INTERNATIONAL HEALTH NEWS

William R. Ware, PhD - Editor

NUMBER 259 **JULY/AUGUST 2015** **24th YEAR**

The feature in this issue is diabetes. We continue coming back to this because it is one of the major health threats facing mankind. Every reader probably knows lots of diabetics and may even be diabetic or prediabetic. Incidence is at epidemic levels and there are a significant number of individuals undiagnosed and many more unknowingly at risk. Even the knowledge of the significance of the complications is probably not widespread, which is unfortunate because anyone can appreciate the impact on the quality of life of having one or both feet amputated or becoming blind or having acute liver failure and requiring an unavailable transplant.

First we examine the growing evidence that statins and especially Lipitor and Zocor, increase the risk of diabetes and that the risk increases with the duration of usage. The data is becoming clear concerning the relationship between the risk of diabetes and the benefits of statins in both primary and secondary prevention of cardiovascular events. A big issue is that before 2012 in the US, the risk was not disclosed even though there was strong but suppressed data going back to 2005. Then when the warning was issued, it was in a language that most laypersons would not understand.

We also bring readers up to date on the work at Newcastle University where the 8-week diet that cures diabetes was developed and tested. Dr. Roy Taylor's group has just published a study which looks at the impact of the duration of diabetes on the success of the diet.

With the new school year near at hand, it seems important to warn parents that the early part of the school year presents a very high risk for a false diagnosis of attention deficit hyperactivity disorder (ADHD). The problem is that normal immaturity is confused with mental disease, the immaturity being in the youngest group in any class. This is all the result of the common practice of using an age cut-off for starting school where each class will contain a distribution of ages covering about one year with the older students providing an unrealistic comparison group for judging the misbehavior of the youngest. As has been "preached" repeatedly in IHN, the drugs prescribed for ADHD are not safe, not benign, have the potential to alter the quality of life permanently, and some can be sold on the street at a very high mark-up over the drugstore price. As always, the issue of risk vs. benefit should be central to the decision to medicate, and this is very difficult given that the stimulant drugs used generate huge profits for Big Pharma, the risks are downplayed, and non-drug therapy is not popular these days.

Finally, we discuss the risk of developing diabetes associated with the fat called triglycerides which, if elevated in the blood, can suggest a high risk in individuals that are not prediabetic.

Have a good summer and if in need of reading material, check back in the past issues and also note that book reviews are listed at the end of the new index.

Wishing you and your family a safe and healthy summer,

William R. Ware, PhD, Editor

Highlights

DO STATINS PROMOTE DEVELOPMENT OF TYPE 2 DIABETES?

When the new American Heart Association/American College of Cardiology guidelines were announced, one well-known critic of poor and flawed clinical trials, John Ioannidis of Stanford School of Medicine published a viewpoint in the *JAMA* pointing out the potential for more than a billion people worldwide becoming eligible for the recommendation of statin therapy to prevent cardiovascular disease.[1] In the US he estimated that there were about 100 million in the targeted age group of 40 to 79 years. The guidelines would qualify about 45 million. The US prevalence of diabetes in this age group is approximately 10 million.

The decision to follow recommendations and take a statin should be based on a risk/benefit analyses. The benefits have been subjected to endless studies and meta-analysis. The general conclusion is that for primary prevention, mostly in populations with enhanced risk of cardiovascular disease events, the absolute benefit for the populations studied was between 1% and 1.5%, i.e. 98.5% to 99% do not benefit. For secondary prevention (prior heart disease) the numbers are slightly higher and typically 97% to 98% do not benefit. Almost all studies have found no impact on mortality. However, and this is vital for such an analysis, when studies are restricted to women, for primary prevention there is no benefit and for secondary prevention it is similar to men.[2, 3] This view was considerably strengthened very recently in a new meta-analysis, although one would be led to the opposite conclusion by reading the discussion section in the paper. It is necessary to examine the tables that are only in the online supplemental material which are very clear. For primary prevention of major coronary events and stroke, statins are not effective.[4]

