

# ArcticNet

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## *The International Inuit Cohort: Emergence of Chronic Diseases (Project 1.5)*

*Eric Dewailly, Grace Egeland, Kue Young*

*Laval U., Mc Gill U., U of Toronto*

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Qanuippitaa?

It is better to be healthy than ill or dead. That is the beginning and the end of the only real argument for public health. It is sufficient.

Geoffrey Rose

Any questions?

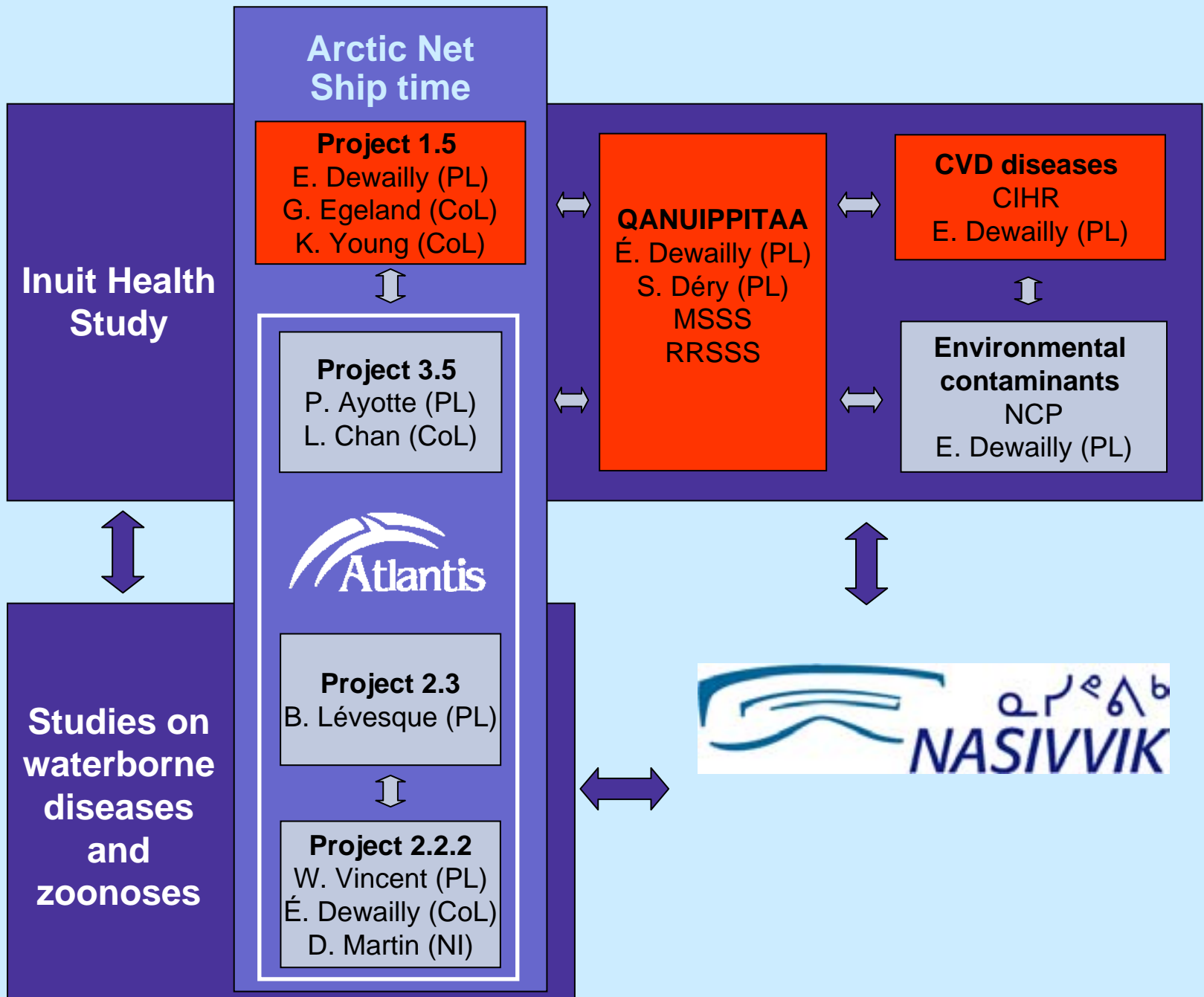
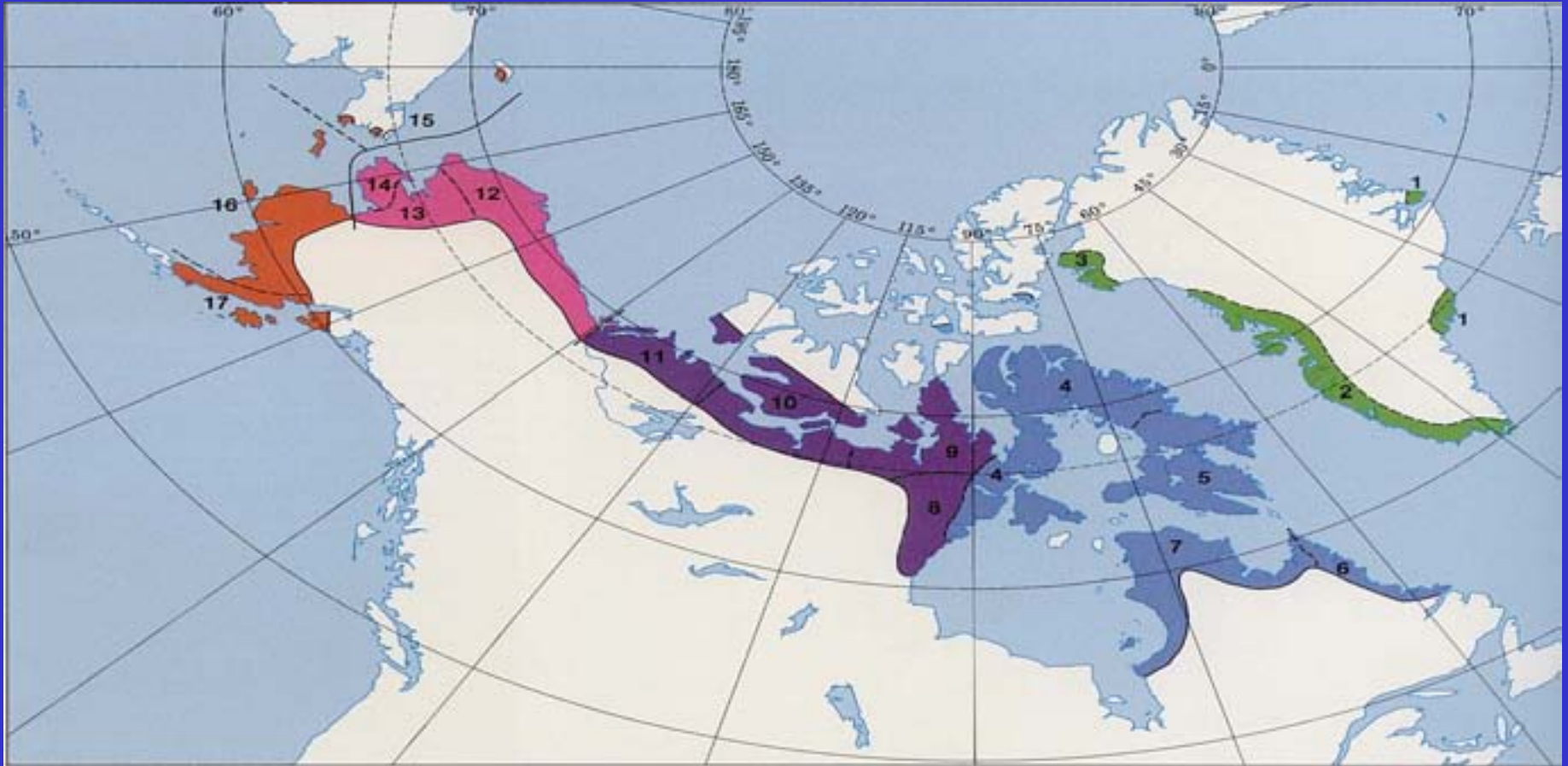


