Trans fats and health  
Briefing paper from the BMA Board of Science  
August 2011

**Introduction**

This briefing paper provides background information and an outline of the research currently available on *trans-isomer* fatty acids (commonly referred to as trans fats, trans fatty acids or TFAs). It has been developed in light of ongoing media interest surrounding the use of trans fats in food products, and in response to the following 2011 Annual Representative Meeting (ARM) resolution:

That this Meeting believes eliminating trans fats from the British diet will greatly increase the health of the nation.*

(*passed as a reference)

This briefing paper provides:

- information on trans fats consumption rates and the effects of trans fats on health
- an overview of current UK, European and international policy as well as stakeholders opinions on trans fats consumption
- a position from the Board of Science on trans fats.

**Background**

Trans fats is the term given to a form of unsaturated fatty acid with one or more of their double bonds in the ‘trans’ orientation rather than the common ‘cis’ configuration. This altered state has an impact on both its physiochemical and functional properties.

Trans fats derive from two sources in the diet, naturally occurring in meat and dairy products of ruminant animals (where they are present at low levels), and artificially through industrial food processing practices known as industrially produced trans fatty acids (IPTFAs).¹

These artificially produced trans fats are formed when liquid vegetable oil is turned into solid fat through the process of partial hydrogenation. They are used primarily as a stabilising agent in processed foods because of their ability to increase shelf life. It is primarily IPTFAs that adversely affect health¹² and which will be the focus of this briefing paper.

Trans fats are considered to be among the more harmful of fats associated with dietary intake. Fig 1 in the appendix shows the various fats within the food system, those that are considered essential for health and those that are not. It is widely acknowledged that trans fats, IPTFAs specifically, provide no nutritional value.

Examples of foods that can contain high levels (>0.5g/100g) of trans fats are:

- Pastries and cakes
- French fries (unless fried in lard/ dripping)
- Doughnuts
- Biscuits / cookies
- Chocolate
- Margarine
- Fried chicken
- Crisps
**Effect of trans fats on health**

**Trans fats and coronary Heart Disease**

In 2007, the Food Standard Agency (FSA) carried out a review of IPTFAs at the request of the Secretary of State for Health. This review looked at, amongst other things, the health impacts of current intakes of IPTFAs. The FSA concluded that the primary health concerns relating to trans fats are an association between increasing trans fats intakes, coronary heart disease (CHD) risk, and raised serum cholesterol levels. In 2009, the World Health Organization undertook a scientific review of IPTFAs. The review concluded that controlled trials and observational studies provide concordant evidence that consumption of IPFTAs adversely affects multiple cardiovascular risk factors and contribute significantly to increased risk of CHD events. Mozaffarian et al estimated that reducing commercial trans fats intake from 2.1 per cent of energy to 1.1 per cent or 0.1 per cent could have a dramatic impact, potentially, preventing 72,000 or 280,000 cardiovascular deaths per year in the US, respectively.

While the evidence associated with trans fats intake and cardiovascular disease is strong and well documented, studies relating to trans fats intake with other diseases are lacking and remain inconclusive. A report undertaken by the Scientific Advisory Committee on Nutrition (SACN) (2007) reviewed the relationship between a number of diseases and trans fats, and their key findings are highlighted below:

**Trans fats and cancer**

The SACN concluded that there is weak and inconsistent evidence for a relationship between trans fats and breast or colorectal cancer. Evidence for an association between trans fats and prostate cancer is also limited, with only a small number of studies showing any association. This potential association requires further investigation.

**Trans fats and obesity**

The SACN reported that there is limited but consistent evidence to support a weak association between trans fats intake and greater body fat gain, at or above, the average UK intake (0.8-1.2 per cent of food energy).

**Trans fats and diabetes**

The SACN concluded that there is limited evidence to suggest that trans fats have adverse effects on insulin sensitivity and type II diabetes.

**Other health concerns**

Trans fats are potential risk factors for a number of additional health issues. Positive trends have been reported for trans fats and an increased risk of Alzheimer’s disease, cognitive decline, and ovulatory infertility, although none of these were found to be statistically significant. The SACN recommended that further research was needed before any conclusions could be made regarding the effect of trans fats intake on these diseases.

**Benefits to health?**

There is no evidence that naturally-derived trans fats are harmful to health. Conjugated Linoleic Acid (CLA), a naturally derived trans fats, has potential anti-oxidant, anti-cancer and cholesterol lowering effects. Almost half of all naturally present trans fats are vaccenic acid. Vaccenic acid can be metabolised by humans to CLA.
**Food policy and trans fats**

**Food and nutrition policy in the NHS**

NHS food is influenced by an increasingly broad range of legislation and guidance, both international and national. Please see Figure 2, in the appendix, for examples of international and national influences impacting upon NHS food and beverage services.