The other numbers needed for the risk/benefit analysis involve risk. Prior to 2012, the data on statins and diabetes was buried in the literature and had not made it to the drug package inserts, the so-called label, which in the US is regulated by the FDA. But the matter was not clarified much. For example, the label change for Lipitor was changed to read, “Increases in HbA1c and fasting serum glucose levels have been reported with HMG-CoA reductase

inhibitors, including Lipitor." This is a way of suggesting that there is a risk of new-onset diabetes, but to many it is intentional doublespeak since for the general public, that statement may not bring up the notion of diabetes risk and it downplays the considerable set of data that actually recorded actual diabetes cases.

Early randomized trials of statins which included checking for increased risk of diabetes mostly suggested enhanced risk with one, ASCOT, finding a statistically significant result. ASCOT used Lipitor, and Pfizer, the manufacturer of Lipitor also carried out two trials itself that looked for increased incidence of diabetes. These were called SPARCL and TNT and both reported findings in 2006 but failed to mention the results with regard to diabetes. It was not until 2011 that the information was released for publication. SPARCL is the interesting trial since it compared 80 mg/day of Lipitor with a placebo. Stated in terms of absolute numbers, there were 9 new cases of diabetes per 10 patients protected from major cardiovascular events. In other words the risk to benefit was essentially a wash. The absolute risk increase for diabetes was 2.64% with a number needed treat to harm one individual (NNH) of 39. The subjects in the trial had previous stroke or transient ischemic attack history and the absolute risk reduction for these endpoints was 2.2%. This was the result for diabetes risk that was not published until 6 years after the trial. However, for women where there is no benefit, it is all risk based on numerous trials. The TNT results also released after about the same delay are less interesting because they relate to a comparison between 80 mg/day vs 10 mg/day, but nevertheless, there was an absolute risk increase with dose of 1.13%. These results were also reported at about the same time by David Preiss at the large European diabetes meeting (European Association for the Study of Diabetes—EASD, Lisbon, September 2011)) where the speaker also gave the following for JUPITER: 7 new cases of diabetes per 10 patients protected from major CVD events. Your editor co-chaired that session.

In the follow-up study called the Woman's Health Initiative, which involved postmenopausal women, Lipitor was found to increase the absolute rate of developing diabetes by 3%, a number consistent with the SPARCL randomized controlled trial. A similar result was obtained for simvastatin (Zocor).[5] There is also a significant dependence in of the risk of diabetes associated with statins depending on the drug used. Carter *et al* found that when the comparison was with pravastatin, the risk was highest with Lipitor, followed by Crestor and Zocor and both Lescol (fluvastatin) and Mevacor (lovastatin) were not associated with increased risk.[6]

With this perspective, consider the latest and probably one of the best studies that examined the association of statin therapy with the risk of developing diabetes.[7] This study is of particular interest because it recruited only healthy individuals who were enrolled in the San Antonio Military Area VA North Texas Health Care System called Tricare Prime/Plus. A group of 3351 statin users were matched through a so-called propensity score such that in terms of a number of relevant health parameters they would to be similar to statin users and served as controls. Comparison between statin users and the matched cohort revealed that for the non-users, the incidence of diabetes was 19.4% whereas for statin users it was 30.9%. This gives an absolute risk increase of 11.5% or a number needed to treat to harm one individual of 9 over about 5 years. When high intensity statin users were compared with low to moderate statin users, the incidence rates were 9.3% vs. 29.7%, yielding an additional absolute risk increase of 9.6% and a number needed to treat to harm one individual (NNH) to 10 for this comparison based only on dose. When the entire cohort of almost 22,000 was compared with 3982 statin users, the NNH was 5. Heavy users had a prevalence of 39% vs. 19.4% for non-users; here we have a 19% absolute increase giving a NNH of 5. A second study published about the same time is equally impressive.[8] See the April 2015 issue of IHN for a discussion of this study with similar shocking NNHs.