Figure 8

# The Inuit Diet and Health Study

## An International Study of the Impact of Diet on Health and Disease among the Inuit and Yupik











## Study Population

- All permanent Nunavik residents
- Exception of exclusively non-Inuit households and persons living full time in public institutions
- A total 600 Inuit households randomly chosen
- Respondents aged 15 and over.
- Total participants: 1058 (117 aged 15-17)















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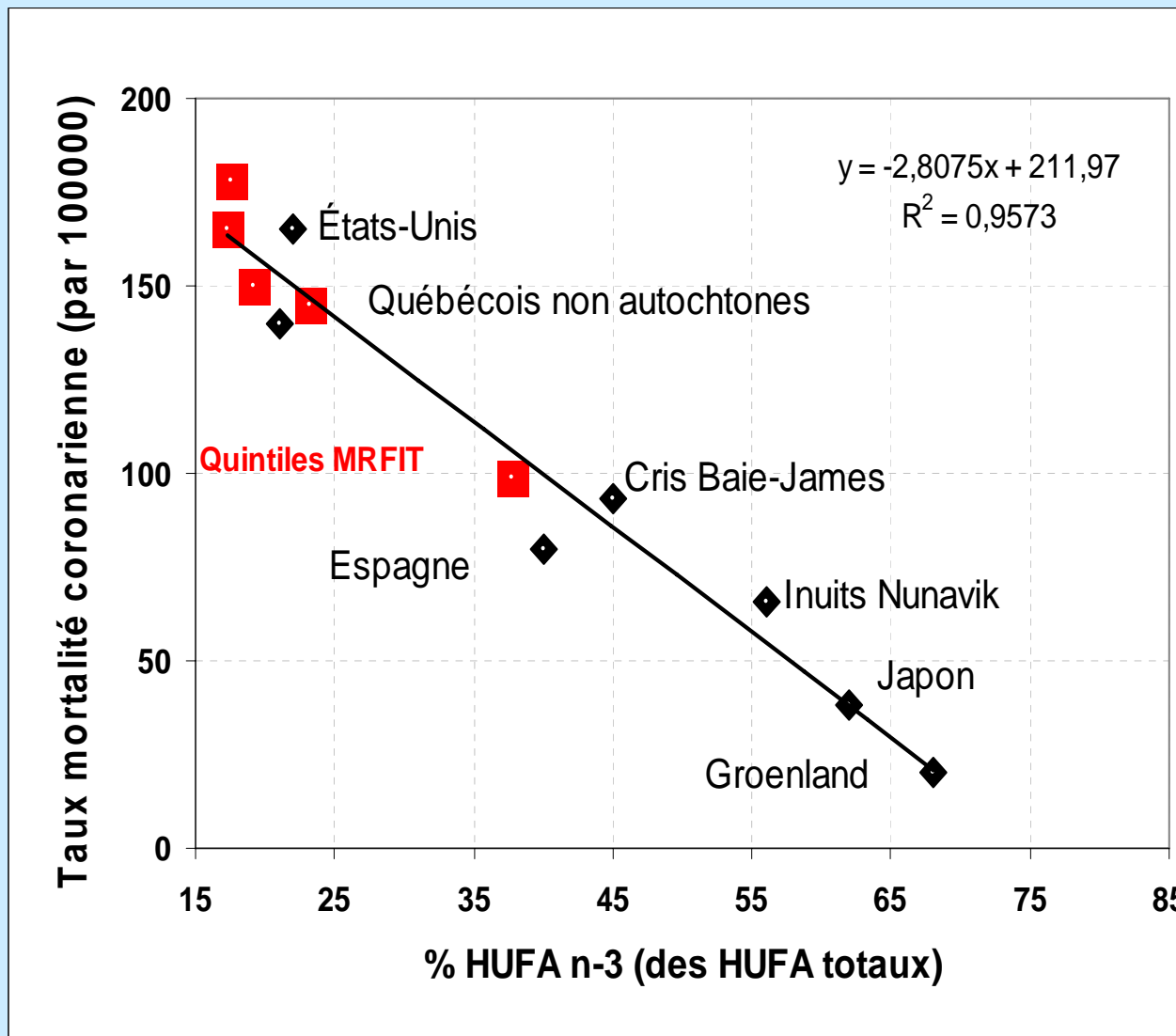
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## Clinical measurements

- Blood pressure
- Height, sitting height, waist and hip
- Corporal impedance + weight
- Cardiac variability (Holter : + than 40 years old)
- Atherosclerosis measurement (carotid)
- Osteoporosis (bone density: women + 35 years old)
- Hearing tests (+ than 18 years old)







