ABC: Root Cause Diagram (RCD)

**B**



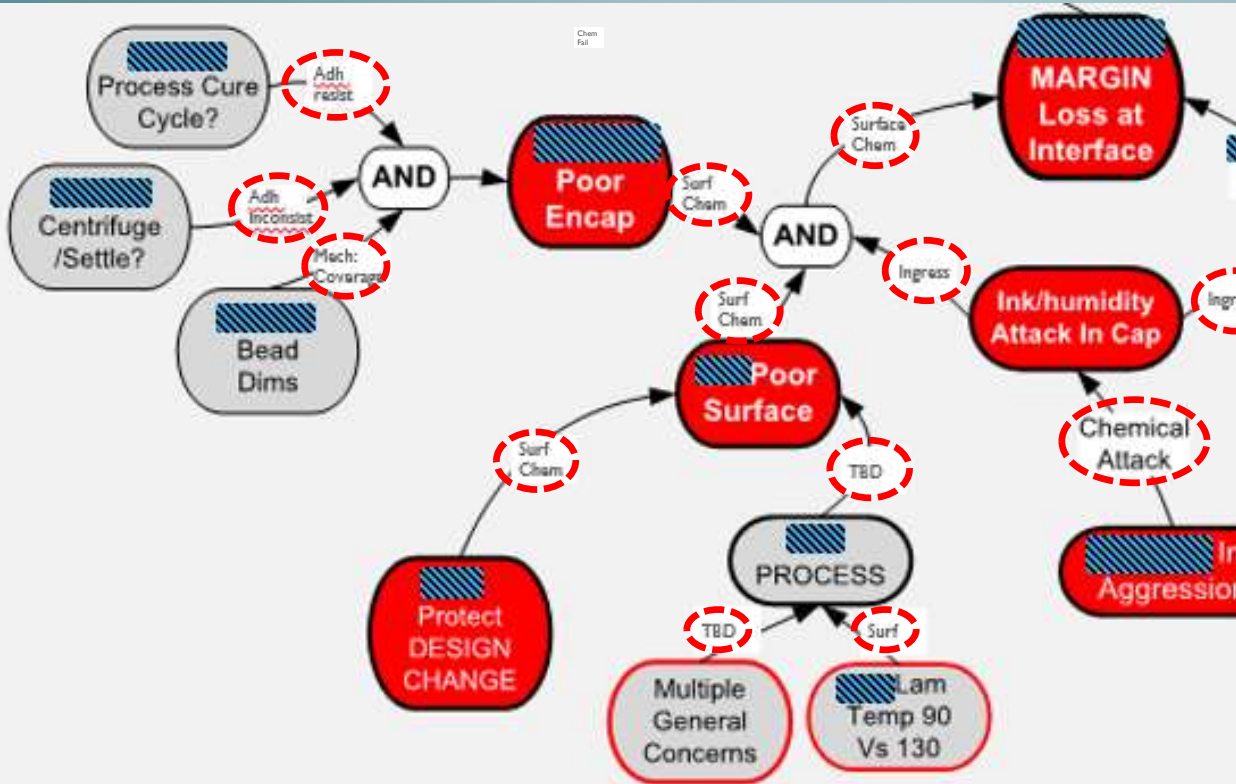
# Know your ABC: Root Cause Diagram (RCD)

**B**



# Know your ABC: Root Cause Diagram (RCD)

**B**




## Integrate the Mechanisms

- Ensure sound science
- Leverage team expertise
- Highlight conflicts
- **Prioritise the Likely Causes**
- **Downgrade unlikely Hypotheses !**

# Know your ABC: C – Hypothesis For/Against Tool

Issue Statements: Air in K Channel after Start-up prime but before Boss causing starvation

HYPOTHESIS	EVIDENCE FOR	EVIDENCE AGAINST	ACTION
SHF increasing over time from wetted interface edge of topside fence	Autopsy from late Jan 7 had showed residue under fence - SHF? Or ink? Fail from Qual 8 had SHF visible around fence?	Possibly that autopsy incorrect - how confident in it? In initial analysis, thought was HIT related issue (soaking HIT stack) BUT then he noticed ink under fence - changing diapos	Multiple condition extreme overnight test NEED Autopsy of latest fails Add ink to now passing fails (Q6+Q8) - rule in/out fence. Research previous autopsy again
	Fails are in CSA testing in early life - if autopsy correct, seems not possible that this is from ink travel AND ingress in first hour in printer? Checked and PHA don't get ink in Fence area for 1h+ printing		Does LPO/WS PHA have ink around the board after printer 40+ pages
	Only seen in older/laged parts (not at LPO or other testing in Ireland?)	Qual 8 at the printer had issue at CSA? Same error code - ending in 23 (VPP) D&M testing Qual 6 PHA for Hue banding i.e. same age	age versus Barry and Autopsy to clarify this CSA fail should be included in analysis Need to capture on assert fails code versus Cause...
	Environment shipping conditions apply in BPO/Printer build testing (humidity, sealed container, wet SHF) - long term shipping.	PHISH testing IRL/VNC had shipping experience at environment conditions. (Start up and 40p test, 40 Printers) per printer build. Clare G shipping test (64 units and 1p printed) - no fails	How many PHISH testing completed for MP2 - K out issue;
	Environment testing conditions apply in BPO/Printer build testing (humidity, sealed container, wet SHF) TRT (but different fail code- Qual 6)	Recovery Test - no VPPs fails EWST - any fails? Mech life testing? EMUN/DW? (Qual 5 @ 8 weeks)	What other environment testing is completed WW -
	Seen Primarily in MP2 and PP - Loose correlation with LPO E-Test spikes on Qual 4, Qual 6? Qual 7? and Qual 8? - not in Qual 5 (no SHF) - not really seen in 1,2,3 until repul - then seen Q1: 0%, Q2: 44%, Q3: 22% Observation that lowest level seen in QX and this was driest appearance	No correlation in Qual 1, 2, 3? Doesn't correlate with visual SHF.	Test Qual 5 when test ready Need LPO Etest data (+repull data)
	Historical Knowledge: Ink-type fluid soaking key interface and sealed up / shipped like that (sauna-like experience?)	IRL has had similar exposure to this sauna-like experience? but no fails. Gen II have no issue - BUT how much on board?? Does Board coating give the margin?	Find out from Gil - Nigel this eve Barry to check coverage on vias/fence coverage
	We have non-encapsulant PCA boards - exposure to SHF ingress? Does CuHd same board but no issue suggest SHF is a factor?	CUHd Zim also has non-covered - but latter has no SHF / diff ink Gen II does wet ship	How wet gen II? (how wet is the SHF process) How do gen II ship, shipped down, sealed...
Fence problem (coverage/integrity) (causing	Fence process on Qual 4 not as stable... fence coverage bit worse.	Best fence Visually on Q6 and Q8 had fails TS and BS (Qual 5-7 solder optimisation	Was Qual 1-3 fence coverage OK?



# Know your ABC: C – Hypothesis For/Against Tool

Issue Statements: Air in K Channel after Start-up prime but before Boss causing starvation

HYPOTHESIS	EVIDENCE FOR	EVIDENCE AGAINST	ACTION
SHF increasing over time from wetted interface edge of topside fence	Autopsy from late Jan 7 had showed residue under fence - SHF? Or ink? Fail from Qual 8 had SHF visible around fence?	Possibly that autopsy incorrect - how confident in it? In initial analysis, thought was HIT related issue (soaking HIT stack) BUT then he noticed ink under fence - changing diapos	Multiple condition extreme overnight test NEED Autopsy of latest fails Add ink to now passing fails (Q6+Q8) - rule in/out fence. Research previous autopsies again
	Fails are in CSA testing in early life - if autopsy correct, seems not possible that this is from ink travel AND ingress in first hour in printer? Checked and PHA don't get ink in Fence area for 1h+ printing		Does LPQ/WS PHA have ink around the board after printer 40+ pages
	Only seen in older/laged parts (not at LPQ or other testing in Ireland?)	Qual 8 at the printer had issue at CSA? Same error code - ending in 23 (VPP) DMD testing Qual 6 PHA for Hue banding i.e. same age	age versus Barry and Autopsy to clarify this CSA fail should be included in analysis Need to capture on assert fails code versus cause...
	Environment shipping conditions apply in BPO/Printer build testing (humidity, sealed container, wet SHF) - long term shipping.	PHISH testing IRL/VNC had shipping experience at environment conditions. (Start up and 40p test, 40 Printers) per printer build. Clare G shipping test (64 units and 1p printed) - no fails	How many PHISH testing completed for MP2 - K out issue;
	Environment testing conditions apply in BPO/Printer build testing (humidity, sealed container, wet SHF) TRT (but different fail code- Qual 6)	Recovery Test - no VPPs fails EWST - any fails? Mech life testing? EMUL/DW? (Qual 5 @ 8 weeks)	What other environment testing is completed WW -
	Seen Primarily in MP2 and PP - Loose correlation with LPQ E-Test spikes on Qual 4, Qual 6?, Qual 7? and Qual 8? - not in Qual 5 (no SHF) - not really seen in 1,2,3 until repul - then seen Q1: 0%, Q2: 44%, Q3: 22% Observation that lowest level seen in QX and this was driest appearance	No correlation in Qual 1, 2,3? Doesn't correlate with visual SHF.	Test Qual 5 when test ready Need LPQ Etest data (+repuil data)
	Historical Knowledge: Ink-type fluid soaking key interface and sealed up / shipped like that (sauna-like experience?)	IRL has had similar exposure to this sauna-like experience? but no fails. Gen II have no issue - BUT how much on board?? Does Board coating give the margin?	Find out from Gil - Nigel this eve Barry to check coverage on via/trace coverage
	We have non-encapsulant PCA boards - exposure to SHF ingress? Does CuHd same board but no issue suggest SHF is a factor?	CUHd Zim also has non-covered - but latter has no SHF / diff Ink Gen II does wet ship	How wet gen II? (how wet is the SHF process) How do gen II ship, shipped down, sealed...
Fence problem (coverage/integrity) (causing	Fence process on Qual 4 not as stable... fence coverage bit worse.	Best fence visually on Q6 and Q8 had fails TS and BS (Qual 5-7 solder optimisation	Was Qual 1-3 fence coverage OK?

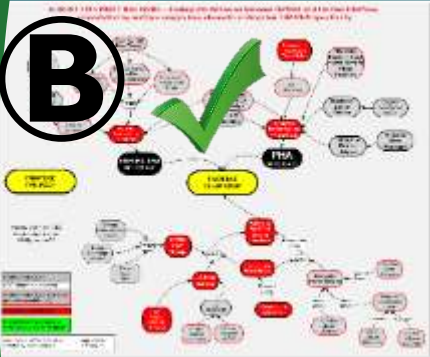


## Integrate the Hypotheses

- Weigh up evidence base
- Leverage team expertise
- Scrutinise conflicts
- Prioritise Best Hypotheses
- Kill the Weak hypotheses !

	IS	IS NOT	DISTINCTIONS ?	INFERENCES
WHAT				
WHY				
WHEN				
EXTENT				

**A**



**B**

IS	IS NOT	DISTINCTIONS ?	INFERENCES
WHAT			
WHY			
WHEN			
EXTENT			

**C**

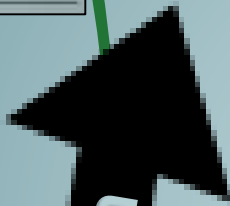
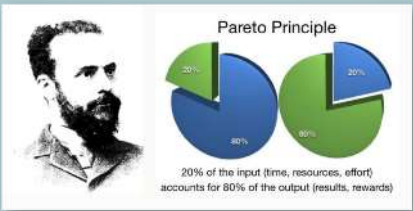


	IS	IS NOT	DISTINCTIONS?	INFERENCES?
WHAT				
WHY				
WHEN				
EXTENT				

**A**

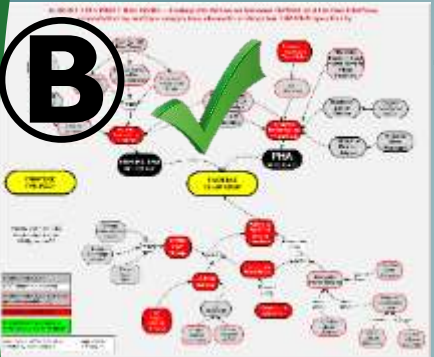


Integration



Integration

Integration



**B**



QUESTION	ANSWER	DEFINITION
What is the difference between a process and a procedure?	A process is a series of steps that lead to a specific outcome, while a procedure is a set of instructions that describe how to perform a task.	Process: A series of steps that lead to a specific outcome. Procedure: A set of instructions that describe how to perform a task.
What is the difference between a task and an activity?	A task is a specific action that needs to be completed, while an activity is a broader category of actions that can include multiple tasks.	Task: A specific action that needs to be completed. Activity: A broader category of actions that can include multiple tasks.
What is the difference between a goal and an objective?	A goal is a broad, long-term aim, while an objective is a specific, measurable, and time-bound target.	Goal: A broad, long-term aim. Objective: A specific, measurable, and time-bound target.
What is the difference between a strategy and a tactic?	A strategy is a high-level plan or approach, while a tactic is a specific action or maneuver used to achieve a goal.	Strategy: A high-level plan or approach. Tactic: A specific action or maneuver used to achieve a goal.
What is the difference between a mission and a vision?	A mission is a statement of purpose, while a vision is a statement of what the organization wants to achieve in the future.	Mission: A statement of purpose. Vision: A statement of what the organization wants to achieve in the future.
What is the difference between a process and a procedure?	A process is a series of steps that lead to a specific outcome, while a procedure is a set of instructions that describe how to perform a task.	Process: A series of steps that lead to a specific outcome. Procedure: A set of instructions that describe how to perform a task.
What is the difference between a task and an activity?	A task is a specific action that needs to be completed, while an activity is a broader category of actions that can include multiple tasks.	Task: A specific action that needs to be completed. Activity: A broader category of actions that can include multiple tasks.
What is the difference between a goal and an objective?	A goal is a broad, long-term aim, while an objective is a specific, measurable, and time-bound target.	Goal: A broad, long-term aim. Objective: A specific, measurable, and time-bound target.
What is the difference between a strategy and a tactic?	A strategy is a high-level plan or approach, while a tactic is a specific action or maneuver used to achieve a goal.	Strategy: A high-level plan or approach. Tactic: A specific action or maneuver used to achieve a goal.
What is the difference between a mission and a vision?	A mission is a statement of purpose, while a vision is a statement of what the organization wants to achieve in the future.	Mission: A statement of purpose. Vision: A statement of what the organization wants to achieve in the future.