The question of clinical predictors of new-onset diabetes associated with statin therapy has also been studied. Baseline fasting glucose and other features of the metabolic syndrome have been found predictive.[9, 10] However, statistical analysis revealed that statins were an independent predictor of high significance, These studies are consistent with the above recent study the enrolled individuals with the metabolic syndrome.[8] When Health Canada finally issued a warning about the risk of Lipitor in increasing the risk of diabetes, they also mentioned predisposing factors. This is in strong contrast to the label change allowed by the FDA where diabetes is not even mentioned.

Finally, it is interesting to note that both in the US and Canada lawsuits have been initiated against Pfizer for not warning patients regarding the risks of Lipitor in new-onset diabetes until recently in spite of knowledge concerning the risks that went back years. Both are gathering individual lawsuits and are restricted to women because of the evidence that they derive no benefit from statins in the context of primary prevention. In the US it is currently anticipated that there will be 10,000 suits which will be assembled into a class action suit. In Canada, the suit from the start was class action.

THE BOTTOM LINE

The issue of diabetes and statins was successfully concealed from the general public for about a decade. The evidence is compelling that the risk is real and that for many men is comparable if not greater than the benefits associated with either primary or secondary prevention of cardiovascular events. For women, the risk is similar if not greater than for men, and there is no balancing benefit in terms of avoidance of cardiovascular events. In this case, any risk is unacceptable. It is also worth noting that diabetes is a strong risk factor for cardiovascular events and that it is believed by critics of the use of statins that there are other adverse effects, the detection of which have been artificially lowered by study design or implementation, or outright suppressed and that during the post-approval period only a few percent of adverse events are reported. Thus the now solid data on diabetes helps level the playing field with regard to risk/benefit, but the worry is still that the total risk burden is vastly greater than the benefits, but unknown. Statins are widely viewed by mainstream medicine as highly beneficial drugs, essentially miracle drugs, and it is firmly believed that the benefits so clearly outweigh the risks that there is no issue at all, and that there is no problem with a significant fraction of the world's population being on statins for life. This is bizarre considering that there has never been convincing evidence of significant benefit for mortality and cardiovascular benefits. Large relative risk reductions are highly touted but statins rarely achieve greater than 3-4% **absolute risk reduction**, and this only in secondary prevention – 4% is equivalent to 96% having no benefit. Hardly miracle drugs!!

COMING SCHOOL YEAR AND ADHD OVERDIAGNOSIS. A PARENTAL ALERT

With the new school year approaching, children will not only be starting school for the first time, but also advancing a grade. Parents need to be aware of a serious threat posed by the new diagnostic criteria for attention deficit hyperactivity disorder (ADHD) that appear in the latest diagnostic manual, the bible of psychiatry called the DSM-5. DSM-5 is really a dictionary-like compilation of diagnostic criteria for a huge number of so-called mental disorders now believed to afflict mankind including, of course, children. We in fact appear to have an epidemic of childhood mental disorders, and over-diagnosis is strongly implicated.[11]

Recent surveys indicate that, according to the US Centers for Disease Control and Prevention (CDC), approximately 11% of children 4-17 years of age have been diagnosed with ADHD. From 2003 to 2007 to 2011 the percentage increased from 7.8% to 9.5% to 11%. It is now 2015 and the number is probably higher, and will almost certainly go up with the broadening of the threshold in guidelines. A high percentage of ADHD "victims" are put on psychiatric drugs. In a recent commentary in the *British Medical Journal*[12] Professor Peter Gøtzsche points out that short term relief seems to be replaced by long-term harm and animal studies strongly suggest that ADHD drugs produce brain damage, something some think is probably the case for all psychotropic drugs.[13]

The DSM-5 is a consensus document written by individuals regarded as experts in the field, but the several thousand criteria have not been validated in the sense that they would meet the stringent requirements of evidence-based medicine—something that is in fact impossible to orchestrate. As discussed several times recently in IHN, the DSM-5 has come under severe criticism as a vehicle for increasing over diagnosis and over retreatment and a document strongly influenced by the pharmaceutical industry.[14, 15]