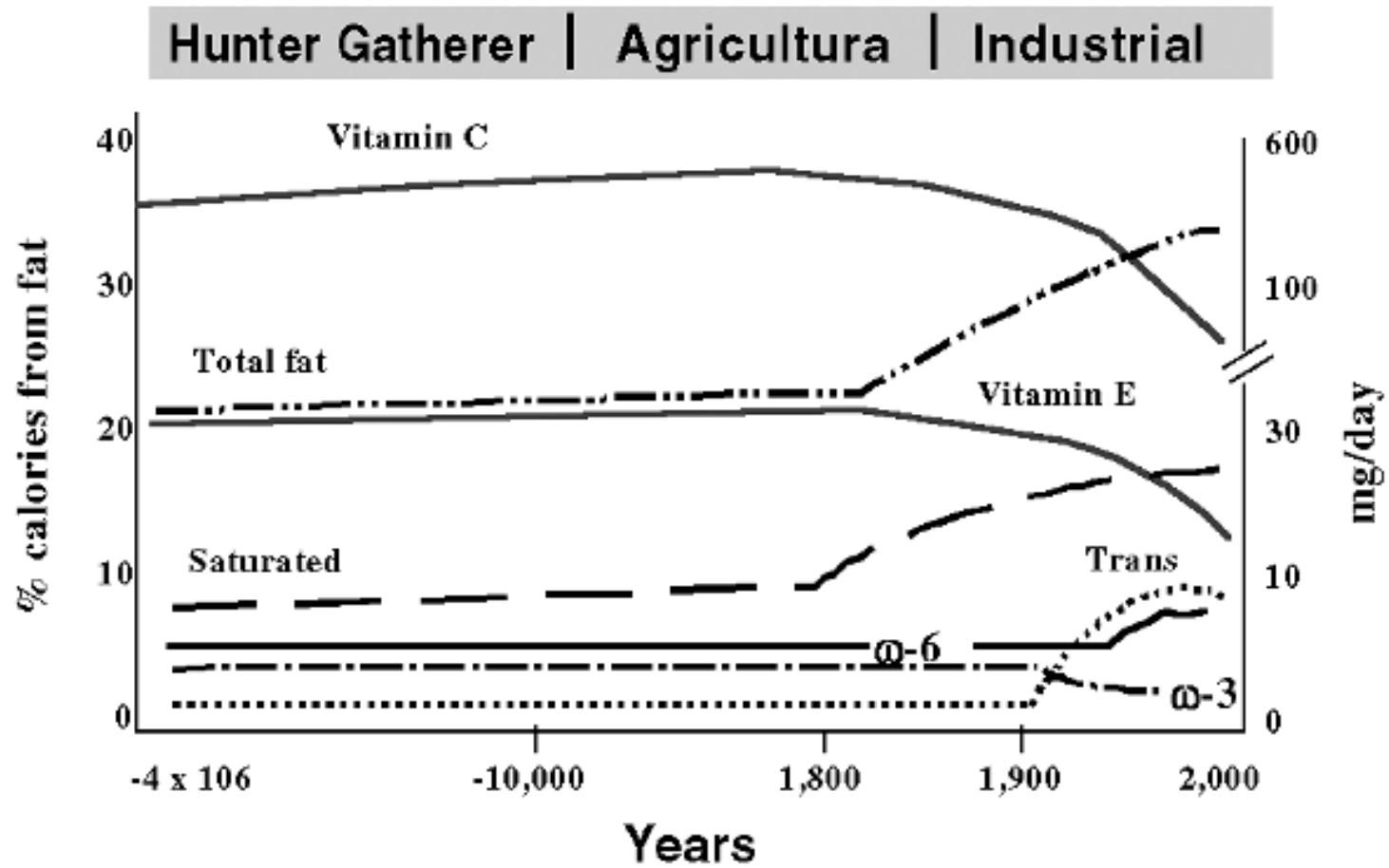
**Association entre taux de mortalités coronariennes ajustés pour l'âge (pour 100000 pers.) et proportions d'oméga-3 dans les acides gras hautement insaturés (HUFA) totaux des tissus.**

Figure reproduite *Lands (2003)* avec permission de l'auteur. %HUFA n-3 (des HUFA totaux) = (HUFA n-3 / HUFA totaux) \* 100

Résultats de Lands et al. 1992. *BBA*. (1180):147-162. Lands et al. 1992. *FASEB J.* (6):2530-2536. Dewailly E. et al. 2002. *Am J Clin Nutr.* 76(1):85-92. Dewailly E. et al. 2002. *Am J Clin Nutr.* 76(1):85-92. Dewailly E et al. 2001. *Am J Clin Nutr* 74(5):603-11.