Decisions about what food is provided in hospitals, ultimately, rest with the board members of NHS trusts. In practice, there is considerable variation in the extent to which trusts exert control over food provision.

Hospital caterers work to a strict standard set by the Care Quality Commission (CQC) and must also conform to nutritional standards, as directed by hospital dieticians. Hospital dieticians, and caterers, adhere to a strict code of practice which is contained in the Dieticians Toolkit “Delivering Nutritional Care through Food and Beverage Services.” This ensures that patients receive the right food for their care. With respect to trans fats, the toolkit states, ‘Suppliers of ingredients and dishes containing trans and hydrogenated fat should be encouraged to minimise levels.’

**The National Institute for Health and Clinical Excellence (NICE)**

The NICE published a report in June 2010 calling for more measures to eliminate IPTFA from the UK diet. The report concluded that new concerns have now emerged, particularly in relation to imported products and fried food prepared in some settings. People from disadvantaged groups are likely to consume more of these products which, in turn, could represent an important contributory factor to health inequalities. It consequently advises that the policy goal should be to “ensure all groups in the population are protected from the harmful effects of IPTFAs”.

**UK Policy**

In 1994, the Committee of Medical Aspects on Food and Nutrition Policy (COMA) recommended average intakes of trans fats should not exceed two per cent of food energy. A 2007 review by the Scientific Advisory Committee on Nutrition (SACN) endorsed COMA recommendations on the basis that there was no scientific reason for its revision.

In 2007, a FSA report stated that although trans fats had a “moderate effect” on CHD risk there was minimal evidence for its effect on other associated diseases (eg diabetes, infertility).

In 2000/01, the National Diet and Nutrition Survey (NDNS) reported that the average adult (19-64 years) intake of IPTFAs is 1.2 per cent food energy. A 2007 re-estimation of intake data took into account food industry reformulation and calculated an average trans fats intake by the UK population to be one per cent of food energy. A NDNS based on figures from 2008/2009 showed that IPTFAs intakes were less than two grams per day for all age groups, representing 0.8 per cent of food energy.

The Dietary Reference Value (DRV) for trans fats is that population average intakes should provide no more than two per cent of food energy. At 0.8 per cent food energy for all age groups, actual intake is below the recommended maximum figure.

In light of the available evidence, the FSA did not consider that the current levels of trans fats in the UK diet warranted any regulatory moves.

In the UK, trans fats do not have to be included in the ‘nutritional information’ provided on a food label, unless a specific trans fats claim has been made eg ‘low in trans fats’. Trans fats are not required to be listed in the ingredients.

As trans fats can be formed during the process of hydrogenation, some foods that contain hydrogenated vegetable oil may also contain trans fats. Hydrogenated vegetable oil must be declared in the ingredients list. This means that if the ingredients list includes hydrogenated vegetable oil, there may also be trans fats in the product.
In 2009, Dr Richard Simpson, Member of the Scottish Parliament (MSP), put forward a Private Members Bill proposing legislation to limit IPTFAs in food products. The “Limit on trans fats (Scotland) Bill” failed to attract sufficient cross-party support and in April 2010 the proposal fell.\textsuperscript{23, 24}

In April 2010, Scottish public health minister Shona Robison said voluntary industry measures were working. Ms Robison stated that “Currently there is no need to take legislative action to reduce trans fats in food products in Scotland. The food industry has successfully taken voluntary steps to reformulate many products and as a result the intake of trans fats has been reduced to less than half the recommended dietary limit…our priority is reducing the amount of saturated fat in the diet as this is a far bigger health risk.”

In March 2011, the Department of Health (DH)\textsuperscript{1} launched the Public Health Responsibility Deal.\textsuperscript{25} This was established to encourage businesses and other organisations in England to improve public health and tackle health inequalities through their influence over food, alcohol, physical activity and health in the workplace. Organisations (partners) who sign up to the responsibility deal show that they are committed to taking action to improve public health. This action is expressed as a series of pledges covering food, alcohol, physical activity and health at work.\textsuperscript{2}

The following two pledges from the Food Network relate to trans fats:

\textbf{Artificial Trans Fat Removal}
We have already removed, or will remove, artificial trans fats from our products by the end of 2011.