**C**



	IS	IS NOT	DISTINCTIONS?	INFERENCES
WHAT				
WHY				
WHEN				
EXTENT				

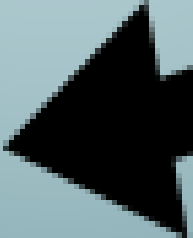
**A**



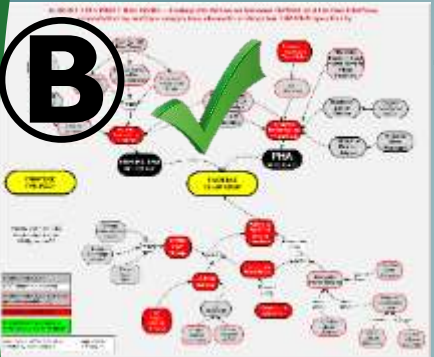
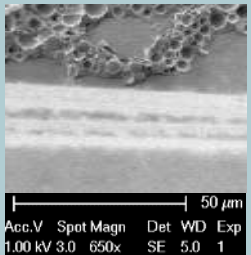
Integration



Integration



Integration



**B**

IS	IS NOT	DISTINCTIONS?	INFERENCES
WHAT			
WHY			
WHEN			
EXTENT			

**C**



	IS	IS NOT	DISTINCTIONS?	INFERENCES?
WHAT				
WHY				
WHEN				
EXTENT				

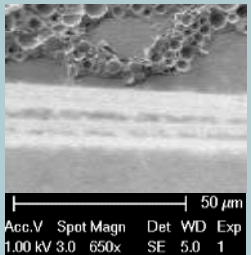
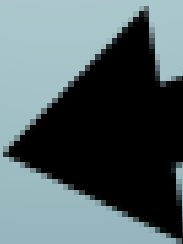
**A**



Integration



Integration

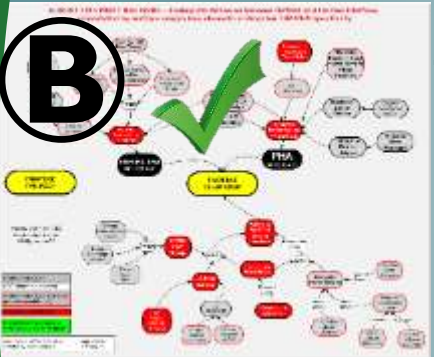


Integration



IS	IS NOT	DISTINCTIONS?	INFERENCES?
WHAT			
WHY			
WHEN			
EXTENT			

**C**



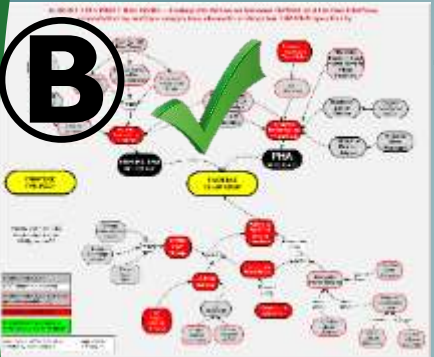
**B**



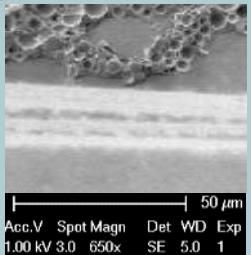
Integration

	IS	IS NOT	DISTINCTIONS?	INFERENCES?
WHAT				
WHY				
WHEN				
EXTENT				

**A**

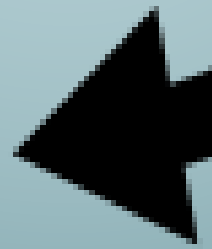


**B**



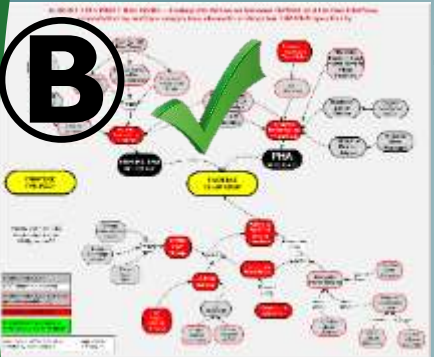
IS	IS NOT	DISTINCTIONS?	INFERENCES?
WHAT			
WHY			
WHEN			
EXTENT			

**C**

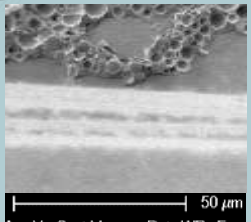


	IS	IS NOT	DISTINCTIONS?	INFERENCES?
WHAT				
WHY				
WHEN				
EXTENT				

**A**



**B**

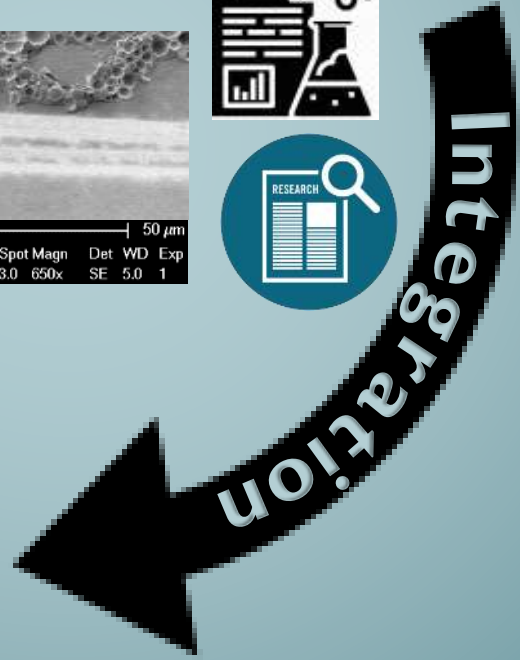


50 μm  
Acc.V Spot Magn Det WD Exp  
1.00 kV 3.0 650x SE 5.0 1



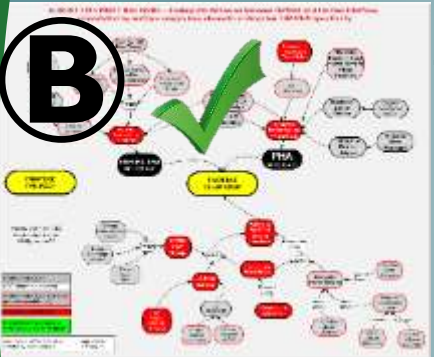
	IS	IS NOT	DISTINCTIONS?	INFERENCES?
WHAT				
WHY				
WHEN				
EXTENT				

**C**



	IS	IS NOT	DISTINCTIONS?	INFERENCES?
WHAT				
WHY				
WHEN				
EXTENT				

**A**

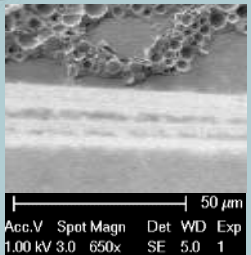
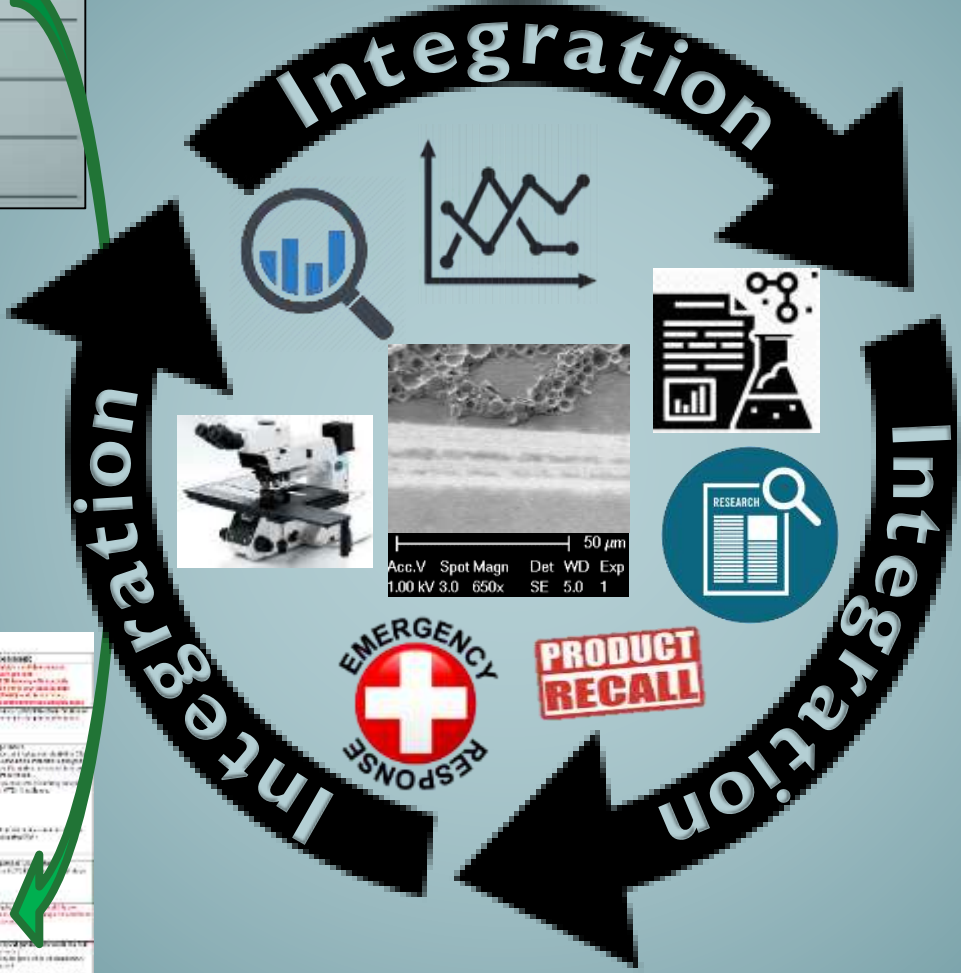


**B**



IS	IS NOT	DISTINCTIONS?	INFERENCES?
WHAT			
WHY			
WHEN			
EXTENT			

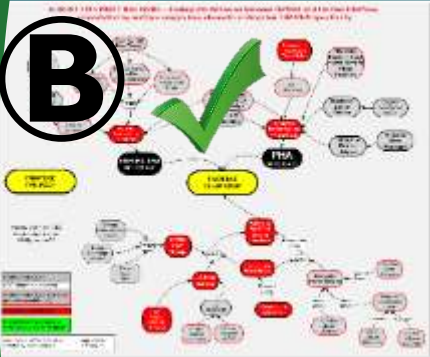
**C**





	IS	IS NOT	DISTINCTIONS?	INFERENCES?
WHAT				
WHY				
WHEN				
EXTENT				

**A**

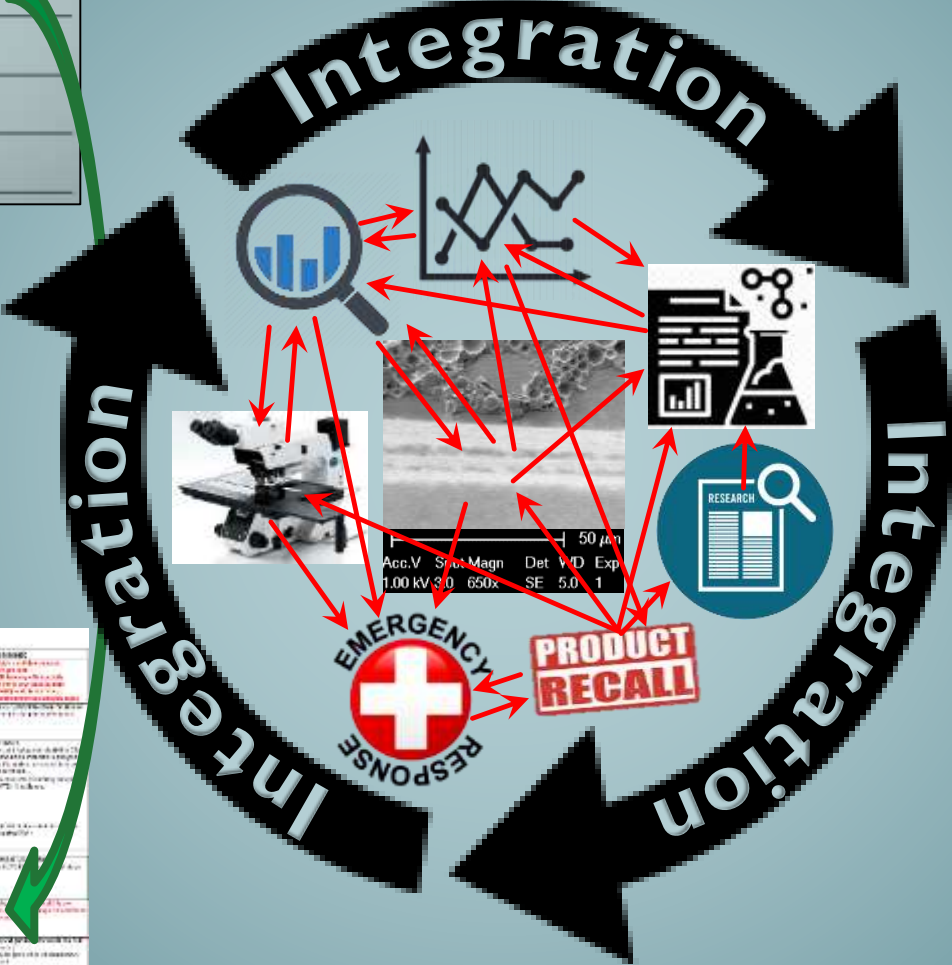


**B**



Case No.	Customer	Complaint	Analysis	Resolution
1001	ABC Corp	Product X not working	Defective component	Replacement
1002	DEF Ltd	Product Y delayed	Supply chain issue	Apology & expedited shipping
1003	GHI Inc	Product Z damaged	Shipping error	Refund & replacement
1004	JKL Co	Product W missing parts	Inventory error	Parts replacement
1005	MNO Pte	Product V inconsistent quality	Quality control failure	Process improvement
1006	PQR Sdn	Product U safety concern	Design flaw	Product recall
1007	STU Sdn	Product T software bug	Software update	Update & support
1008	VWX Sdn	Product S customer service	Staff training	Improved service
1009	YZA Sdn	Product R packaging issue	Labeling error	Repackaging
1010	BCD Sdn	Product Q pricing	Market analysis	Price adjustment

**C**



Integration

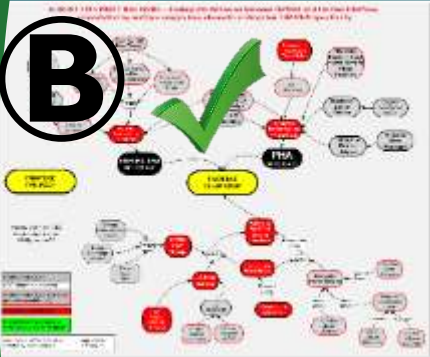
Integration

Integration



	IS	IS NOT	DISTINCTIONS?	INFERENCES?
WHAT				
WHY				
WHEN				
EXTENT				

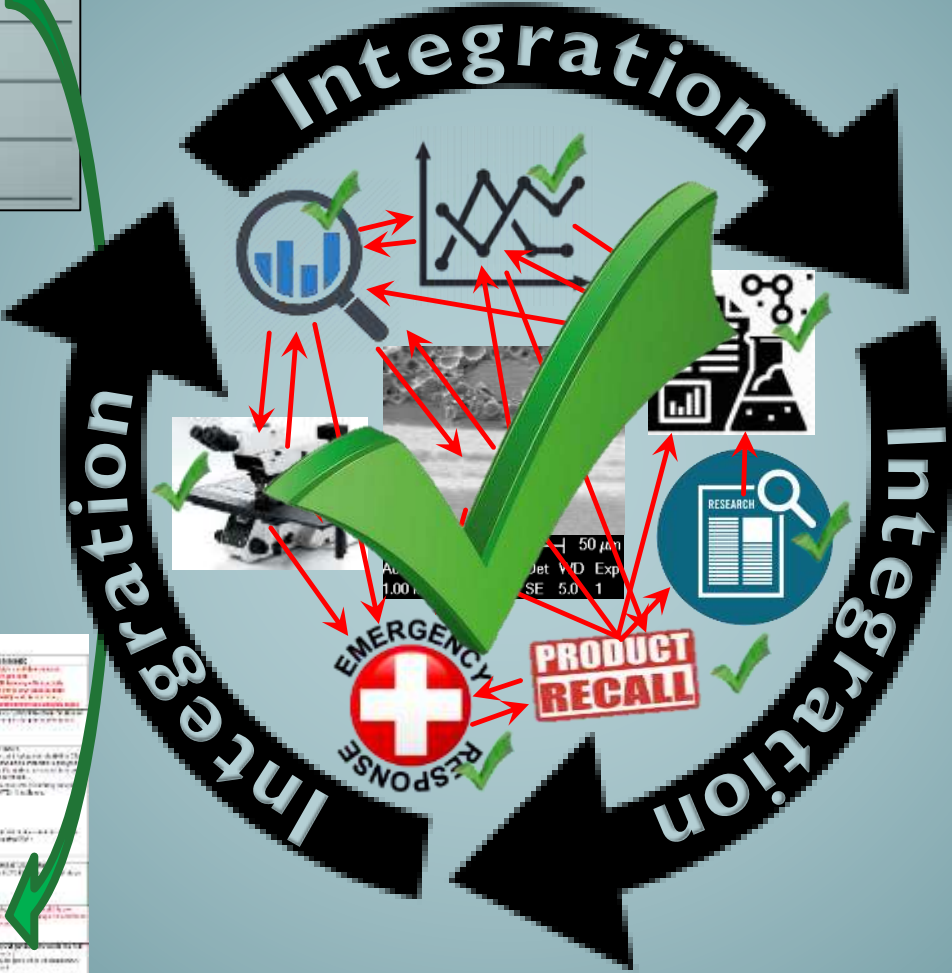
**A**



**B**

Issue No.	Issue Description	Root Cause	Corrective Action	Preventive Action
1	...	...	...	...
2	...	...	...	...
3	...	...	...	...
4	...	...	...	...
5	...	...	...	...
6	...	...	...	...
7	...	...	...	...
8	...	...	...	...
9	...	...	...	...
10	...	...	...	...