During the coming new school year it is inevitable that some readers will be contacted by school authorities wishing to open the issue of ADHD. Parents need to be prepared. The first thing to know is that the evidence is compelling that the identification of the ADHD problem and its diagnosis is strongly concentrated among the youngest members of each class, a situation that arises when there is an age cut off for each grade and thus a 12 month range in age. Thus critics claim that what is really being observed is merely immaturity, not a mental disorder. The second problem is classical; the differentiation between normal and mental disorders, since normal covers a rather wide range of behaviors and some of those in the sets of criteria will be recognized as in a very gray area in the context of this issue. Thus the concern among a number of professionals that over-diagnosis, now rampant in their opinion, will only get worse with DSM-5.

In a recent article, Batstra *et al* recommend a stepped approach to avoid false positive ADHD diagnosis.[15] This approach starts with merely watchful waiting to see what evolves to which may be added non-drug interventions such as psychosocial and educational approaches in what they call the pre-diagnosis stage. If there continues to be a valid issue regarding the diagnosis of ADHD, more elaborate professional and unbiased investigation should be undertaken. It is implied that the combined views of the teacher, the school health expert, and the physician who will be required to get the prescription for ADHD medication is insufficient, especially if the physician is in general practice and not trained in psychiatry. A label of ADHD, i.e. a mental disorder, can follow a child through life, impact success in getting a job and insurance, and caries a stigma strong enough to be worth avoiding if possible, and certainly if there is no real mental disorder but merely a kid acting normal, albeit in the upper range of teacher and parental tolerability. Also, medication appears to the in many cases the first choice, not the much more benign psychotherapy approach, i.e. an opportunity lost.

Parents need to also be aware that the stimulant drugs used to treat ADHD are mostly in the amphetamine class, and one is crystal meth which is also illegally made in basement and garage labs for sale as a street drug, and that this class of stimulant drug has a number of serious side effects which vary considerable from child to child ranging from mild to drowsiness, impairment of intellectual powers and even conversion to a zombie. Stimulant drugs prescribed for ADHD also have considerable value on resale as a street drug. The following is a list of commonly observed side effects for the stimulant class of drug used in ADHD.

- Headache
- Anxiety
- Nausea
- Dizziness
- Vomiting and abdominal pain
- Restlessness
- Weight loss
- Anorexia
- Itching
- Sleep problems
- Decreased appetite
- Delayed growth
- Moodiness and irritability

Parents should also reflect on the fact that withdrawal from this class of drug can be difficult and dangerous for some children, a phenomenon that characterizes most psychiatric drugs.[16] They should also be aware of the current tendency of prescribing not only a stimulant, but also adding an antipsychotic drug or antidepressant for ADHD, and that adverse effects can be misdiagnosed as worsening of the mental disorder which calls for more medications. This sort of polypharmacy is notorious for altering personalities until the individual is a completely different person, frequently unresponsive to many normal situations. The limiting case is of course the zombie.

THE BOTTOM LINE

Parents need to be aware that false positive diagnosis is rampant in psychiatry and can be regarded as a failure to draw a common-sense line between normal behavior or symptoms and true mental disease. Parents should find very alarming the study on ADHD diagnosis within each grade being strongly age-dependent, since we are talking about the driving force for the medication of children with powerful psychiatric drugs with serious side effects, and the potential, while small, of life-altering and disastrous effects.

The reader is encouraged to read the Research Review in the September 2014 and March 2013 issues of IHN titled *The Crisis in Psychiatry* and *Epidemic of Overdiagnosis, and* one or more of the books in the bibliography of the later review, especially those by Dr. Peter Breggin and as well *Saving Normal* by Dr. Allen Frances.