# Transfats?



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Europe: 0.36 %

## Transfatty acids (% plasma PhL) according to age

*Age groups years*

*18-24*

*25- 34*

*35-44*

*45-54*

*55-64*

*65-89*

**N**

**Mean**

113

1.09

135

1.14

105

1.17

56

1.00

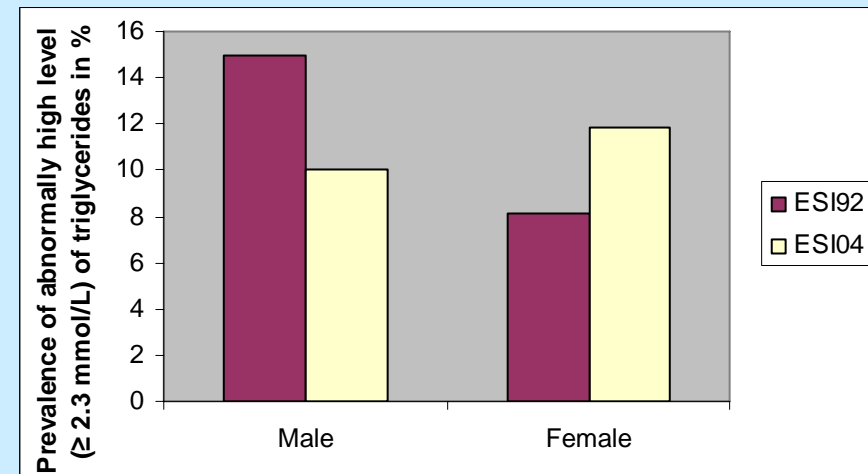
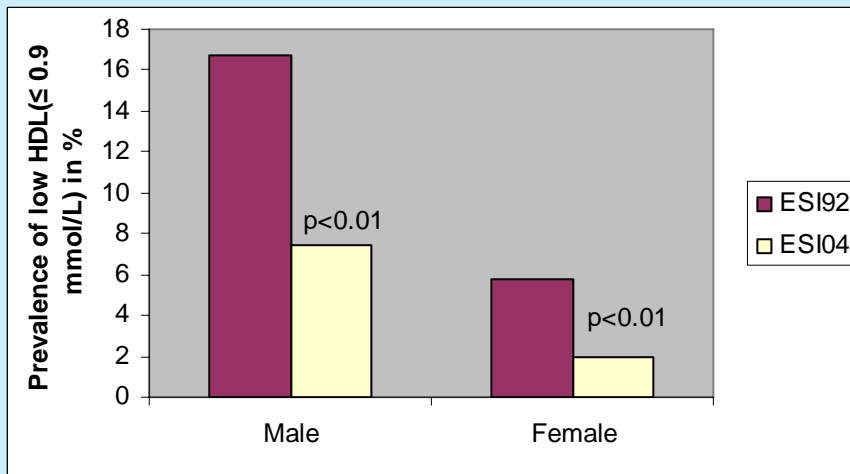
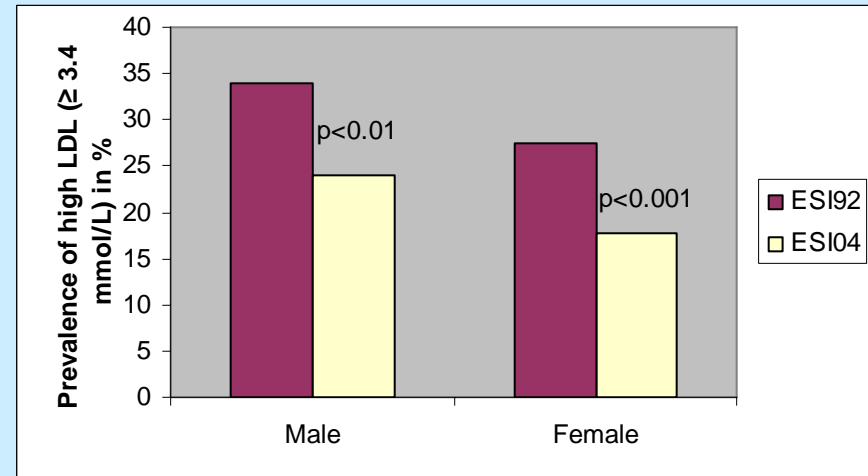
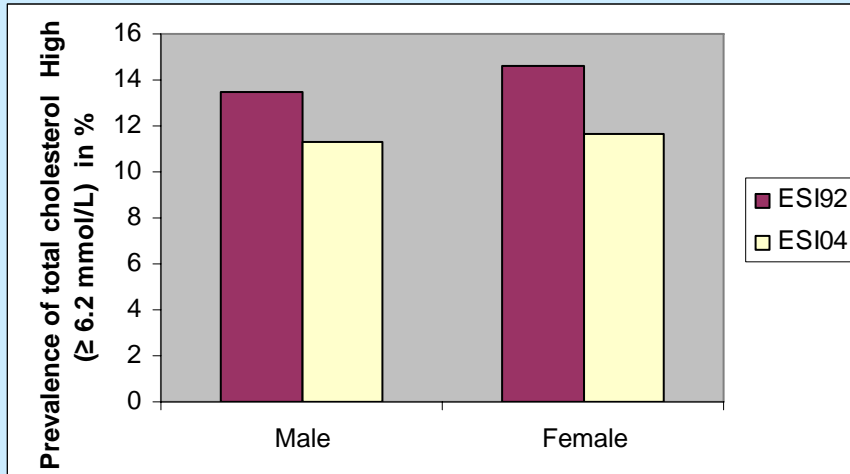
37

0.85

24

0.98

# Results: ....since the 1992's health survey (SEE ORAL PRESENTATION ML CHÂTEAU-DEGAT ET AL.)



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## Tot Chol/HDL according to Body Mass Index

*Body Mass Index (kg/m<sup>2</sup>)*

	<b>N</b>	<b>Mean</b>	<b>IC</b>
<i>Normal: &lt;= 24.9</i>	338	2.75	2.67- 2.84
<i>Overweight: 25-29.9</i>	250	3.27	3.14- 3.40
<i>Obesity: 30-39.9</i>	218	3.76	3.62- 3.89
<i>Severe Obesity: &gt;=40</i>	28	3.91	3.54- 4.28

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## Fasting glucose (mmol/l) according to Body Mass Index

*Body Mass Index (kg/m<sup>2</sup>)*

	<b>N</b>	<b>Mean</b>	<b>IC</b>
<i>Normal: &lt;= 24.9</i>	338	4.26	4.18- 4.35
<i>Overweight: 25-29.9</i>	250	4.56	4.42- 4.69
<i>Obesity: 30-39.9</i>	218	4.87	4.72- 5.03
<i>Severe Obesity2: &gt;=40</i>	28	5.75	4.76- 6.74

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## Tot Chol/HDL according to fasting glucose

*Fasting glucose (mmol/L)*

*Normal: < 5.6*  
*Prediabetes: 5.6-6.9*  
*Diabetes: >=7.0*

<b>N</b>	<b>Mean</b>	<b>IC</b>
804	3.20	3.13- 3.27
77	3.40	3.13- 3.68
22	3.55	3.11- 3.98

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## Triglycerides (mmol/l) according to Body Mass Index

*Body mass index (kg/m<sup>2</sup>)*

	<b>N</b>	<b>Mean</b>	<b>IC</b>
<i>Normal: &lt;= 24.9</i>	338	0.96	0.91- 1.01
<i>Overweight: 25-29.9</i>	250	1.14	1.07- 1.21
<i>Obesity: 30-39.9</i>	218	1.49	1.38- 1.60
<i>Severe Obesity &gt;=40</i>	28	1.73	1.41- 2.05

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## Triglycerides (mmol/l) according to fasting glucose

*Fasting glucose mmol/L*

*Normal: < 5.6*

*Prediabete: 5.6-6.9*

*Diabete: >=7.0*

<b>N</b>	<b>Mean</b>	<b>IC</b>
804	1.19	1.14 - 1.24
77	1.45	1.29 - 1.61
22	1.68	1.19 - 2.17