**C**



Integration

Integration

Integration

EMERGENCY RESPONSE

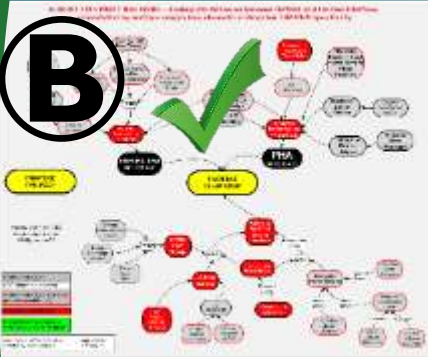
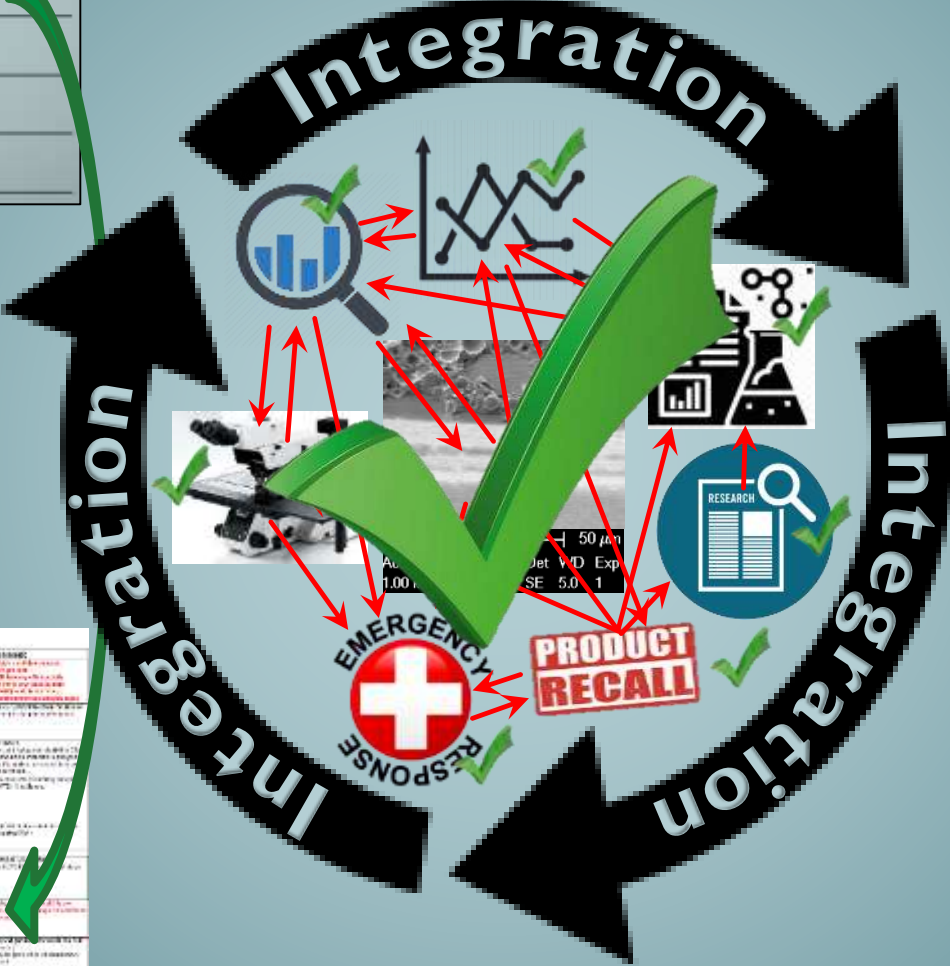
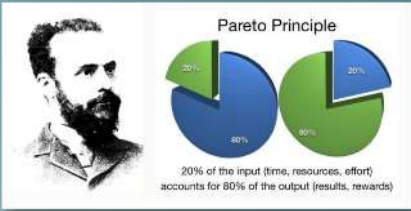
PRODUCT RECALL

RESEARCH

50 per  
Det. V/D Exp  
SE 5.0 1

	IS	IS NOT	DISTINCTIONS?	INFERENCES?
WHAT				
WHY				
WHEN				
EXTENT				

**A**



**B**

Case No.	Case Title	Case Description	Case Outcome
1	...	...	...
2	...	...	...
3	...	...	...
4	...	...	...
5	...	...	...
6	...	...	...
7	...	...	...
8	...	...	...
9	...	...	...
10	...	...	...

**C**

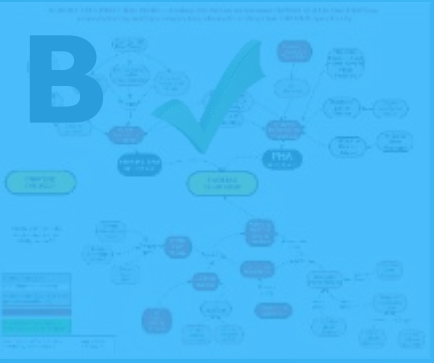


**A** ✓

Item	Category	Value	Unit	Notes
1	...	...	...	...
2	...	...	...	...
3	...	...	...	...
4	...	...	...	...
5	...	...	...	...
6	...	...	...	...
7	...	...	...	...
8	...	...	...	...
9	...	...	...	...
10	...	...	...	...
11	...	...	...	...
12	...	...	...	...
13	...	...	...	...
14	...	...	...	...
15	...	...	...	...
16	...	...	...	...
17	...	...	...	...
18	...	...	...	...
19	...	...	...	...
20	...	...	...	...
21	...	...	...	...
22	...	...	...	...
23	...	...	...	...
24	...	...	...	...
25	...	...	...	...
26	...	...	...	...
27	...	...	...	...
28	...	...	...	...
29	...	...	...	...
30	...	...	...	...
31	...	...	...	...
32	...	...	...	...
33	...	...	...	...
34	...	...	...	...
35	...	...	...	...
36	...	...	...	...
37	...	...	...	...
38	...	...	...	...
39	...	...	...	...
40	...	...	...	...
41	...	...	...	...
42	...	...	...	...
43	...	...	...	...
44	...	...	...	...
45	...	...	...	...
46	...	...	...	...
47	...	...	...	...
48	...	...	...	...
49	...	...	...	...
50	...	...	...	...
51	...	...	...	...
52	...	...	...	...
53	...	...	...	...
54	...	...	...	...
55	...	...	...	...
56	...	...	...	...
57	...	...	...	...
58	...	...	...	...
59	...	...	...	...
60	...	...	...	...
61	...	...	...	...
62	...	...	...	...
63	...	...	...	...
64	...	...	...	...
65	...	...	...	...
66	...	...	...	...
67	...	...	...	...
68	...	...	...	...
69	...	...	...	...
70	...	...	...	...
71	...	...	...	...
72	...	...	...	...
73	...	...	...	...
74	...	...	...	...
75	...	...	...	...
76	...	...	...	...
77	...	...	...	...
78	...	...	...	...
79	...	...	...	...
80	...	...	...	...
81	...	...	...	...
82	...	...	...	...
83	...	...	...	...
84	...	...	...	...
85	...	...	...	...
86	...	...	...	...
87	...	...	...	...
88	...	...	...	...
89	...	...	...	...
90	...	...	...	...
91	...	...	...	...
92	...	...	...	...
93	...	...	...	...
94	...	...	...	...
95	...	...	...	...
96	...	...	...	...
97	...	...	...	...
98	...	...	...	...
99	...	...	...	...
100	...	...	...	...

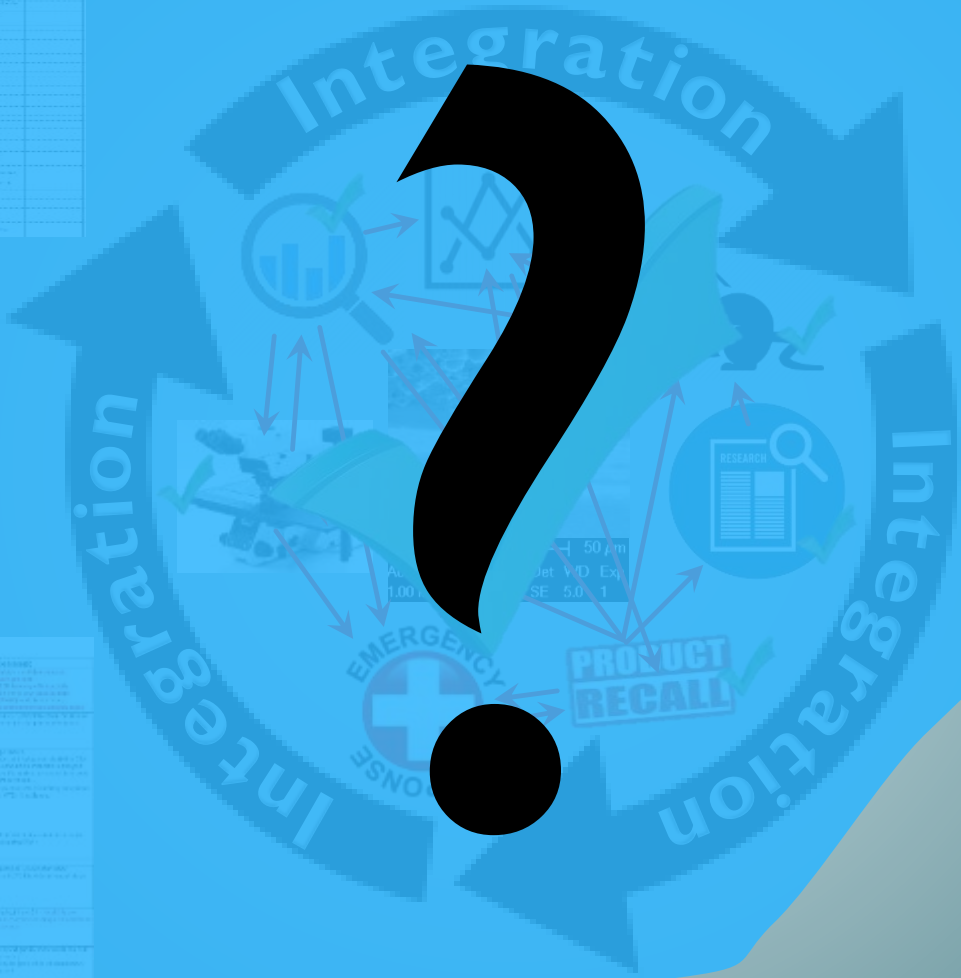
**Pareto Principle**

20% of the input (time, resources, effort) accounts for 80% of the output (results, rewards)



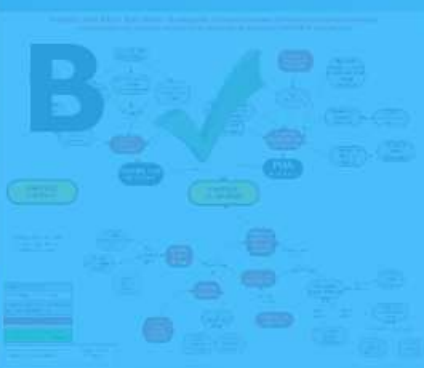
**C** ✓

Item	Category	Value	Unit	Notes
1	...	...	...	...
2	...	...	...	...
3	...	...	...	...
4	...	...	...	...
5	...	...	...	...
6	...	...	...	...
7	...	...	...	...
8	...	...	...	...
9	...	...	...	...
10	...	...	...	...
11	...	...	...	...
12	...	...	...	...
13	...	...	...	...
14	...	...	...	...
15	...	...	...	...
16	...	...	...	...
17	...	...	...	...
18	...	...	...	...
19	...	...	...	...
20	...	...	...	...
21	...	...	...	...
22	...	...	...	...
23	...	...	...	...
24	...	...	...	...
25	...	...	...	...
26	...	...	...	...
27	...	...	...	...
28	...	...	...	...
29	...	...	...	...
30	...	...	...	...
31	...	...	...	...
32	...	...	...	...
33	...	...	...	...
34	...	...	...	...
35	...	...	...	...
36	...	...	...	...
37	...	...	...	...
38	...	...	...	...
39	...	...	...	...
40	...	...	...	...
41	...	...	...	...
42	...	...	...	...
43	...	...	...	...
44	...	...	...	...
45	...	...	...	...
46	...	...	...	...
47	...	...	...	...
48	...	...	...	...
49	...	...	...	...
50	...	...	...	...
51	...	...	...	...
52	...	...	...	...
53	...	...	...	...
54	...	...	...	...
55	...	...	...	...
56	...	...	...	...
57	...	...	...	...
58	...	...	...	...
59	...	...	...	...
60	...	...	...	...
61	...	...	...	...
62	...	...	...	...
63	...	...	...	...
64	...	...	...	...
65	...	...	...	...
66	...	...	...	...
67	...	...	...	...
68	...	...	...	...
69	...	...	...	...
70	...	...	...	...
71	...	...	...	...
72	...	...	...	...
73	...	...	...	...
74	...	...	...	...
75	...	...	...	...
76	...	...	...	...
77	...	...	...	...
78	...	...	...	...
79	...	...	...	...
80	...	...	...	...
81	...	...	...	...
82	...	...	...	...
83	...	...	...	...
84	...	...	...	...
85	...	...	...	...
86	...	...	...	...
87	...	...	...	...
88	...	...	...	...
89	...	...	...	...
90	...	...	...	...
91	...	...	...	...
92	...	...	...	...
93	...	...	...	...
94	...	...	...	...
95	...	...	...	...
96	...	...	...	...
97	...	...	...	...
98	...	...	...	...
99	...	...	...	...
100	...	...	...	...



**A**

Item	Category	Value	Notes
1	Category 1	Value 1	Notes 1
2	Category 2	Value 2	Notes 2
3	Category 3	Value 3	Notes 3
4	Category 4	Value 4	Notes 4
5	Category 5	Value 5	Notes 5
6	Category 6	Value 6	Notes 6
7	Category 7	Value 7	Notes 7
8	Category 8	Value 8	Notes 8
9	Category 9	Value 9	Notes 9
10	Category 10	Value 10	Notes 10
11	Category 11	Value 11	Notes 11
12	Category 12	Value 12	Notes 12
13	Category 13	Value 13	Notes 13
14	Category 14	Value 14	Notes 14
15	Category 15	Value 15	Notes 15
16	Category 16	Value 16	Notes 16
17	Category 17	Value 17	Notes 17
18	Category 18	Value 18	Notes 18
19	Category 19	Value 19	Notes 19
20	Category 20	Value 20	Notes 20

**B****C**

Item	Category	Value	Notes
1	Category 1	Value 1	Notes 1
2	Category 2	Value 2	Notes 2
3	Category 3	Value 3	Notes 3
4	Category 4	Value 4	Notes 4
5	Category 5	Value 5	Notes 5
6	Category 6	Value 6	Notes 6
7	Category 7	Value 7	Notes 7
8	Category 8	Value 8	Notes 8
9	Category 9	Value 9	Notes 9
10	Category 10	Value 10	Notes 10
11	Category 11	Value 11	Notes 11
12	Category 12	Value 12	Notes 12
13	Category 13	Value 13	Notes 13
14	Category 14	Value 14	Notes 14
15	Category 15	Value 15	Notes 15
16	Category 16	Value 16	Notes 16
17	Category 17	Value 17	Notes 17
18	Category 18	Value 18	Notes 18
19	Category 19	Value 19	Notes 19
20	Category 20	Value 20	Notes 20



**Pareto Principle**

80% of the total 2000 revenues, which accounts for 20% of the total clients, generated

**PRODUCT RECALL**

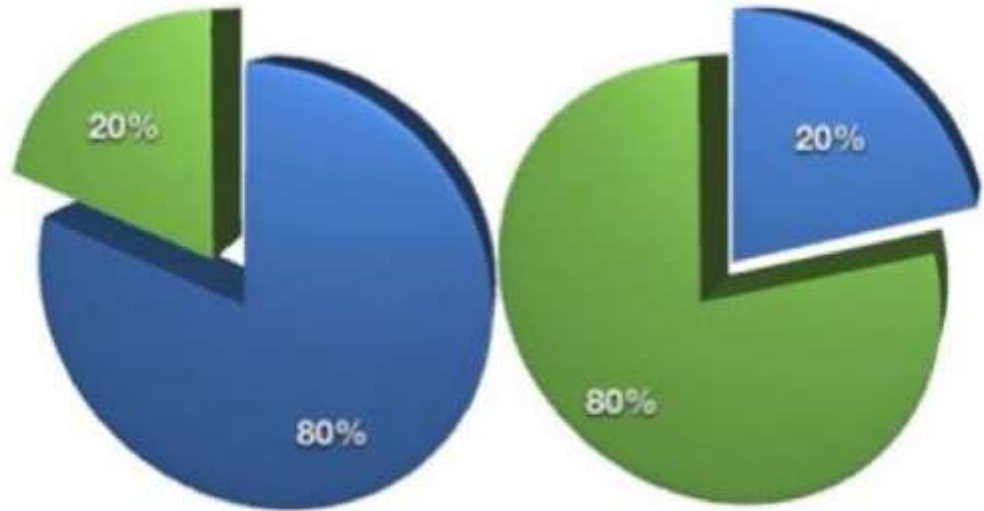
# PART 2

Engineering Problem Solving  
*- for Heart Disease*

# Rule Zero: Always Honor Pareto



## Pareto Principle



20% of the input (time, resources, effort)  
accounts for 80% of the output (results, rewards)

# A Kepner Tragoie IS / IS NOT Excerpt for CVD

Kepner Tragoie - State the problem, Analyze the Logic:

CVD and MI - Huge increase in Modernised Humans over Past Century

	<i>IS</i>	<i>IS NOT</i>	<i>DISTINCTIONS</i>	<i>INFERENCES</i>	<i>UNLIKELY</i>
<b>WHAT</b>	<small>What similar objects could reasonably have the deviation, but do not? What other deviations could reasonably be observed, but are not?</small>		<small>What is different, odd, special, or unique about the IS compared with the IS NOT?</small>		
<small>What specific object has the deviation?</small>	Primarily "Modernized Humans"	Traditional Humans e.g. Kitavans	Insulin Levels / IR	Insulin dynamics	ApoB / LDL-P ?