NEW STUDY USING THE NEWCASTLE DIET FOR DIABETES

In the October 2014 IHN a novel dietary approach was discussed which successfully reversed type 2 diabetes in 8 weeks. The research group headed by Dr. Roy Taylor of the University of Newcastle in the UK has just published a second clinical trial.[17] This trial addresses the question of the efficacy of the diet for individuals with long-term duration of diabetes (> 8 years) as compared to those with short-term duration < 4 years), the latter group being similar to those the original study published in 2011.[18] The report was prefaced by the statement: “The inevitably progressive nature of type 2 diabetes has been widely accepted since the UK Prospective Diabetes Study was carried out, which showed that glucose control steadily worsened towards requirement for insulin treatment despite best possible therapy.”

There were 15 subjects in the short-duration and 14 in the long-duration groups. The protocol was similar to the earlier study with subjects taken off anti-diabetic medications prior to the start and then all put on a diet of approximately 700 calories for 8 weeks. The diet consisted of 600 calories from a meal replacement product and the balance from vegetables. Using fasting blood glucose (FBG) as the criterion, all the subjects in the short-duration group regressed to normal

glycemia and could be considered at least temporarily cured. As is indicated in the table presented below, those with > 8 years with a diagnosis of type 2 diabetes did not do as well.[12]

Table 1. Results (mean values) of the Newcastle Diet for both short- and long-term duration of diagnosed diabetes.[17]

	DURATION OF DIABETES			
	SHORT		LONG	
MEASURED PARAMETERS	**START**	**8 wks**	**START**	**8 wks**
Weight (kg)	99	84	96	83
Waist circumference (cm)	110	98	113	110
Fasting blood glucose (mmol/L)	9.6	5.8	13.4	8.4
HbA1c (%)	7.2	6.1	8.6	8.0
Triglycerides (mmol/L)	2.2	1.1	1.5	1.1
HDL cholesterol (mmol/L)	1.1	1.1	1.1	1.1
Systolic blood pressure (mm HG)	144	125	160	133

These are mean values. A total of 87% of the short-term group and 50% of the long-term group achieved non-diabetic fasting glucose levels in 8 weeks despite the withdrawal of all diabetes medications. In addition, HbA1c is a 12-week average but in 8 weeks 40% of the short term group had achieved non-diabetic status (6.1%) whereas 14% of the long-term group accomplished this. Those in the short-duration group all experienced rapid decreases in fasting glucose, similar to that seen in the earlier study. For the long-duration group, there was a large variation from rapid normalization to no decrease. Some in the long-duration group has a slow decrease in fasting glucose which ultimately entered the normal range. Those who did not respond well had the highest baseline fasting glucose, the longest duration, the most treatment and were older in age. The report indicated that this study cohort will be followed up to examine the issue of durability, although the earlier study also had an informal follow-up phase which was quite positive (see IHN, October 2014). In fact, they report that for those in the original study, in those who lost weight and returned to normal glucose control the duration of normal glycemia now approaches 3 years, and provided weight loss is maintained, the diabetes does not return, at least over several years of follow-up. If one combines the original Newcastle Diet Study data and the short-term group from this study, there are now 26 individuals within the framework of a clinical study who have experienced near or complete reversal of type 2 diabetes.

The authors comment that while a very low calorie diet has been accepted into the European National Institute for Health and Care Excellence guidelines regarding obesity, this is not the case for the same approach in the context of diabetes. They suggest this caution may be related to perceived probability of low adherence, concerns about the sustainability of the benefit and theoretical concerns about detrimental effects of the diet on lipid profiles (the latter ignoring the dramatic decrease in triglycerides!). The two clinical studies from Taylor's group would seem to suggest these concerns are unwarranted. Common sense would suggest they are not realistic. The authors summarize the overall health benefits aside from curing diabetes as follows.