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## Tot Chol/HDL according to fasting glucose

*Fasting glucose (mmol/L)*

	<b>N</b>	<b>Mean</b>	<b>IC</b>
<i>Normal:</i> < 5.6	804	3.20	3.13- 3.27
<i>Prediabete:</i> 5.6-6.9	77	3.40	3.13- 3.68
<i>Diabete:</i> >=7.0	22	3.55	3.11- 3.98

# The Economist

DECEMBER 18TH-19TH 2003

[www.economist.com](http://www.economist.com)

Gore anoints Dean

PAGES 82 AND 83

America's Taiwan test

PAGES 82 AND 89

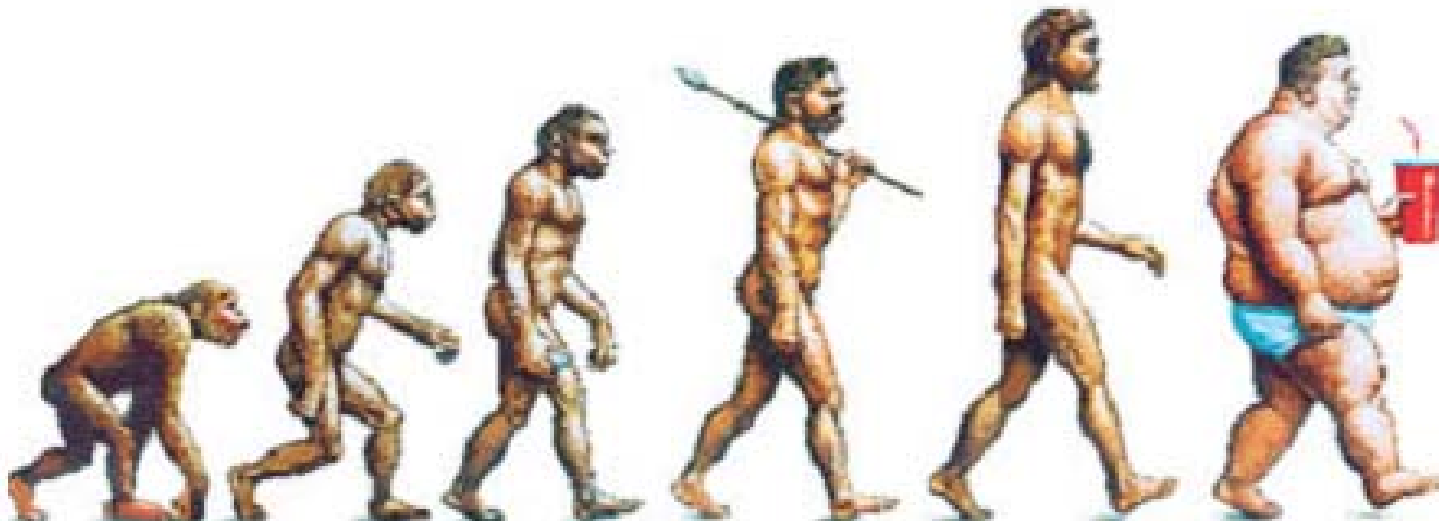
The future of flight

PAGES 79-81

**A SURVEY OF FOOD**

AFTER PAGE 57

## The shape of things to come





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## Omega-3 (% plasma PhL) according to age

*Age groups years*

*18-24*

*25- 34*

*35-44*

*45-54*

*55-64*

*65-89*

**N**

**Mean**

113

5.23

135

6.35

105

7.72

56

9.98

37

9.93

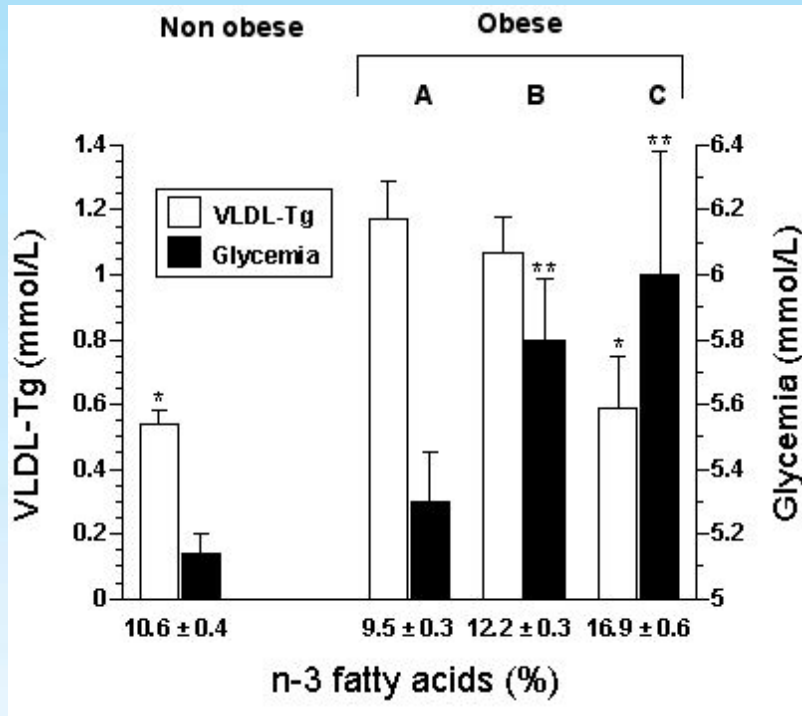
24

12.10



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# Glycemia and omega-3



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## Omega-3 (% plasma PhL) according to diabetes status

*Fasting glucose*

*Normal: < 5.6 mmol*

*Prediabetes: 5.6-6.9*

*Diabetes: >=7.0*

	<b>N</b>	<b>Mean</b>
	417	7.24
	41	8.47
	10	10.09

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## Omega-3 (% PhL) according to Body Mass Index

<i>Body mass index</i>	<b>N</b>	<b>Mean</b>
<i>Normal: &lt;= 24.9</i>	175	6.48
<i>Overweight: 25-29.9</i>	135	7.80
<i>Obesity: 30-39.9</i>	109	8.10
<i>Severe Obesity2: &gt;=40</i>	13	11.56