# A Kepner Tragoie Excerpt for CVD

**Kepner Tragoie - State the problem, Analyze the Logic:**

**CVD and MI - Huge increase in Modernised Humans over Past Century**

	IS	IS NOT	DISTINCTIONS	AREA OF INVESTIGATION	REJECTED HYPOTHESIS
<b>WHAT</b>	<small>What similar objects could reasonably have the deviation, but is not? What other deviations could reasonably be observed, but are not?</small>		<small>What is different, add, special or unique about the D, compared with the D-NOT?</small>		
<small>What specific objects are the deviation?</small>	Primarily "Modernized Humans"	Traditional Humans e.g. Kitavans	Insulin Levels / IR	Insulin dynamics	ApoB / LDL-P ?

	IS	IS NOT	DISTINCTIONS	INFERENCES	UNLIKELY
<b>WHERE</b>	<small>Where else could the object be when the deviation is observed, but is not? Where else could the deviation be located on the object, but is not?</small>				
<small>Where is the deviation on the object?</small>	Arteries	Veins	Oxygenation / Pressure / Vasa Vasorum	Vladimir Subbotin's Hypothesis (!)	Vein Design

# **A** Kepner Tragoie Excerpt for CVD

*Prog. Lipid Res.* Vol. 31, No. 3, pp. 195-243, 1992  
Printed in Great Britain. All rights reserved

0163-7827/92/\$15.00  
© 1992 Pergamon Press Ltd

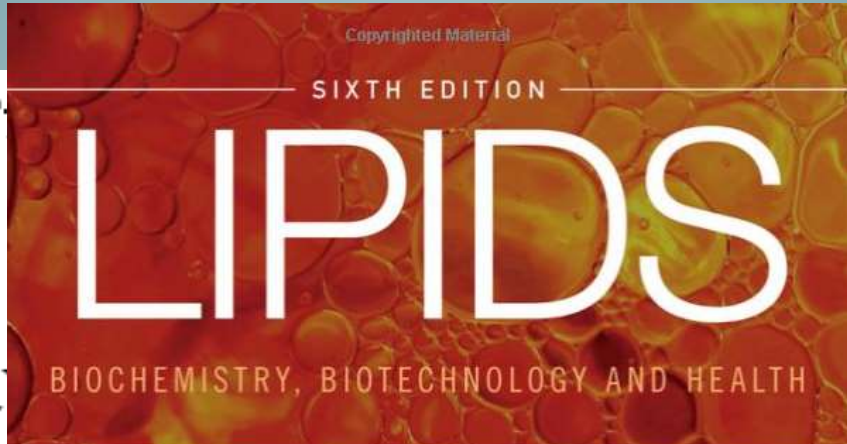
## **DIETARY LIPIDS AND CORONARY HEART DISEASE: OLD EVIDENCE, NEW PERSPECTIVE**

**MICHAEL I. GURR**

# A Kepner Tragoe Excerpt for CVD

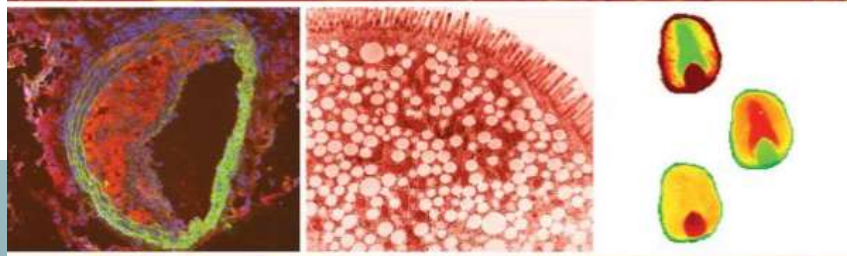
*Prog. Lipid Res.* Vol. 31, No. 3, pp. 1-10  
Printed in Great Britain. All rights reserved.

**DIETARY  
DISEASE:**



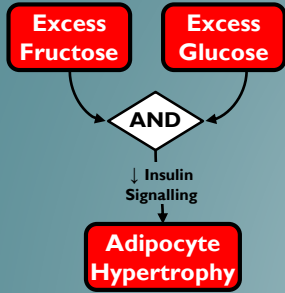
0163-7827/92/\$15.00  
© 1992 Pergamon Press Ltd

**HEART  
PERSPECTIVE**

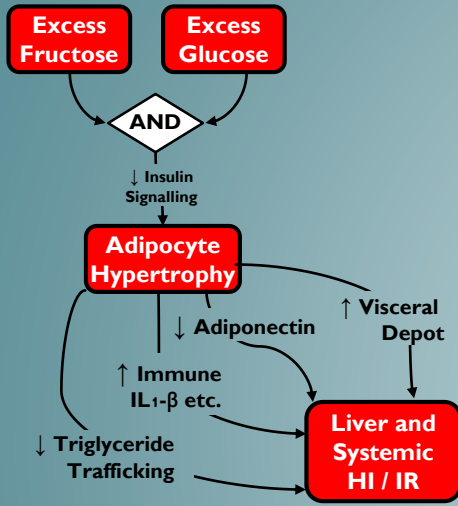


Michael I. Gurr, John L. Harwood,  
Keith N. Frayn, Denis J. Murphy  
and Robert H. Michell