- Lower blood pressure, similar to that obtained by pharmaceutical intervention
- Improved blood lipid profile similar to that obtained with intensive statin therapy
- Improved general wellbeing
- Increased mobility
- Better sleep quality

While this is not discussed in the report, if one uses the standard definition of the metabolic syndrome which requires passing three of five thresholds, the short-term group in this study all qualified for this diagnosis at baseline as did the long-term group. At 8 weeks, the short-term group could be declared metabolic syndrome free, whereas this was not the case for the long-term group but the triglycerides and HDL met the threshold requirements.

Finally, it is of interest to compare the effectiveness of lifestyle interventions on the incidence of diabetes in high-risk patients since the Newcastle diet almost certainly returns high-risk (prediabetic) individuals to normal. A recent set of meta-analyses examined the success of standard approaches. When studies were grouped into 4, 6 and 10-year follow-up, the percentage who developed type 2 diabetes in spite of the lifestyle intervention including weight loss as compared to usual care was 86%, 87%, and 90%, respectively. Not a very good result to put it mildly. For mortality, two studies when combined yielded 98% with no benefit.[19] These are all studies that are adding lifestyle including weight loss to the standard management by medication. Also, in the similar LOOK AHEAD trial, intensive lifestyle intervention with weight loss did not significantly reduce cardiovascular related events or death after nearly 10 years of follow-up, and again, the intervention was in addition to pharmaceutical treatment.[20] Contrast this with the second Newcastle Diet study described above, where for the short-term diabetics, only 13% failed to benefit and there may have been correctable aspects that could have reduced this number to nil. The 87% who regained normal glucose metabolism may well have also avoided the whole set of adverse effects that potentially accompanied their diabetes, although this remains an open and very interesting question. As discussed frequently in IHN, only severe carbohydrate restriction as distinguished from severe calorie restriction like the Newcastle Diet appears capable of bringing about regression from diabetes to prediabetes or from prediabetes to normal in significant numbers of individual subjects.

THE BOTTOM LINE

It is very simple. Anyone with diabetes, especially if it is not of long duration, should consider this approach to achieving a cure and should recognize that mainstream medicine has nothing remotely resembling it in terms of this endpoint. In fact the weight loss will also have a number of health benefits over and above getting rid of the diabetes, and the maintenance of the new weight by some calorie restriction rather than returning to overeating might contribute to enhanced longevity.

TRIGLYCERIDES AND RISK OF TYPE 2 DIABETES

In the work of Professor Roy Taylor concerning a dietary intervention capable of completely reversing type 2 diabetes, a key factor in the biological plausibility of this cure involves pancreatic dysfunction associated with circulating triglycerides. Evidence for this goes back some time in animal studies, [21] and in 2007 the first human study provided confirmation by showing a strong negative correlation between pancreatic fat as measured by imaging and pancreatic beta-cell function as measured by several parameters.[22] It is also well known that type 2 diabetics very frequently have elevated circulating triglycerides that accompany elevated pancreatic fat levels. A recent observational study (follow-up) has provided additional evidence in favor of this model for the development of diabetes.

Lee *et al* have proposed an index (TyG Index) based on routine blood measurements that provides strong evidence for the risk of developing diabetes.[23] The index involves the product of the fasting blood sugar and triglyceride concentrations (calculated by multiplying the fasting blood (plasma) glucose and the blood triglyceride level both in mg/dL, dividing by 2 and then taking the natural logarithm as a convenient way to give values typically around 8 to 10). In the study, 5354 non-diabetic subjects had a number of parameters measured at baseline and were followed for a mean of 4.6 years to determine the number who had developed diabetes. When the cohort was divided into four groups of equal number according to the TyG index, in comparison with those in the lowest quartile, those in the highest had a statistically significant *four-fold* increase in risk (absolute risk ratio after adjusting for a large number of potential confounding factors). The results are summarized in Table 2 given below. Note that the fasting glucose levels at baseline ranged up to the threshold for prediabetes, and that there was a considerable range of baseline triglyceride values and some had triglyceride levels well above the level where guidelines indicate cause for concern. Thus the TyG index appears to be a simple and powerful independent predictor of the risk of diabetes and these results should help focus attention on dietary measures to reduce triglycerides.