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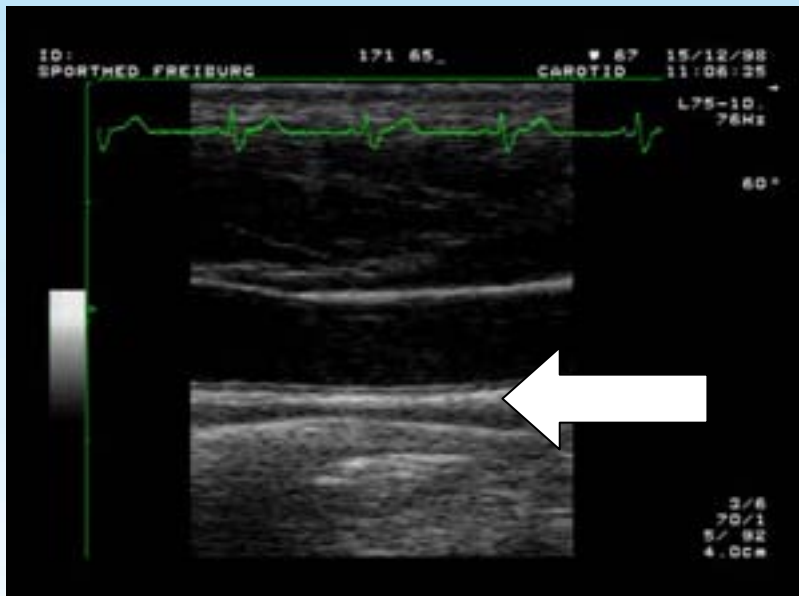


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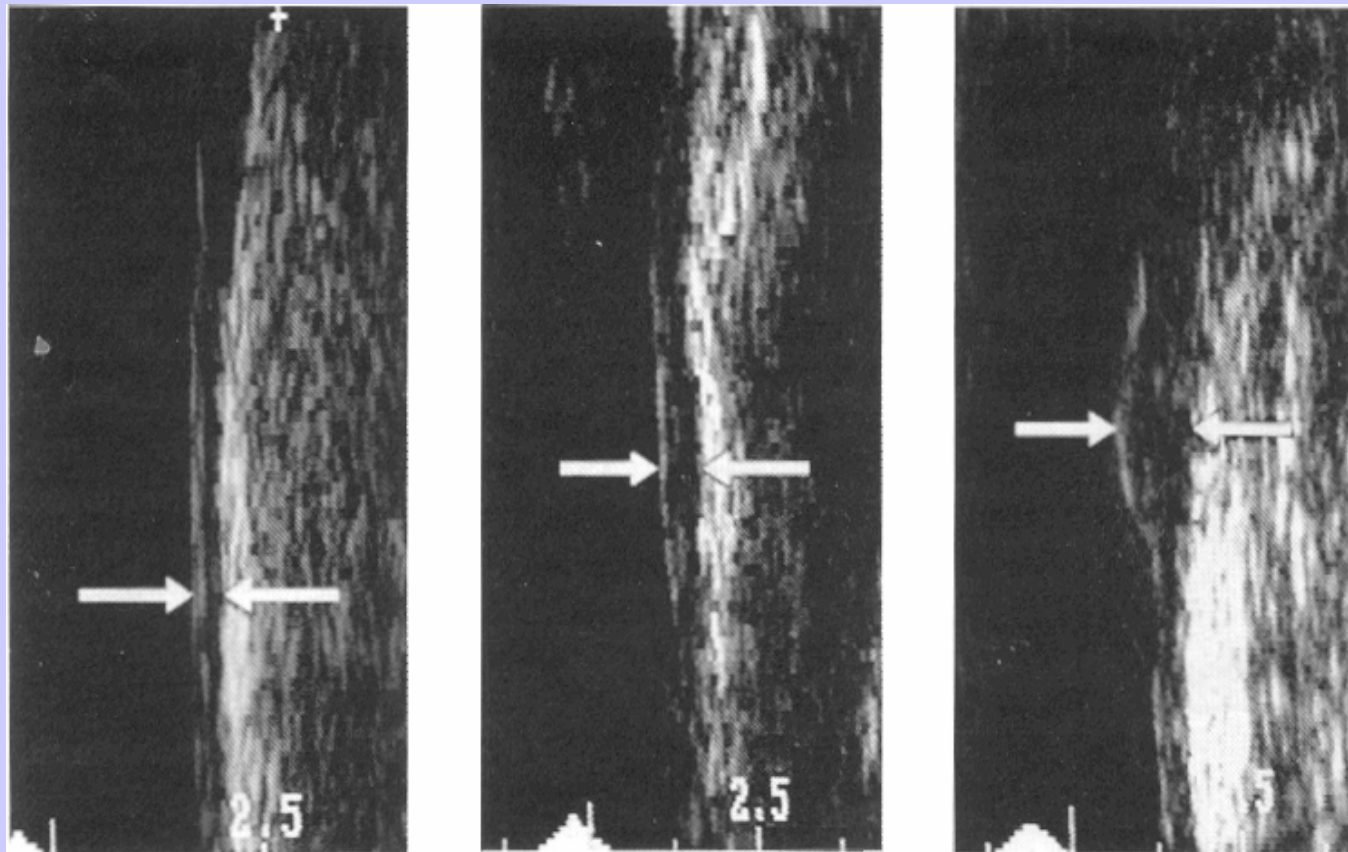
# Carotid Ultrasound

(E Lonn Mc Master)