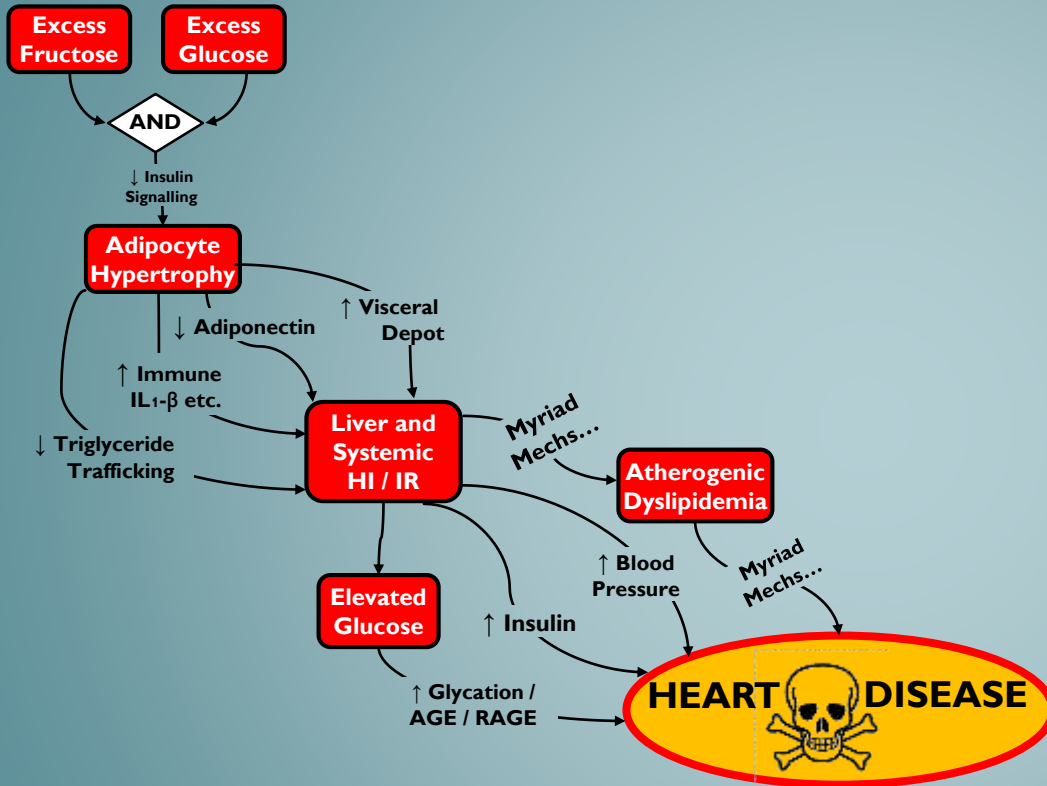
# B Root Cause Diagram Excerpt for CVD



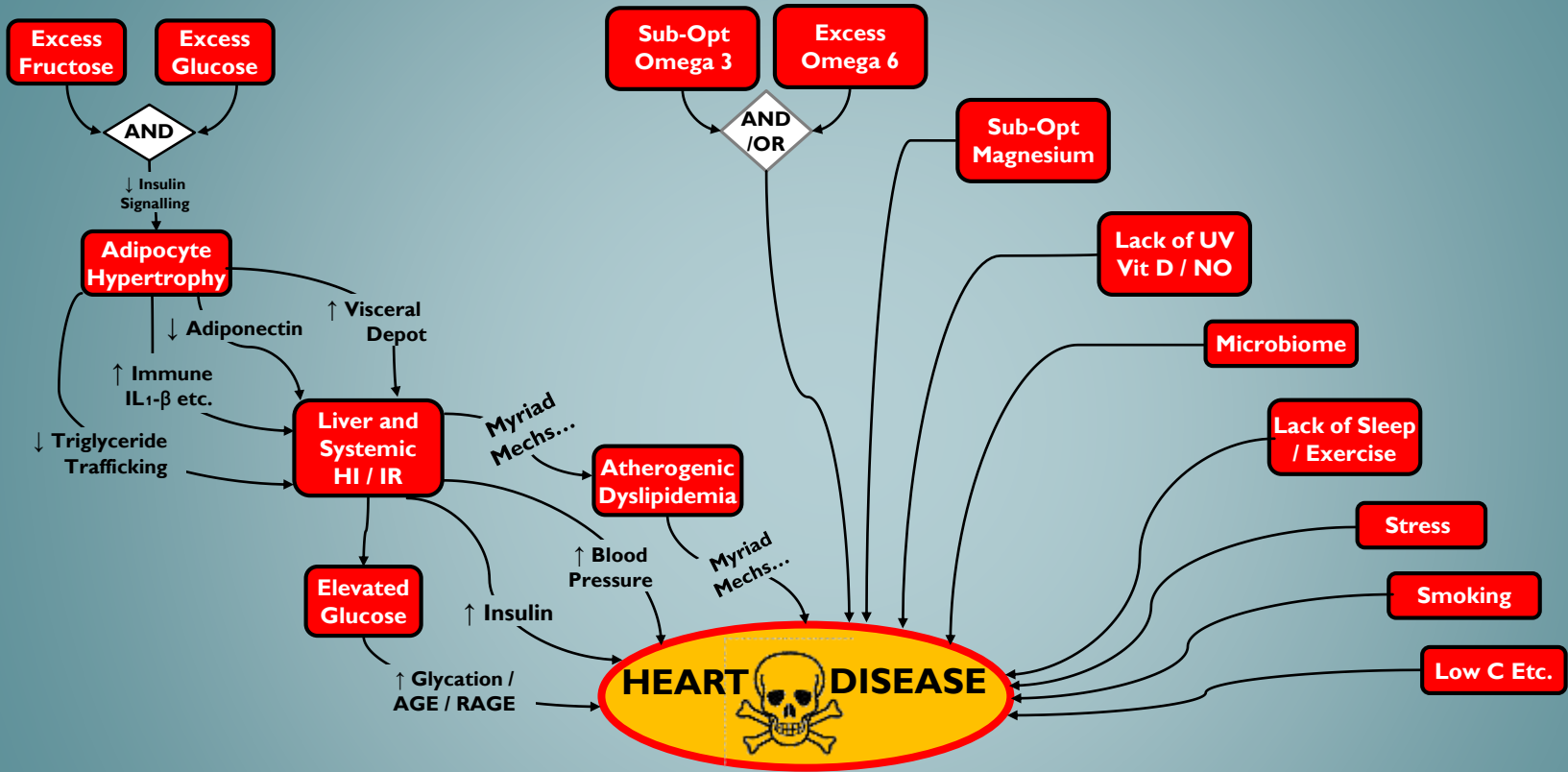
# B Root Cause Diagram Excerpt for CVD



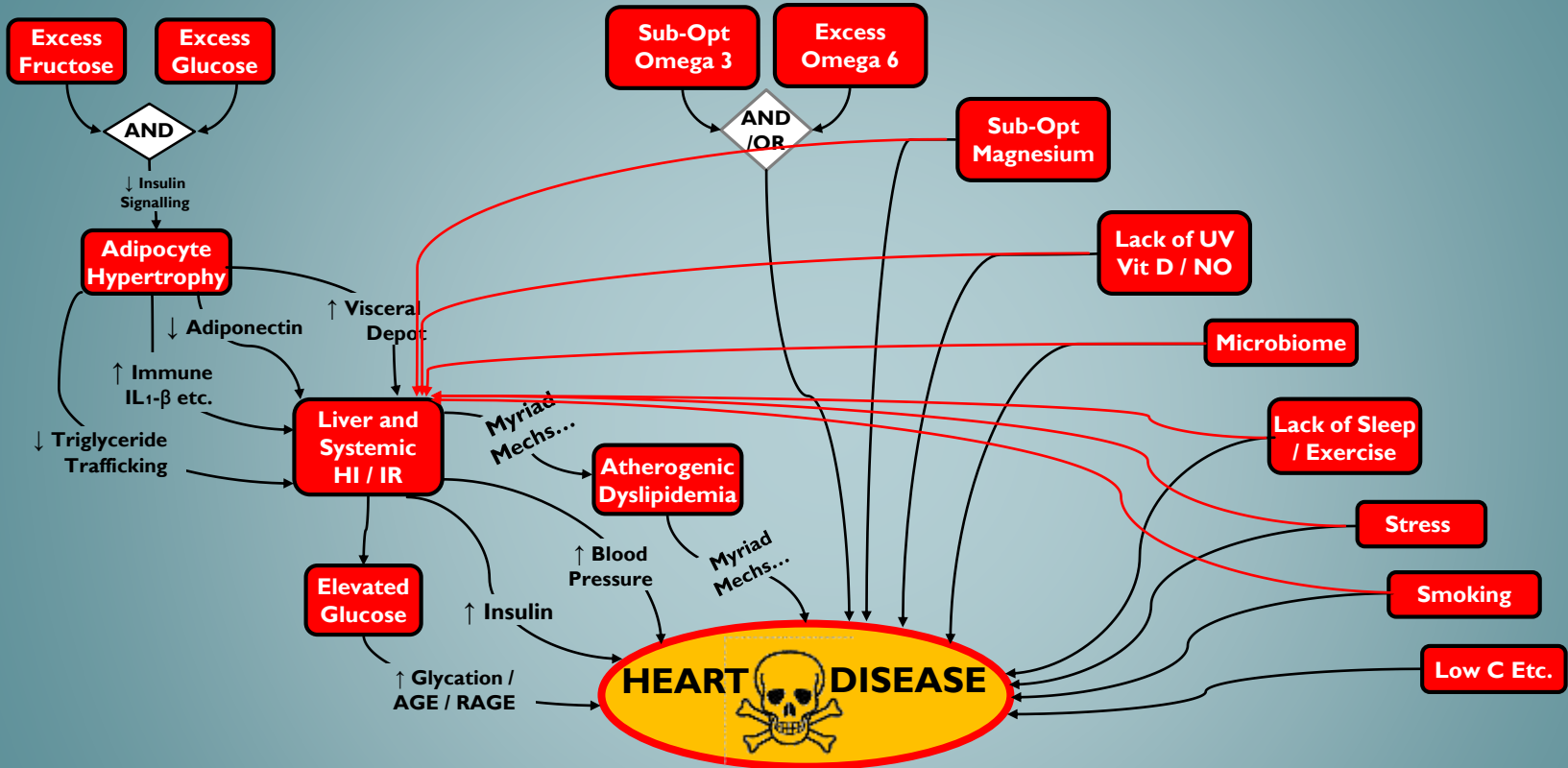
# B Root Cause Diagram Excerpt for CVD



# B Root Cause Diagram Excerpt for CVD

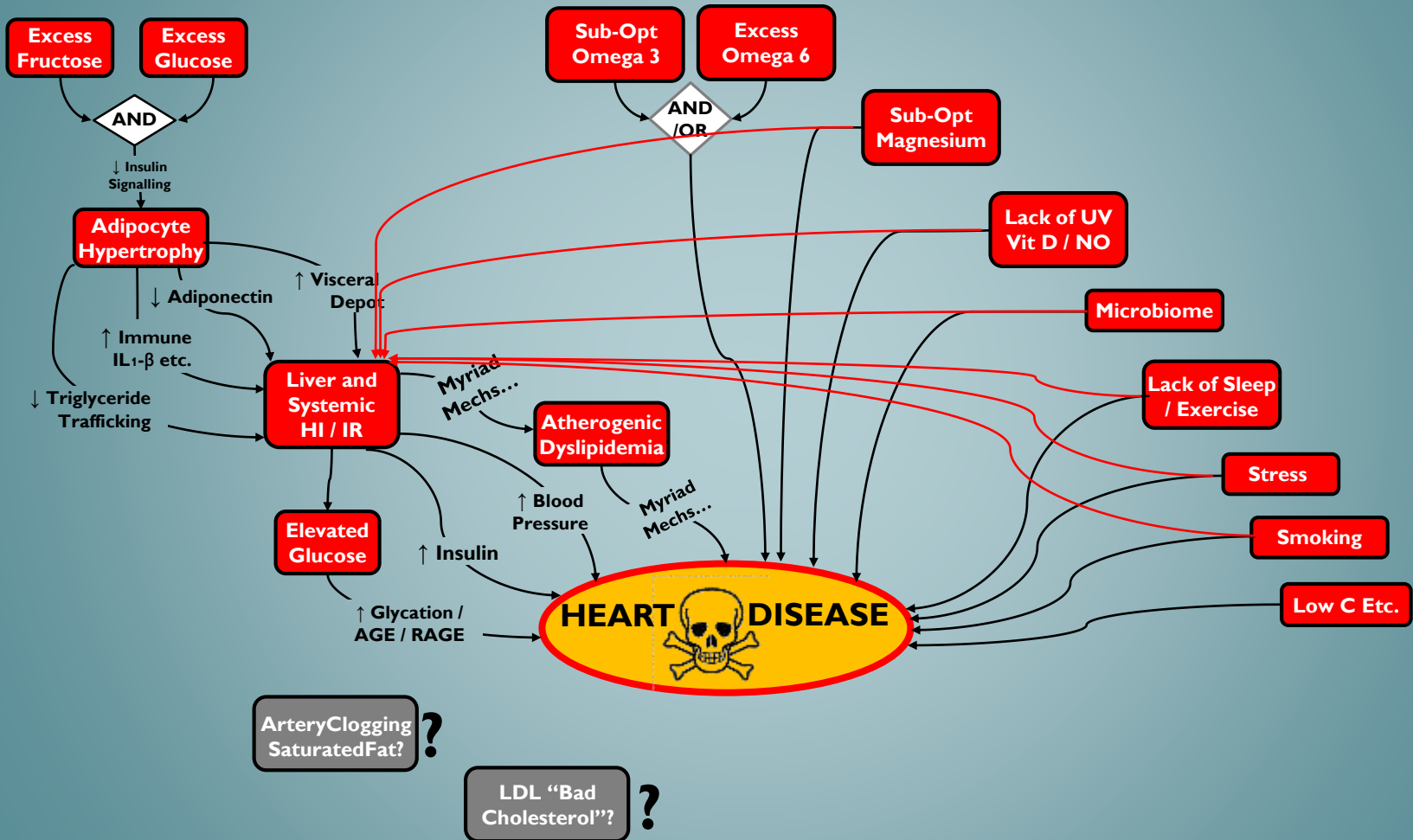


# B Root Cause Diagram Excerpt for CVD





# B Root Cause Diagram Excerpt for CVD



# C Hypothesis For/Against Excerpt for CVD

Issue Statement: Primary Root Causes and Solutions for Premature CVD and MI need to be Prioritised

	<b>HYPOTHESIS</b>	<b>EVIDENCE FOR</b>	<b>EVIDENCE AGAINST</b>
<b>1</b>	<b>HYPERINSULINEMIA - INSULIN RESISTANCE</b>	Overwhelming <b>COMPARATIVE/ASSOCIATIONAL</b> evidence from case-control, prospective observational, epidemiological, ecological and other comparative studies. Hazard ratios impressive and consistent.	Insulinoma patients lack expected degree of issue?
		Overwhelming <b>MECHANISTIC</b> evidence from scientific literature - HI/IR interacts through myriad pathways that exacerbate and drive CVD & MI. Also, what drives HI/IR consistently can be shown to link intimately to processes which drive CVD & MI	N/A
		<b>EXPERIMENTAL</b> evidence from animal and other studies in support	N/A
		<b>EXPERIMENTAL</b> evidence from pharmaceutical RCT's is limited - improving insulin dynamics has not been really targeted	N/A
		<b>OTHER</b> - longest lived organisms unified by lower Insulin / IGF-1 etc.	
		Blah Blah Blah...	

# C Hypothesis For/Against Excerpt for CVD

Issue Statement: Primary Root Causes and Solutions for Premature CVD and MI need to be Prioritised

	<b>HYPOTHESIS</b>	<b>EVIDENCE FOR</b>	<b>EVIDENCE AGAINST</b>
<b>1</b>	<b>HYPERINSULINEMIA - INSULIN RESISTANCE</b>	Overwhelming <b>COMPARATIVE/ASSOCIATIONAL</b> evidence from case-control, prospective observational, epidemiological, ecological and other comparative studies. Hazard ratios impressive and consistent	Insulinoma patients lack expected degree of issue?
		Overwhelming <b>MECHANISTIC</b> evidence from scientific literature - HI/IR interacts through myriad pathways that exacerbate and drive CVD & MI. Also, what drives HI consistently can be shown to link intimately to processes which drive CVD & MI	N/A
		<b>EXPERIMENTAL</b> evidence from animal and other studies in support	N/A
		<b>EXPERIMENTAL</b> evidence from pharmaceutical RCT's is limited - improving insulin dynamics has not been really targeted	N/A
		<b>OTHER</b> - longest lived organisms unified by lower Insulin / IGF-1 etc.	
		Blah Blah Blah...	

# C Hypothesis For/Against Excerpt for CVD

Issue Statement: Primary Root Causes and Solutions for Premature CVD and MI need to be Prioritised

	<b>HYPOTHESIS</b>	<b>EVIDENCE FOR</b>	<b>EVIDENCE AGAINST</b>
<b>1</b>	<b>HYPERINSULINEMIA - INSULIN RESISTANCE</b>	Overwhelming COMPARATIVE/ASSOCIATIONAL evidence from case-control, prospective observational, epidemiological, ecological and other comparative studies. Hazard ratios impressive and consistent	Insulinoma patients lack expected degree of issue?
		Overwhelming MECHANISTIC evidence from scientific literature - HI/IR interacts through myriad pathways that exacerbate and drive CVD & MI. Also, what drives HI consistently can be shown to link intimately to processes which drive CVD & MI	N/A
		EXPERIMENTAL evidence from animal and other studies in support	N/A
		EXPERIMENTAL evidence from pharmaceutical RCT's is limited - improving insulin dynamics has not been really targeted	N/A
		OTHER - longest lived organisms unified by lower Insulin / IGF-1 etc.	
		Blah Blah Blah...	

<b>2</b>	<b>“BAD CHOLESTEROL” LDL</b>	COMPARATIVE/ASSOCIATIONAL evidence from prospective observational, epidemiological, ecological and other comparative studies.	
		MECHANISTIC evidence from scientific literature	
		EXPERIMENTAL evidence from pharmaceutical RCT's and nutritional interventions - LDL drops in population, event rates are lowered	
		Blah Blah Blah...	

# C Hypothesis For/Against Excerpt for CVD

Issue Statement: Primary Root Causes and Solutions for Premature CVD and MI need to be Prioritised

	<b>HYPOTHESIS</b>	<b>EVIDENCE FOR</b>	<b>EVIDENCE AGAINST</b>
<b>1</b>	<b>HYPERINSULINEMIA - INSULIN RESISTANCE</b>	Overwhelming <b>COMPARATIVE/ASSOCIATIONAL</b> evidence from case-control, prospective observational, epidemiological, ecological and other comparative studies. Hazard ratios impressive and consistent	Insulinoma patients lack expected degree of issue?
		Overwhelming <b>MECHANISTIC</b> evidence from scientific literature - HI/IR interacts through myriad pathways that exacerbate and drive CVD & MI. Also, what drives HI consistently can be shown to link intimately to processes which drive CVD & MI	N/A
		<b>EXPERIMENTAL</b> evidence from animal and other studies in support	N/A
		<b>EXPERIMENTAL</b> evidence from pharmaceutical RCT's is limited - improving insulin dynamics has not been really targeted	N/A
		<b>OTHER</b> - longest lived organisms unified by lower Insulin / IGF-1 etc.	
		Blah Blah Blah...	

<b>2</b>	<b>"BAD CHOLESTEROL" LDL</b>	<b>COMPARATIVE/ASSOCIATIONAL</b> evidence from prospective observational, epidemiological, ecological and other comparative studies.	
		<b>MECHANISTIC</b> evidence from scientific literature	
		<b>EXPERIMENTAL</b> evidence from pharmaceutical RCT's and nutritional interventions - LDL drops in population, event rates are lowered	
		Blah Blah Blah...	

# C Hypothesis For/Against Excerpt for CVD

Issue Statement: Primary Root Causes and Solutions for Premature CVD and MI need to be Prioritised

	<b>HYPOTHESIS</b>	<b>EVIDENCE FOR</b>	<b>EVIDENCE AGAINST</b>
<b>1</b>	<b>HYPERINSULINEMIA - INSULIN RESISTANCE</b>	Overwhelming <b>COMPARATIVE/ASSOCIATIONAL</b> evidence from case-control, prospective observational, epidemiological, ecological and other comparative studies. Hazard ratios impressive and consistent	Insulinoma patients lack expected degree of issue?
		Overwhelming <b>MECHANISTIC</b> evidence from scientific literature - HI/IR interacts through myriad pathways that exacerbate and drive CVD & MI. Also, what drives HI consistently can be shown to link intimately to processes which drive CVD & MI	N/A
		<b>EXPERIMENTAL</b> evidence from animal and other studies in support	N/A
		<b>EXPERIMENTAL</b> evidence from pharmaceutical RCT's is limited - improving insulin dynamics has not been really targeted	N/A
		<b>OTHER</b> - longest lived organisms unified by lower Insulin / IGF-1 etc.	
		Blah Blah Blah...	

<b>2</b>	<b>"BAD CHOLESTEROL" LDL</b>	<b>COMPARATIVE/ASSOCIATIONAL</b> evidence from prospective observational, epidemiological, ecological and other comparative studies.	<ul style="list-style-type: none"> <li>* Hazard ratios not impressive and inconsistent.</li> <li>* Many studies show no relationship of any note.</li> <li>* Case-control generally no LDL difference between diseased and well.</li> <li>* Even in FH, prematurely diseased have same LDL as those aging healthily</li> <li>* In ~20 studies, calcification extent didn't correlate with LDL levels</li> <li>* In autopsies, atherosclerosis extent didn't correlate with LDL levels</li> </ul> Blah Blah Blah....Blah.
		<b>MECHANISTIC</b> evidence from scientific literature	LDL lipoproteins glycated, damaged or modified would make sense - but latter due to effect of other genuine causes
		<b>EXPERIMENTAL</b> evidence from pharmaceutical RCT's and nutritional interventions - LDL drops in population, event rates are lowered	<ul style="list-style-type: none"> <li>* Multiple analyses show that event-reduction extent does not correspond to LDL-lowering extent across individuals</li> <li>* These analyses show that ferritin, CRP and other trial measures DO actually track in dose-response fashion</li> </ul> Blah Blah Blah...
		Blah Blah Blah...	Blah Blah Blah...

# C Hypothesis For/Against Excerpt for CVD

Issue Statement: Primary Root Causes and Solutions for Premature CVD and MI need to be Prioritised

	HYPOTHESIS	EVIDENCE FOR	EVIDENCE AGAINST
1	HYPERINSULINEMIA - INSULIN RESISTANCE	Overwhelming COMPARATIVE/ASSOCIATIONAL evidence from case-control, prospective observational, epidemiological, ecological and other comparative studies. Hazard ratios impressive and consistent	Insulinoma patients lack expected degree of issue?
		Overwhelming MECHANISTIC evidence from scientific literature - HI/IR interacts through myriad pathways that exacerbate and drive CVD & MI. Also, what drives HI/IR consistently can be shown to link intimately to processes which drive CVD & MI	N/A
		EXPERIMENTAL evidence from animal and other studies in support	N/A
		EXPERIMENTAL evidence from pharmaceutical RCT's is limited - improving insulin dynamics has not been really targeted	N/A
		OTHER - longest lived organisms unified by lower Insulin / IGF-1 etc.	
		Blah Blah Blah...	

2	"BAD CHOLESTEROL" LDL	COMPARATIVE/ASSOCIATIONAL evidence from prospective observational, epidemiological, ecological and other comparative studies.	<ul style="list-style-type: none"> <li>* Hazard ratios not impressive and inconsistent.</li> <li>* Many studies show no relationship of any note.</li> <li>* Case-control generally no LDL difference between diseased and well.</li> <li>* Even in FH, prematurely diseased have same LDL as those aging healthily</li> <li>* In ~20 studies, calcification extent didn't correlate with LDL levels</li> <li>* In autopsies, atherosclerosis extent didn't correlate with LDL levels</li> <li>Blah Blah Blah....Blah.</li> </ul>	
		MECHANISTIC evidence from scientific literature		LDL lipoproteins glycated, damaged or oxidized would make sense - but latter due to effect of other genetic causes
		EXPERIMENTAL evidence from pharmaceutical RCT's and nutritional interventions - LDL drops in population, event rates are lowered		<ul style="list-style-type: none"> <li>* Multiple analyses show that event-reduction extent does not correspond to LDL-lowering extent across individuals</li> <li>* These analyses show that ferritin, CRP and other trial measures DO actually track in dose-response fashion</li> </ul>
		Blah Blah Blah...		Blah Blah Blah...