In Taylor's clinical studies, triglyceride levels were elevated in all the diabetics and dramatically decreased to normal after the 8 week, 800 calorie diet. In addition, this was accompanied by a return to normal of the fat levels in both the liver and pancreas as directly measured by imaging. Very low carbohydrate diets with somewhat reduced calories intake also can have a strong impact on triglyceride levels.[24] In the lowest quartile of the Lee *et al* study, triglyceride level had a mean of about 125 mg/dL. The conventional level for concern is above 150 mg/dL. A low carbohydrate diet should be able to bring a level of 150 or higher down to 125 although it may be necessary to also increase calorie restriction to achieve a desired reduction.
The study of Lee *et al* is entirely consistent with Taylor's view of how diabetes develops. Consuming excess calories results in the conversion of excess carbohydrates to fat which increases not only the liver fat content but also the pancreatic fat content (in the form of triglycerides). The resultant beta-cell dysfunction enters into a vicious cycle which results ultimately in glucose metabolism becoming sufficiently impaired to justify the diagnosis of diabetes. The TyG Index would then be much higher than for non-diabetic individuals simply because both factors would be elevated. However, the point of the study was to predict diabetes from the TyG Index while subjects were still non-diabetic.

Readers of IHN will recall repeated comments regarding the fat-is-bad dogma resulting in a widespread adoption of low-fat high-carbohydrate diets which reproducibly elevated triglycerides and incidentally reduced HDL cholesterol and many individuals also experienced increased weight. Critics of this huge change in diet philosophy over several decades predicted that this would increase the risk of diabetes and the metabolic syndrome but no one listened. In retrospect, now that diabetes is an epidemic, the elevation of triglycerides was probably a key factor. This was at the same time that everyone was having their so-called lipid panels measured, but the focus was on cholesterol since elevated levels could be successfully treated. Triglycerides were measured but ignored since drug interventions had only a small effect on levels which in fact needed to be, for many individuals, dramatically reduced. Ten percent was not good enough. The TyG Index study reinforces this view as does Taylor's approach to curing diabetes.

Table 2. Predicting the development of type 2 diabetes from the product of fasting plasma glucose and fasting triglycerides. The adjusted risk increase is given for four quartiles of the population according to the TyG Index using Q1 for comparison. Adapted from Lee *et al*[23]

PARAMETERS	**Q1**	**Q2**	**Q3**	**Q4**
Quartile mean values, TyG Index	8.0	8.4	8.8	9.4
Fasting glucose (mmol/L)	4.86±0.48	4.96±0.45	5.02±0.43	5.10±0.47
Triglyceride average (mmol/L)	0.77	1.17	1.66	2.86
Triglyceride range (mmol/L)	(0.65-0.90)	(1.06-2.29)	(1.51-1.84)	(2.31-3.35)
Risk increase (REF Q1)	1	2.3	2.0	4.1

THE BOTTOM LINE

Watch your triglycerides. Fasting triglycerides are reported any time a lipid panel blood test is done. LDL is in fact calculated, not measured and the equation requires the triglyceride level. Use diet to keep triglycerides in the low-normal range. Watch your fasting glucose. Keep it in the normal range with diet. Note that triglycerides and fasting glucose are parameters which when elevated allow the diagnosis of the metabolic syndrome, a well-established risk factor for diabetes. Because of the horrible complications, avoiding diabetes should be high on everyone's do-list. The good news, as discussed above is that the new studies strengthen the evidence that the Newcastle 8-week 600-700 calorie diet works to reverse diabetes.

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Editor: William R. Ware, PhD

INTERNATIONAL HEALTH NEWS is published 10 times a year by
Hans R. Larsen MSc ChE, 1320 Point Street, Victoria, BC, Canada, V8S 1A5
E-mail: editor@yourhealthbase.com World Wide Web: http://www.yourhealthbase.com

ISSN 1203-1933

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