- IMT measure
- Early diagnosis of atherosclerosis
- Non invasive
- Portable



# Intima - Medial Thickness (IMT)



0.70mm

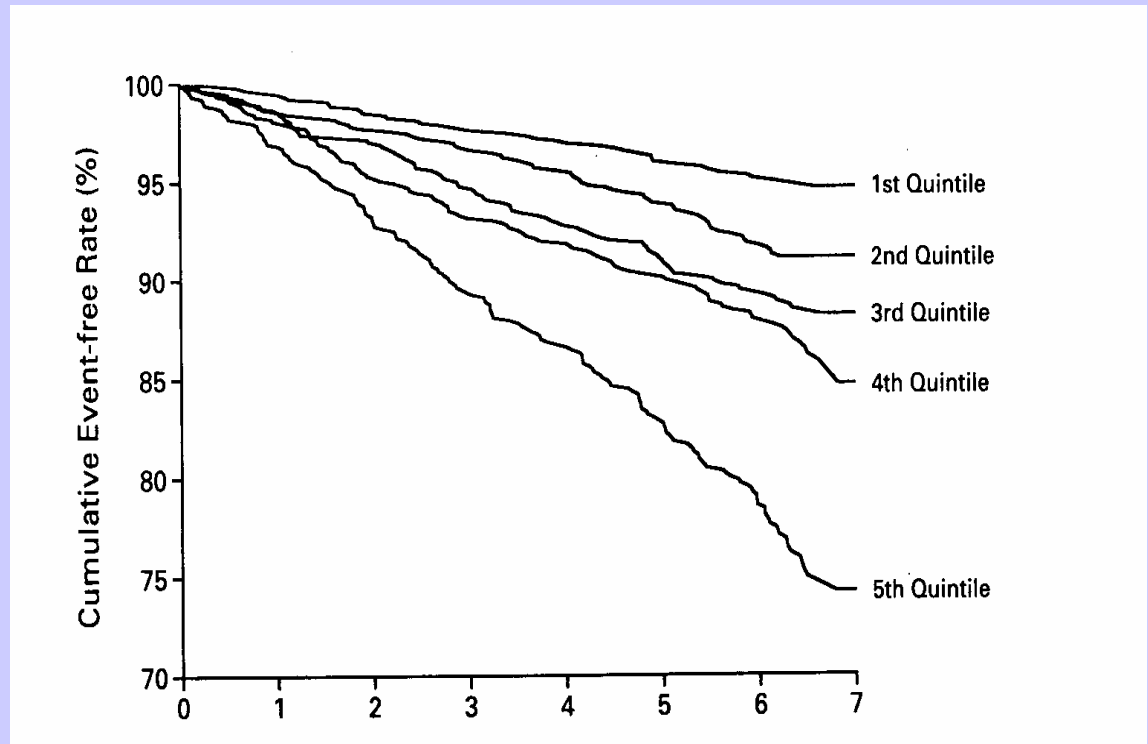
1.15mm

2.43mm

# The Role of Carotid IMT in Predicting Coronary Events and Stroke

## The Cardiovascular Health Study

5858 subjects  $\geq 65$  yrs  
4476 subjects - no CVD  
at baseline  
Follow-up: 6.2 years



Unadjusted cumulative event-free rates for the combined endpoint MI and stroke by quintiles of IMT

Mean maximum carotid artery intimal medial thickness (mm) in the entire population and by gender according to various determinants

		Overall		Women		Men	
		Mean	SD	Mean	SD	Mean	SD
<b>BMI</b>	<b>15-24.9</b>	<b>0.65</b>	0.02	0.62	0.02	0.68	0.04
	<b>25-29.9</b>	<b>0.74</b>	0.03	0.69	0.04	0.78	0.04
	<b>30-49</b>	<b>0.71</b>	0.02	0.64	0.02	0.79	0.03
<b>Age</b>	<b>40-44 years</b>	<b>0.56</b>	0.01	0.53	0.01	0.59	0.02
	<b>45-54 years</b>	<b>0.63</b>	0.02	0.59	0.01	0.67	0.03
	<b>55-74 years</b>	<b>0.88</b>	0.02	0.81	0.03	0.93	0.03
<b>Fasting glucose</b>							
	<b>Normal &lt;6.1</b>	<b>0.69</b>	0.01	0.63	0.02	0.74	0.02
	<b>At risk 6.1-6.9</b>	<b>0.63</b>	0.05	0.51	0.04	0.73	0.07
<b>Diabetes</b>	<b>&gt;=7.0*</b>	<b>0.83</b>	0.05	0.77	0.05	0.95	0.10

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## Fasting glucose (mmol/L) according to IMT

*IMT (mm)*

*Q1: 0.39-0.52*

*Q2: 0.53-0.62*

*Q3: 0.63-0.77*

*Q4: 0.78- 0.83*

<b>N</b>	<b>Mean</b>	<b>IC</b>
70	4.79	4.29- 5.29
70	4.72	4.53- 4.92
70	4.96	4.80- 5.12
71	5.19	4.67- 5.71

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## Omega-3 (% PhL) according to IMT

*IMT (mm)*

	<b>N</b>	<b>Mean</b>
<i>Q1: 0.39-0.52</i>	37	9.15
<i>Q2: 0.53-0.62</i>	36	9.40
<i>Q3: 0.63-0.77</i>	29	9.66
<i>Q4: 0.78- 0.83</i>	35	12.01

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## IL-6 (pg/ml) according to IMT

<i>IMT (mm)</i>	<b>N</b>	<b>Mean</b>	<b>IC</b>
<i>Q1:0.39-0.52</i>	70	2.27	1.84- 2.70
<i>Q2:0.53-0.62</i>	70	2.21	1.80- 2.62
<i>Q3:0.63-0.77</i>	70	2.94	2.43- 3.46
<i>Q4:0.78- 0.83</i>	71	3.47	2.86- 4.07

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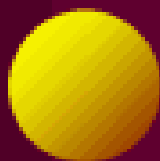


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## LDL Particle Size Subclass

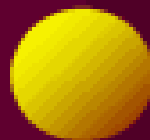


IDL



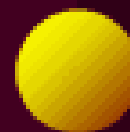
L3

large,  
buoyant



L2

small, dense



L1

A ← AB → B

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## LDL size (Å) according to IMT

*IMT (mm)*

*Q1: 0.39-0.52*

*Q2: 0.53-0.62*

*Q3: 0.63-0.77*

*Q4: 0.78- 0.83*

<b>N</b>	<b>Mean</b>	<b>IC</b>
70	255.89	255.2-256.5
70	255.96	255.3-256.6
70	255.47	254.8-256.1
71	252.37	245.2-259.6