# C Hypothesis For/Against Excerpt for CVD

Issue Statement: Primary Root Causes and Solutions for Premature CVD and MI need to be Prioritised

	HYPOTHESIS	EVIDENCE FOR	EVIDENCE AGAINST
1	HYPERINSULINEMIA - INSULIN RESISTANCE	Overwhelming COMPARATIVE/ASSOCIATIONAL evidence from case-control, prospective observational, epidemiological, ecological and other comparative studies. Hazard ratios impressive and consistent	Insulinoma patients lack expected degree of issue?
		Overwhelming MECHANISTIC evidence from scientific literature - HI/IR interacts through myriad pathways that exacerbate and drive CVD & MI. Also, what drives HI/IR consistently can be shown to link intimately to processes which drive CVD & MI	N/A
		EXPERIMENTAL evidence from animal and other studies in support	N/A
		EXPERIMENTAL evidence from pharmaceutical RCT's is limited - improving insulin dynamics has not been really targeted	N/A
		OTHER - longest lived organisms unified by lower Insulin / IGF-1 etc.	
		Blah Blah Blah...	



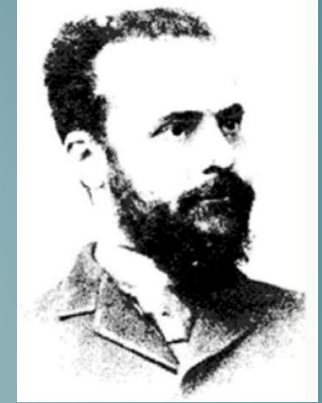
2	"BAD CHOLESTEROL" LDL	COMPARATIVE/ASSOCIATIONAL evidence from prospective observational, epidemiological, ecological and other comparative studies.	<ul style="list-style-type: none"> <li>* Hazard ratios not impressive and inconsistent.</li> <li>* Many studies show no relationship of any note.</li> <li>* Case-control generally no LDL difference between diseased and well.</li> <li>* Even in FH, prematurely diseased have same LDL as those aging healthily</li> <li>* In ~20 studies, calcification extent didn't correlate with LDL levels</li> <li>* In autopsies, atherosclerosis extent didn't correlate with LDL levels</li> <li>Blah Blah Blah....Blah.</li> </ul>	
		MECHANISTIC evidence from scientific literature		LDL lipoproteins glycated, damaged or oxidized would make sense - but latter due to effect of other genetic causes
		EXPERIMENTAL evidence from pharmaceutical RCT's and nutritional interventions - LDL drops in population, event rates are lowered		<ul style="list-style-type: none"> <li>* Multiple analyses show that event-reduction extent does not correspond to LDL-lowering extent across individuals</li> <li>* These analyses show that ferritin, CRP and other trial measures DO actually track in dose-response fashion</li> </ul>
		Blah Blah Blah...		Blah Blah Blah...



# C Hypothesis For/Against Excerpt for CVD

Issue Statement: Primary Root Causes and Solutions for Premature CVD and MI need to be Prioritised

	HYPOTHESIS	EVIDENCE FOR	EVIDENCE AGAINST
1	HYPERINSULINEMIA - INSULIN RESISTANCE	Overwhelming COMPARATIVE/ASSOCIATIONAL evidence from case-control, prospective observational, epidemiological, ecological and other comparative studies. Hazard ratios impressive and consistent	Insulinoma patients lack expected degree of issue?
		Overwhelming MECHANISTIC evidence from scientific literature - HI/IR interacts through myriad pathways that exacerbate and drive CVD & MI. Also, what drives HI/IR consistently can be shown to link intimately to processes which drive CVD & MI	N/A
		EXPERIMENTAL evidence from animal and other studies in support	N/A
		EXPERIMENTAL evidence from pharmaceutical RCT's is limited - improving insulin dynamics has not been really targeted	N/A
		OTHER - longest lived organisms unified by lower Insulin / IGF-1 etc.	
		Blah Blah Blah...	



2	"BAD CHOLESTEROL" LDL	COMPARATIVE/ASSOCIATIONAL evidence from prospective observational, epidemiological, ecological and other comparative studies.	<ul style="list-style-type: none"> <li>* Hazard ratios not impressive and inconsistent.</li> <li>* Many studies show no relationship of any note.</li> <li>* Case-control generally no LDL difference between diseased and well.</li> <li>* Even in FH, prematurely diseased have same LDL as those aging healthily</li> <li>* In ~20 studies, calcification extent didn't correlate with LDL levels</li> <li>* In autopsies, atherosclerosis extent didn't correlate with LDL levels</li> <li>Blah Blah Blah....Blah.</li> </ul>
		MECHANISTIC evidence from scientific literature	LDL lipoproteins glycated, damaged or oxidized would make sense - but latter due to effect of other genetic causes
		EXPERIMENTAL evidence from pharmaceutical RCT's and nutritional interventions - LDL drops in population, event rates are lowered	<ul style="list-style-type: none"> <li>* Multiple analyses show that event-reduction extent does not correspond to LDL-lowering extent across individuals</li> <li>* These analyses show that ferritin, CRP and other trial measures DO actually track in dose-response fashion</li> </ul>
		Blah Blah Blah...	Blah Blah Blah...



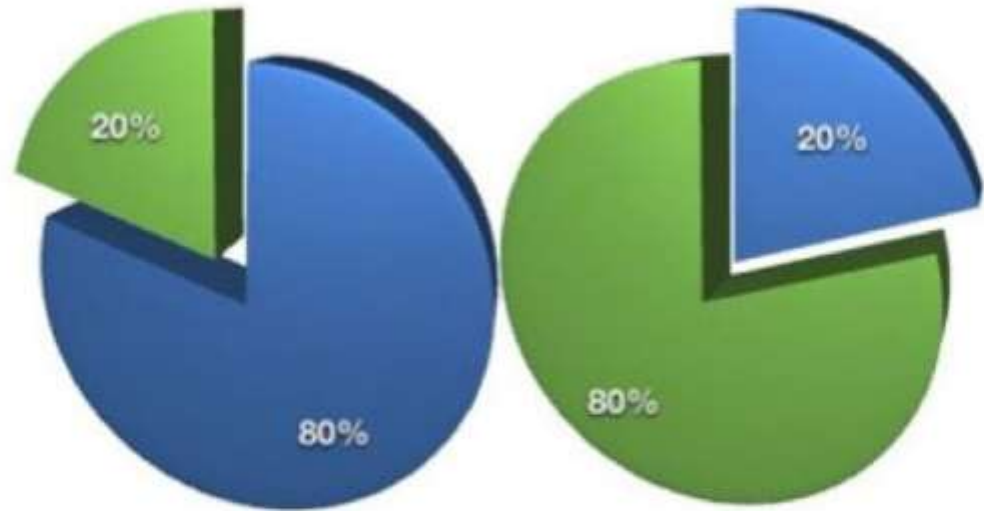
# PART 3

Heart & Chronic Disease  
*- the Solution Space*

# Always Honor Pareto



## Pareto Principle



20% of the input (time, resources, effort)  
accounts for 80% of the output (results, rewards)

# RACK and STACK – and RESOLVE

CAUSE	DO	DON'T DO	MAIN MECHS
 		 	Insulin Resistance Hyperglycemia Inflammatory vectors Etc.













# RACK and STACK – and RESOLVE

CAUSE	DO	DON'T DO	MAIN MECHS
<p>Excess Fructose</p> <p>Excess Glucose</p>	<p>How to Eat LCHF</p> 	 	<p>Insulin Resistance</p> <p>Hyperglycemia</p> <p>Inflammatory vectors</p> <p>Etc.</p>
<p>Sub-Opt Omega 3</p> <p>Excess Omega 6</p>	 	 	<p>Inflammatory vectors</p> <p>Cellular damage</p>

# RACK and STACK – and RESOLVE

CAUSE	DO	DON'T DO	MAIN MECHS
<p>Excess Fructose</p> <p>Excess Glucose</p>	<p>How to Eat <b>LCHF</b></p> 	 	<p>Insulin Resistance</p> <p>Hyperglycemia</p> <p>Inflammatory vectors</p> <p>Etc.</p>
<p>Sub-Opt Omega 3</p> <p>Excess Omega 6</p>		 	<p>Inflammatory vectors</p> <p>Cellular damage</p>
<p><b>Sub-Optimum Magnesium</b></p>			<p>Biochemical Basics</p>

# RACK and STACK – and RESOLVE

CAUSE	DO	DON'T DO	MAIN MECHS
<p>Excess Fructose</p> <p>Excess Glucose</p>	<p>How to Eat <b>LCHF</b></p> 	 	<p>Insulin Resistance</p> <p>Hyperglycemia</p> <p>Inflammatory vectors</p> <p>Etc.</p>
<p>Sub-Opt Omega 3</p> <p>Excess Omega 6</p>	 	 	<p>Inflammatory vectors</p> <p>Cellular damage</p>
<p>Sub-Optimum Magnesium</p>	 		<p>Biochemical Basics</p>
<p>Lack of UV Vit D / NO</p>	  	 	<p>Biochemical Basics</p>

# RACK and STACK – and RESOLVE

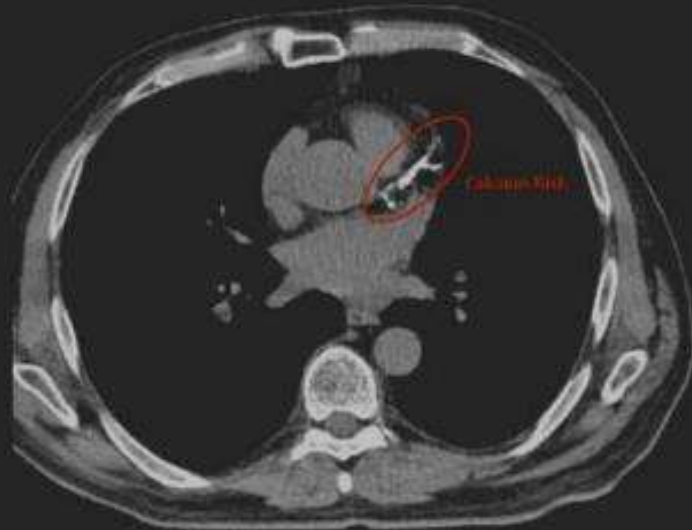
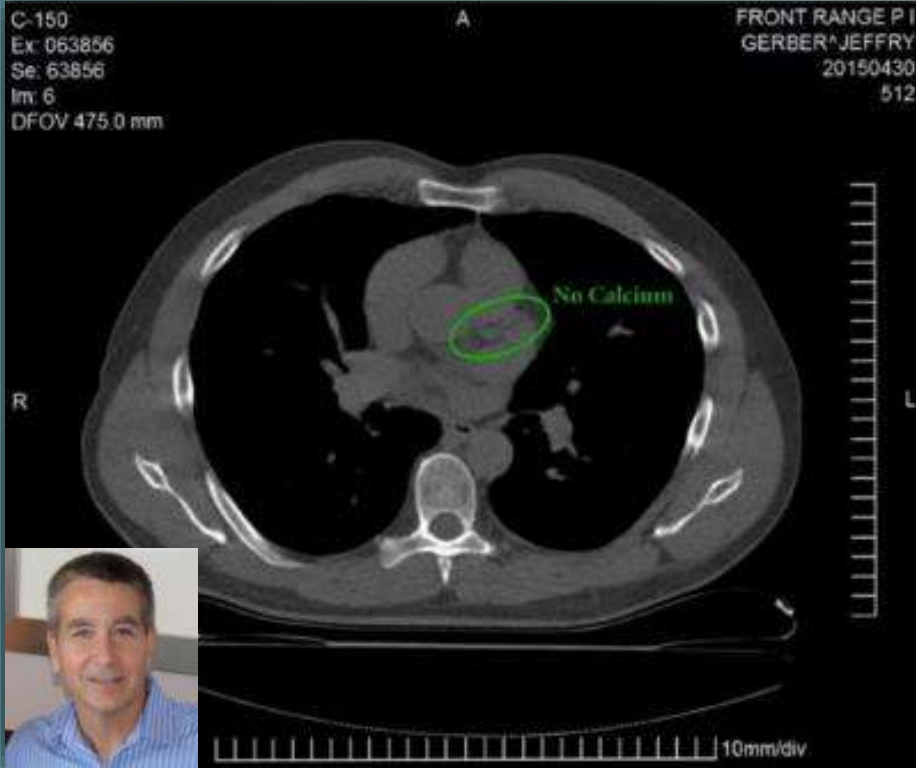
CAUSE	DO	DON'T DO	MAIN MECHS
<p>Excess Fructose    Excess Glucose</p>	<p>How to Eat <b>LCHF</b></p> 	 	<p>Insulin Resistance Hyperglycemia Inflammatory vectors Etc.</p>
<p>Sub-Opt Omega 3    Excess Omega 6</p>	 	 	<p>Inflammatory vectors Cellular damage</p>
<p>Sub-Optimum Magnesium</p>	 		<p>Biochemical Basics</p>
<p>Lack of UV Vit D / NO</p>	  	 	<p>Biochemical Basics</p>
<p><b>And so on...</b></p>	<p>Move on down the Pareto...</p>	 <p>Many and varied...</p>	



# PART 4

If you Don't Measure It  
- *it Don't Get Fixed*

# CAC: THE MASTER MEASURE



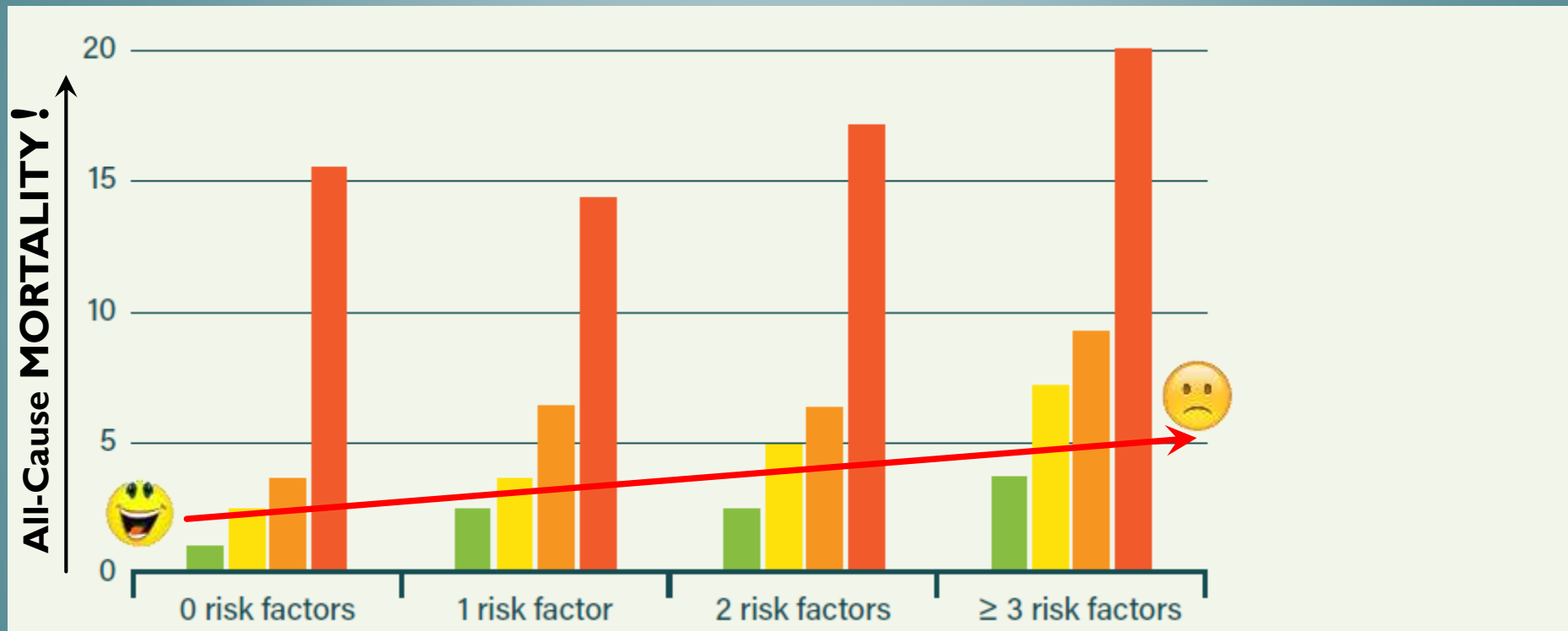
# CAC: THE **MASTER** MEASURE

Calcium Score	Risk Equivalent	10-Year Event Rate, %
0	Very low	1.1-1.7
1-100	Low	2.3-5.9
101-400	Intermediate	12.8-16.4
>400	High	22.5-28.6
>1000	Very high	37