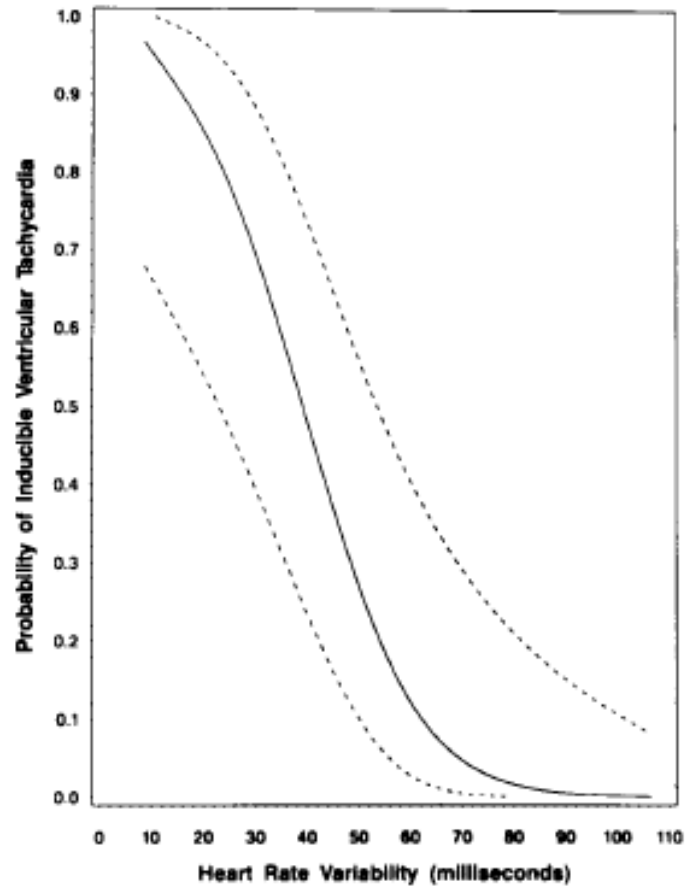


## Some preliminary conclusion

- CVD classical risk factors including diabetes are still low compared to other aboriginal groups.
- Obesity has increased particularly abdominal obesity among women
- Transfats are high among young adults
- Atherosclerosis is present but moderate, inflammation too. Electrical protection by omega-3?



Bikkina et al., 1998





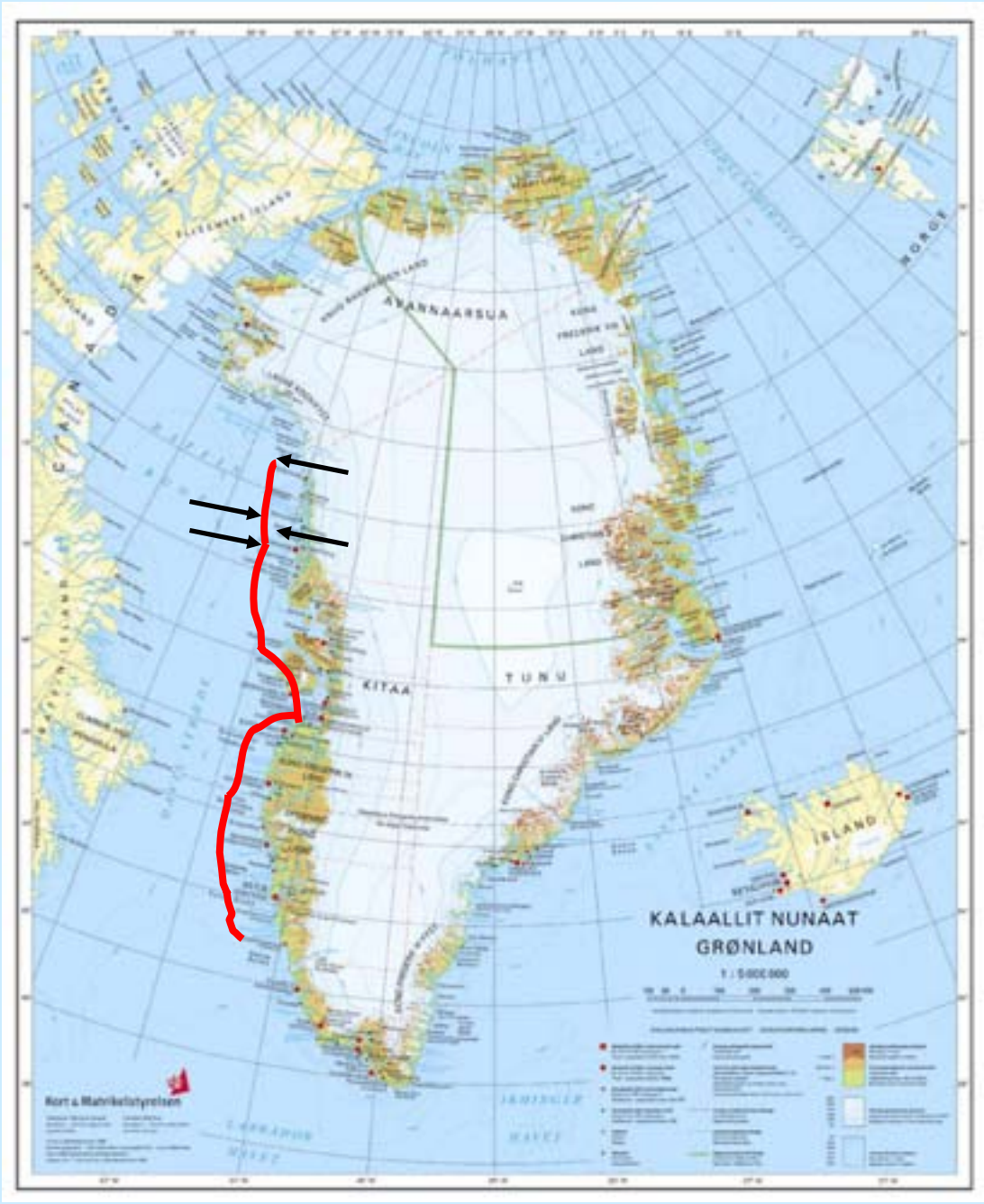












# Status for data collection

<b>Community</b>	<b>Target</b>	<b>Result</b>	<b>Remaining</b>
Nanortalik bygder	103		103
Qaqortoq	232	292	
Narsaq	130		130
Nuuk	443	313	130
Nuuk bygder	28		28
Maniitsoq	212		212
Maniitsoq bygder	92		92
Aasiaat	242	204	
Qasigiannnguit	295	295	
Ilulissat bygder	98	98	
Upernavik	81	84	
Upernavik bygder	254	244	
Tasiilaq	115		115
<b>Total</b>	<b>2325</b>	<b>1530</b>	<b>810</b>

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## IHT Greenland - Fall 2006 visit to villages

<b>Community</b>	<b>Sample</b>	<b>Result</b>	<b>Participation rate</b>
Upernavik	121	84	69
Kullorsuaq	206	114	55
Innaarsuit	77	65	84
Aappilattoq	97	65	67
All	501	328	66
IHT 2005-2006		1530	65









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Thank you