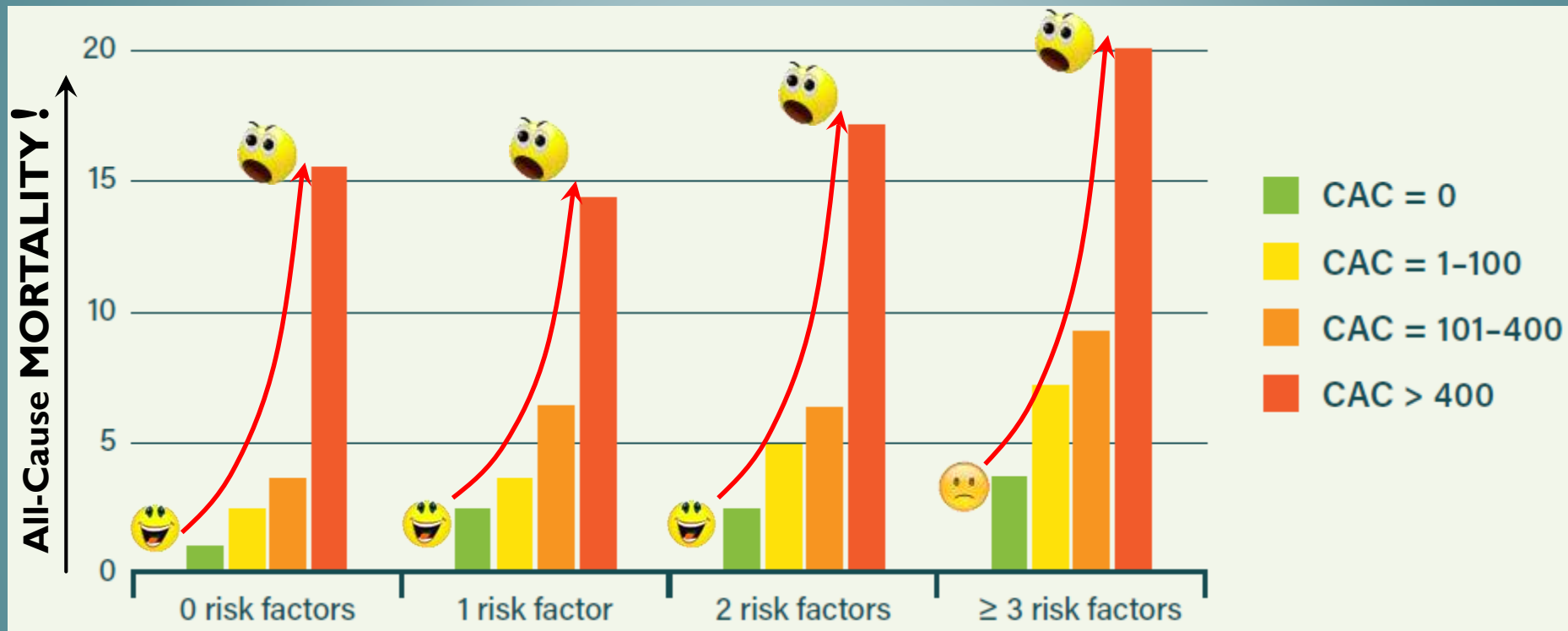
Reproducible and quantifiable

Based on 100's of thousands of subjects

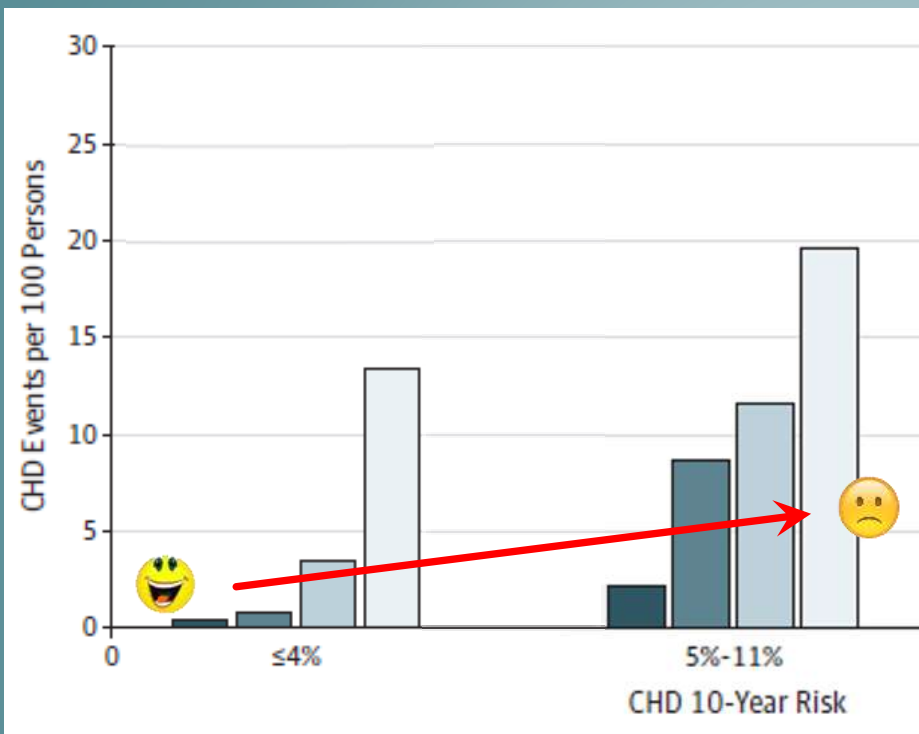
# CAC: THE MASTER MEASURE – Always Performs



# CAC: THE MASTER MEASURE – Always Performs



# CAC: THE **MASTER** MEASURE - Feb 8th 2017 Study



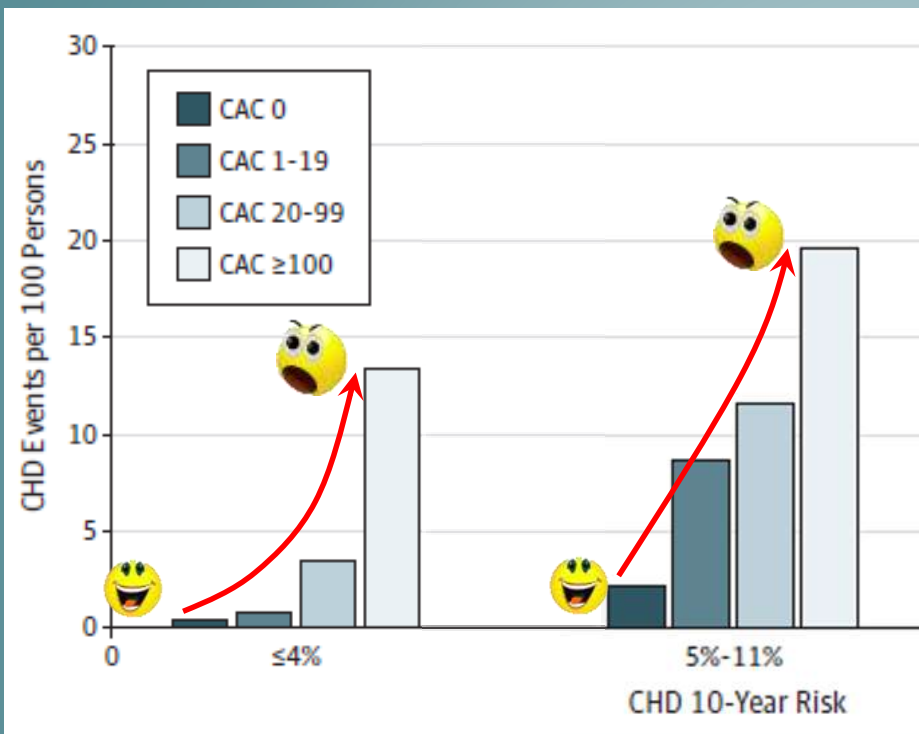
- Adults aged 32 to 46 followed
- Mean event follow-up 12.5 years
- CAC score makes a farce of “risk factors”
- ...because it ain’t guessing.

“Association of Coronary Artery Calcium in Adults Aged 32 to 46 Years With Incident Coronary Heart Disease and Death”

*JAMA Cardiol.* doi:10.1001/jamacardio.2016.5493

Published online February 8, 2017.

# CAC: THE MASTER MEASURE - Feb 8th 2017 Study



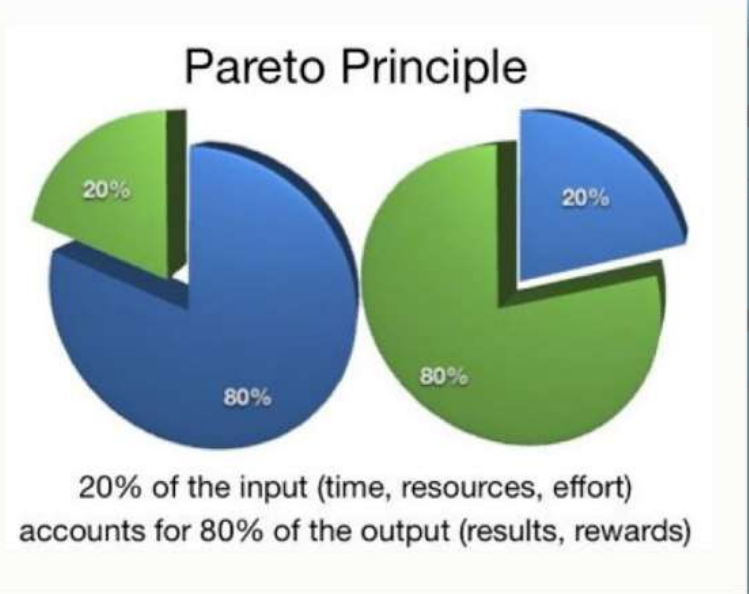
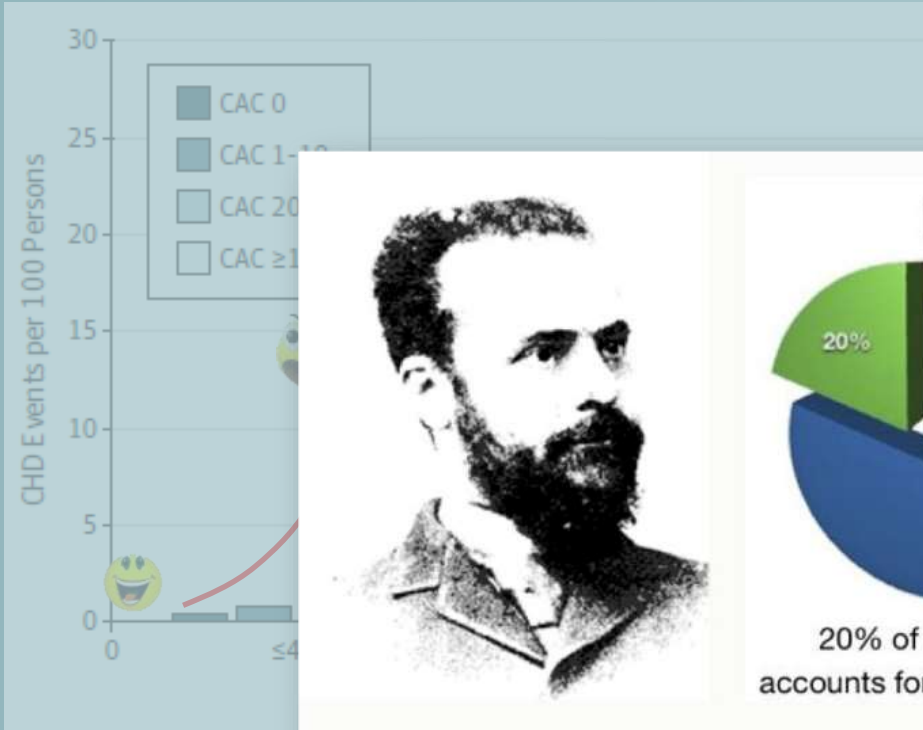
- Adults aged 32 to 46 followed
- Mean event follow-up 12.5 years
- CAC score makes a farce of “risk factors”
- ...because it ain’t guessing.

“Association of Coronary Artery Calcium in Adults Aged 32 to 46 Years With Incident Coronary Heart Disease and Death”

*JAMA Cardiol.* doi:10.1001/jamacardio.2016.5493

Published online February 8, 2017.

# CAC: THE MASTER MEASURE - Feb 8th 2017 Study



followed  
p 12.5 years  
farce of “risk  
essing.

“Association of Coronary Artery Calcium in Adults Aged 32 to 46 Years With Incident Coronary Heart Disease and Death”

*JAMA Cardiol.* doi:10.1001/jamacardio.2016.5493

Published online February 8, 2017.



# David Bobbett – one of the Saved



- \* CEO/Owner of H&K International
- \* 52 years old, slim and fit non-smoker
- \* Jogging ~4 times per week
- \* Described by docs as “bulletproof”

# David Bobbett – one of the Saved



- \* CEO/Owner of H&K International
- \* 52 years old, slim and fit non-smoker
- \* Jogging ~4 times per week
- \* **Described by docs as “bulletproof”**



- \* 15 executive medicals...
- \* All Bloods Good
- \* Treadmill Stress Tests/ECG
- \* Fittest 10% for age

# David Bobbett – one of the Saved



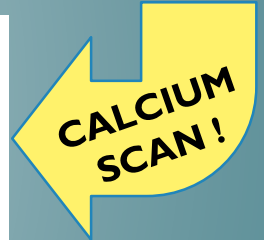
- \* CEO/Owner of H&K International
- \* 52 years old, slim and fit non-smoker
- \* Jogging ~4 times per week
- \* **Described by docs as “bulletproof”**



- \* 15 executive medicals...
- \* All Bloods Good
- \* Treadmill Stress Tests/ECG
- \* Fittest 10% for age



- \* **CAC=906 ! Worst 1% for age.**
- \* **75% chance of Heart Attack**
- \* **CAC supersedes all tests**



# David Bobbett – one of the Saved



- \* CEO/Owner of H&K International
- \* 52 years old, slim and fit non-smoker
- \* Jogging ~4 times per week
- \* **Described by docs as “bulletproof”**

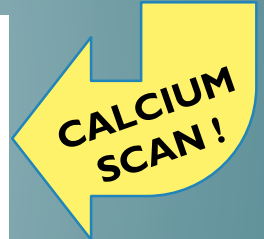


- \* 15 executive medicals...
- \* All Bloods Good
- \* Treadmill Stress Tests/ECG
- \* Fittest 10% for age

- \* Angio shows **severe** blockages
- \* No Surgery - meds+lifestyle fix
- \* **David takes 6mths to study**



- \* **CAC=906 ! Worst 1% for age.**
- \* **75% chance of Heart Attack**
- \* **CAC supersedes all tests**



# David Bobbett – one of the Saved



- \* CEO/Owner of H&K International
- \* 52 years old, slim and fit non-smoker
- \* Jogging ~4 times per week
- \* **Described by docs as “bulletproof”**

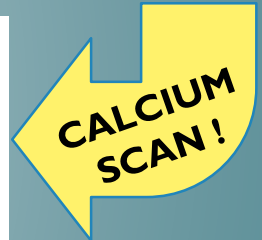


- \* 15 executive medicals...
- \* All Bloods Good
- \* Treadmill Stress Tests/ECG
- \* Fittest 10% for age

- \* Angio shows **severe** blockages
- \* No Surgery - meds+lifestyle fix
- \* **David takes 6mths to study**



- \* **CAC=906 ! Worst 1% for age.**
- \* **75% chance of Heart Attack**
- \* **CAC supersedes all tests**



- \* **He was *diabetic*, undiagnosed**
- \* **But Heart Disease IS resolvable**
- \* **Meds + nutrition excellent path**

# David Bobbett – one of the Saved



- \* CEO/Owner of H&K International
- \* 52 years old, slim and fit non-smoker
- \* Jogging ~4 times per week
- \* **Described by docs as “bulletproof”**

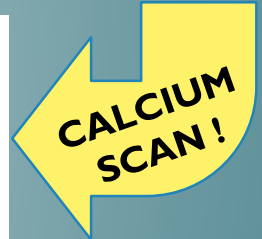


- \* 15 executive medicals...
- \* All Bloods Good
- \* Treadmill Stress Tests/ECG
- \* Fittest 10% for age

- \* Angio shows **severe** blockages
- \* No Surgery - meds+lifestyle fix
- \* **David takes 6mths to study**



- \* **CAC=906 ! Worst 1% for age.**
- \* **75% chance of Heart Attack**
- \* **CAC supersedes all tests**



- \* **He was diabetic, undiagnosed**
- \* **But Heart Disease IS resolvable**
- \* **Meds + nutrition excellent path**



- \* Resolved his disease process
- \* Founded **www.IHDA.ie**
- \* Funded The Widowmaker Movie
- \* **Total Philanthropy**







Middle-Risk?



Middle-aged?





Middle-Risk?



Middle-aged?



**CAC**  
*The  
Ultimate  
Decider*



Middle-Risk?



Middle-aged?



**CAC**  
*The Ultimate Decider*

SCORE  
LOW



+

CAUSE	DO	DONT DO	MAIN MECHS



Middle-Risk?



Middle-aged?



**CAC**  
The  
Ultimate  
Decider

SCORE  
LOW



+

CAUSE	DO	DONT DO	MAIN MECHS



5-7 years...



**CAC**



HIGH SCORE

LOW SCORE

Middle-Risk?



Middle-aged?

**CAC**  
The  
Ultimate  
Decider



+

CAUSE	DO	DONT DO	MAIN MECHS
<ul style="list-style-type: none"> <li>High cholesterol</li> <li>High blood pressure</li> <li>Diabetes</li> <li>Smoking</li> <li>Obesity</li> <li>Family history</li> </ul>	<ul style="list-style-type: none"> <li>Control cholesterol</li> <li>Control blood pressure</li> <li>Control diabetes</li> <li>Quit smoking</li> <li>Control weight</li> <li>Control blood sugar</li> </ul>	<ul style="list-style-type: none"> <li>Don't smoke</li> <li>Don't drink alcohol</li> <li>Don't eat high-fat, high-salt, high-sugar foods</li> <li>Don't be sedentary</li> <li>Don't ignore symptoms</li> </ul>	<ul style="list-style-type: none"> <li>LDL cholesterol</li> <li>HDL cholesterol</li> <li>Triglycerides</li> <li>Blood pressure</li> <li>Blood sugar</li> <li>Insulin resistance</li> </ul>
<ul style="list-style-type: none"> <li>High cholesterol</li> <li>High blood pressure</li> <li>Diabetes</li> <li>Smoking</li> <li>Obesity</li> <li>Family history</li> </ul>	<ul style="list-style-type: none"> <li>Control cholesterol</li> <li>Control blood pressure</li> <li>Control diabetes</li> <li>Quit smoking</li> <li>Control weight</li> <li>Control blood sugar</li> </ul>	<ul style="list-style-type: none"> <li>Don't smoke</li> <li>Don't drink alcohol</li> <li>Don't eat high-fat, high-salt, high-sugar foods</li> <li>Don't be sedentary</li> <li>Don't ignore symptoms</li> </ul>	<ul style="list-style-type: none"> <li>LDL cholesterol</li> <li>HDL cholesterol</li> <li>Triglycerides</li> <li>Blood pressure</li> <li>Blood sugar</li> <li>Insulin resistance</li> </ul>
<ul style="list-style-type: none"> <li>High cholesterol</li> <li>High blood pressure</li> <li>Diabetes</li> <li>Smoking</li> <li>Obesity</li> <li>Family history</li> </ul>	<ul style="list-style-type: none"> <li>Control cholesterol</li> <li>Control blood pressure</li> <li>Control diabetes</li> <li>Quit smoking</li> <li>Control weight</li> <li>Control blood sugar</li> </ul>	<ul style="list-style-type: none"> <li>Don't smoke</li> <li>Don't drink alcohol</li> <li>Don't eat high-fat, high-salt, high-sugar foods</li> <li>Don't be sedentary</li> <li>Don't ignore symptoms</li> </ul>	<ul style="list-style-type: none"> <li>LDL cholesterol</li> <li>HDL cholesterol</li> <li>Triglycerides</li> <li>Blood pressure</li> <li>Blood sugar</li> <li>Insulin resistance</li> </ul>
<ul style="list-style-type: none"> <li>High cholesterol</li> <li>High blood pressure</li> <li>Diabetes</li> <li>Smoking</li> <li>Obesity</li> <li>Family history</li> </ul>	<ul style="list-style-type: none"> <li>Control cholesterol</li> <li>Control blood pressure</li> <li>Control diabetes</li> <li>Quit smoking</li> <li>Control weight</li> <li>Control blood sugar</li> </ul>	<ul style="list-style-type: none"> <li>Don't smoke</li> <li>Don't drink alcohol</li> <li>Don't eat high-fat, high-salt, high-sugar foods</li> <li>Don't be sedentary</li> <li>Don't ignore symptoms</li> </ul>	<ul style="list-style-type: none"> <li>LDL cholesterol</li> <li>HDL cholesterol</li> <li>Triglycerides</li> <li>Blood pressure</li> <li>Blood sugar</li> <li>Insulin resistance</li> </ul>

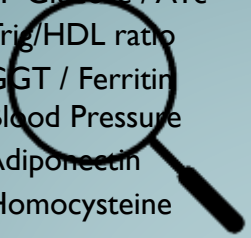
5-7 years...



**CAC**



- PP Insulin Level
- PP Glucose / A1c
- Trig/HDL ratio
- GGT / Ferritin
- Blood Pressure
- Adiponectin
- Homocysteine
- sdLDL, ApoB/ApoA1
- Etc. etc.



HIGH SCORE

Middle-Risk?



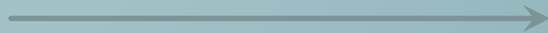
Middle-aged?

**CAC**  
The  
Ultimate  
Decider

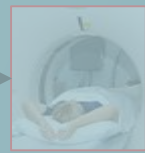
LOW SCORE



CAUSE	DO	DONT DO	MAIN MECHS
High Blood Pressure	Control Blood Pressure	Don't smoke	High Blood Pressure
High Cholesterol	Control Cholesterol	Don't smoke	High Cholesterol
High Blood Sugar	Control Blood Sugar	Don't smoke	High Blood Sugar
High Triglycerides	Control Triglycerides	Don't smoke	High Triglycerides
High C-Reactive Protein	Control C-Reactive Protein	Don't smoke	High C-Reactive Protein
High Homocysteine	Control Homocysteine	Don't smoke	High Homocysteine
High Fibrinogen	Control Fibrinogen	Don't smoke	High Fibrinogen
High Insulin	Control Insulin	Don't smoke	High Insulin
High Ferritin	Control Ferritin	Don't smoke	High Ferritin
High GGT	Control GGT	Don't smoke	High GGT
High Adiponectin	Control Adiponectin	Don't smoke	High Adiponectin
High Homocysteine	Control Homocysteine	Don't smoke	High Homocysteine
High sdLDL	Control sdLDL	Don't smoke	High sdLDL
High ApoB	Control ApoB	Don't smoke	High ApoB
High ApoA1	Control ApoA1	Don't smoke	High ApoA1
High Etc. etc.	Control Etc. etc.	Don't smoke	High Etc. etc.



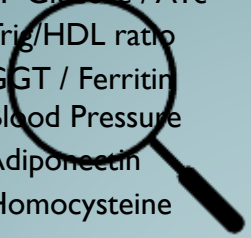
5-7 years...



**CAC**



PP Insulin Level  
 PP Glucose / A1c  
 Trig/HDL ratio  
 GGT / Ferritin  
 Blood Pressure  
 Adiponectin  
 Homocysteine  
 sdLDL, ApoB/ApoA1  
 Etc. etc.



**HIGH  
SCORE**

Middle-Risk?



Middle-aged?

**CAC**  
*The  
 Ultimate  
 Decider*

**LOW  
SCORE**



CAUSE	DO	DONT DO	MAIN MECHS
			LDL cholesterol LDL particle number
			Inflammation CRP, IL-6, etc.
			Endothelial dysfunction
			Insulin resistance
			Hypertension



*5-7 years...*



**CAC**



PP Insulin Level  
 PP Glucose / A1c  
 Trig/HDL ratio  
 GGT / Ferritin  
 Blood Pressure  
 Adiponectin  
 Homocysteine  
 sdLDL, ApoB/ApoA1  
 Etc. etc.

+

CAUSE	DO	DON'T DO	MAIN MECHS	
<div style="display: flex; justify-content: space-between;"> <div>Excess Fructose</div> <div>Excess Glucose</div> </div>	How to Eat LCHF			Insulin Resistance Hyperglycemia Inflammatory vectors
<div style="display: flex; justify-content: space-between;"> <div>Sub-Opt Omega 3</div> <div>Excess Omega 6</div> </div>				Inflammatory vectors Cellular damage
Sub-Optimum Magnesium				Biochemical Basics
Lack of UP / Y4D / NO				Biochemical Basics
And so on...	Move on down the Pareto...			Many and varied...

HIGH SCORE



**CAC**  
 The  
 Ultimate  
 Decider

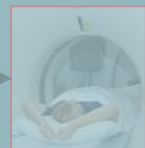
LOW SCORE



+

CAUSE	DO	DONT DO	MAIN MECHS	
<div style="display: flex; justify-content: space-between;"> <div>Excess Fructose</div> <div>Excess Glucose</div> </div>	How to Eat LCHF			Insulin Resistance Hyperglycemia Inflammatory vectors
<div style="display: flex; justify-content: space-between;"> <div>Sub-Opt Omega 3</div> <div>Excess Omega 6</div> </div>				Inflammatory vectors Cellular damage
Sub-Optimum Magnesium				Biochemical Basics
Lack of UP / Y4D / NO				Biochemical Basics
And so on...	Move on down the Pareto...			Many and varied...

5-7 years...



**CAC**

Middle-Risk?



Middle-aged?





PP Insulin Level  
 PP Glucose / A1c  
 Trig/HDL ratio  
 GGT / Ferritin  
 Blood Pressure  
 Adiponectin  
 Homocysteine  
 sdLDL, ApoB/ApoA1  
 Etc. etc.



CAUSE	DO	DON'T DO	MAIN MECHS
<div style="display: flex; justify-content: space-between;"> <div>Excess Fructose</div> <div>Excess Glucose</div> </div>	How to Eat LCHF	<div style="display: flex; justify-content: space-between;"> <div>Excess Fat</div> <div>Excess Sugar</div> </div>	Insulin Resistance Hyperglycemia Inflammatory vectors
<div style="display: flex; justify-content: space-between;"> <div>Sub-Opt Omega 3</div> <div>Excess Omega 6</div> </div>	<div style="display: flex; justify-content: space-around;"> </div>	<div style="display: flex; justify-content: space-between;"> <div>Excess Omega 6</div> <div>Excess Sugar</div> </div>	Inflammatory vectors Cellular damage
Sub-Optimum Magnesium	<div style="display: flex; justify-content: space-around;"> </div>		Biochemical Basics
Lack of UV / VED / NO	<div style="display: flex; justify-content: space-around;"> </div>	<div style="display: flex; justify-content: space-between;"> <div>Excess Sugar</div> <div>Excess Fat</div> </div>	Biochemical Basics
And so on...	Move on down the Pareto...		Many and varied...

HIGH SCORE



**CAC**  
 The  
 Ultimate  
 Decider

LOW SCORE



CAUSE	DO	DONT DO	MAIN MECHS
<div style="display: flex; justify-content: space-between;"> <div>Excess Fructose</div> <div>Excess Glucose</div> </div>	How to Eat LCHF	<div style="display: flex; justify-content: space-between;"> <div>Excess Fat</div> <div>Excess Sugar</div> </div>	Insulin Resistance Hyperglycemia Inflammatory vectors
<div style="display: flex; justify-content: space-between;"> <div>Sub-Opt Omega 3</div> <div>Excess Omega 6</div> </div>	<div style="display: flex; justify-content: space-around;"> </div>	<div style="display: flex; justify-content: space-between;"> <div>Excess Omega 6</div> <div>Excess Sugar</div> </div>	Inflammatory vectors Cellular damage
Sub-Optimum Magnesium	<div style="display: flex; justify-content: space-around;"> </div>		Biochemical Basics
Lack of UV / VED / NO	<div style="display: flex; justify-content: space-around;"> </div>	<div style="display: flex; justify-content: space-between;"> <div>Excess Sugar</div> <div>Excess Fat</div> </div>	Biochemical Basics
And so on...	Move on down the Pareto...		Many and varied...



5-7 years...



**CAC**

Middle-Risk?



Middle-aged?





PP Insulin Level  
 PP Glucose / A1c  
 Trig/HDL ratio  
 GGT / Ferritin  
 Blood Pressure  
 Adiponectin  
 Homocysteine  
 sdLDL, ApoB/ApoA1  
 Etc. etc.

+

CAUSE	DO	DON'T DO	MAIN MECHS
<div style="display: flex; justify-content: space-between;"> <div>Excess Fructose</div> <div>Excess Glucose</div> </div>	How to Eat LCHF	<div style="display: flex; justify-content: space-between;"> <div>Excess Fat</div> <div>Excess Omega 6</div> </div>	Insulin Resistance Hyperglycemia Inflammatory vectors
<div style="display: flex; justify-content: space-between;"> <div>Sub-Opt Omega 3</div> <div>Excess Omega 6</div> </div>		<div style="display: flex; justify-content: space-between;"> <div>Excess Fat</div> <div>Excess Omega 6</div> </div>	Inflammatory vectors Cellular damage
Sub-Optimum Magnesium		<div style="display: flex; justify-content: space-between;"> <div>Excess Fat</div> <div>Excess Omega 6</div> </div>	Biochemical Basics
Lack of UV / Vit D / NO		<div style="display: flex; justify-content: space-between;"> <div>Excess Fat</div> <div>Excess Omega 6</div> </div>	Biochemical Basics
And so on...	<div style="border: 2px dashed red; border-radius: 50%; padding: 5px; display: inline-block;">           Move on down the Pareto...         </div>		Many and varied...

~2yrs



CAC

HIGH SCORE

LOW SCORE

Middle-Risk?



**CAC**  
 The  
 Ultimate  
 Decider

Middle-aged?



+

CAUSE	DO	DONT DO	MAIN MECHS
<div style="display: flex; justify-content: space-between;"> <div>Excess Fructose</div> <div>Excess Glucose</div> </div>	How to Eat LCHF	<div style="display: flex; justify-content: space-between;"> <div>Excess Fat</div> <div>Excess Omega 6</div> </div>	Insulin Resistance Hyperglycemia Inflammatory vectors
<div style="display: flex; justify-content: space-between;"> <div>Sub-Opt Omega 3</div> <div>Excess Omega 6</div> </div>		<div style="display: flex; justify-content: space-between;"> <div>Excess Fat</div> <div>Excess Omega 6</div> </div>	Inflammatory vectors Cellular damage
Sub-Optimum Magnesium		<div style="display: flex; justify-content: space-between;"> <div>Excess Fat</div> <div>Excess Omega 6</div> </div>	Biochemical Basics
Lack of UV / Vit D / NO		<div style="display: flex; justify-content: space-between;"> <div>Excess Fat</div> <div>Excess Omega 6</div> </div>	Biochemical Basics
And so on...	<div style="border: 2px dashed red; border-radius: 50%; padding: 5px; display: inline-block;">           Move on down the Pareto...         </div>		Many and varied...

5-7 years...



CAC

Middle-



Middle-



CAUSE	DO	DON'T DO	MAIN MECHS
Excess Fructose Excess Glucose	How to Eat LCHF		Insulin Resistance Hyperglycemia Inflammatory vectors
Sub-Opt Omega 3 Excess Omega 6	 		Inflammatory vectors Cellular damage
Sub-Optimal Phagocytosis	 		Biochemical Basics
Lack of IYD Yield / NO	  		Biochemical Basics
And so on...	Move on down the Pareto...		Many and varied...

~2yrs  
→



CAC

DO	DONT DO	MAIN MECHS
Move on down the Pareto...		

5-7 years...  
→



CAC



CAC



CAC

Middle-



Middle-