This will be achieved by eliminating the use of partially hydrogenated vegetable oils (p-HVO) in foods and limiting the levels of trans fats in oils and fats used as ingredients or in preparing foods (eg frying oils) to a maximum of two per cent.

\textbf{Healthier Staff Restaurants}
To implement some basic measures for encouraging healthier staff restaurants/ vending outlets/buffets for staff, including:

- Working with caterers to reformulate recipes to provide meals which are lower in fat, salt, and energy and which do not contain artificial trans fats.

Appendix 2 details the organisations that have signed up to the pledges. These pledges are not intended to replace Government action. As this is a Department of Health lead initiative, the responsibility deal only applies to organisations in England and does not apply to the devolved nations.

In June 2011, a final deal on EU food labelling was provisionally agreed by the European Council. Among the key elements is mandatory nutrition information on pre-packed foods, a minimum font size, and the extension of country of origin labelling. Under the new rules, the energy value and the amounts of fat, saturated fat, carbohydrates, proteins, sugars and salt form the ‘mandatory nutrition declaration’. There is, however, no obligation to declare trans fats as had previously been suggested. The deal is expected to be approved by the European Parliament in Summer 2011 and then adopted soon after.

Food companies will have three years to adopt the new rules, and an additional two years to apply the nutrition declaration rules.\textsuperscript{26}

\textsuperscript{1} In 2010, following the Coalition Government’s restructuring of Arm’s Length Bodies, nutrition policy in England was transferred from the Food Standard Agency to the Department of Health.
What is the UK food industry doing?

In recent years, food manufacturers have been, voluntarily, removing IPTFAs from their products. In 2006, for example, the British Retail Consortium (BRC), whose members include Asda, Co-op, Iceland, Marks and Spencer, Sainsbury’s, Tesco and Waitrose voluntarily committed to remove all IPTFAs from their ‘own-brand’ products. This commitment was achieved by January 2008 and up to 5,000 own-brand products were reformulated.27

International Policy

In March 2010, the European Food Safety Authority (EFSA) reviewed its intake data and published a revised opinion on Dietary Reference Values (DRVs) for fats.28 The EFSA panel concluded that trans fats were provided by several fats and oils that were also important sources of essential fatty acids and other nutrients. They determined that “it was not possible to continually lower the intake of trans fats without compromising the intake of essential nutrients.” The Panel also noted that trans fats intake should be as low as possible within the context of a nutritionally adequate diet. The EFSA did not specify targets for national authorities.

A number of countries in Europe (including Denmark, Switzerland, and Austria) have introduced, or are in the process of introducing national limits for trans fats. Limits to trans fats intake are present in other countries such as Canada and certain parts of the United States of America. A summary of the details are listed below:

<table>
<thead>
<tr>
<th>Country</th>
<th>Date</th>
<th>Action taken</th>
</tr>
</thead>
<tbody>
<tr>
<td>Denmark</td>
<td>2003</td>
<td>Brought in legislation prohibiting the use of fats and oils containing more than two per cent of IPTFAs in food products. Ruminant trans fats are exempt. Products with “free from” claims should contain no more than one per cent of trans fats oil content.</td>
</tr>
<tr>
<td>Switzerland</td>
<td>2008</td>
<td>Limited TFA content in oils to maximum of 2g/100g.</td>
</tr>
<tr>
<td></td>
<td>2009</td>
<td>Limited to maximum of two grams per 100g in all food products.</td>
</tr>
<tr>
<td>Austria</td>
<td>2009</td>
<td>Introduced a legal maximum of two grams of IPTFAs in food products.</td>
</tr>
<tr>
<td>Canada</td>
<td>2007</td>
<td>Health Canada adopted two recommendations outlined by the trans fats task force: 1. limit the trans fats content of vegetable oils and soft margarines to two per cent of total fat content; and 2. limit the trans fats content for all foods to five per cent of the total fat content, including ingredients sold to restaurants. A two year transition period was put in place for the recommendations to come into force.</td>
</tr>
<tr>
<td>New York City</td>
<td>2008</td>
<td>All food service establishments must not serve food containing more than 0.5g of IPTFAs per serving.</td>
</tr>
<tr>
<td>California</td>
<td>2010</td>
<td>A ban on all food containing more than 0.5g of IPTFAs per serving began on 1 January 2011.</td>
</tr>
</tbody>
</table>

In 2006, the US Food and Drug Administration (FDA) made it a requirement for food products to list trans fats levels within the nutritional profile. Foods must declare the quantity of trans fats present in the product where it is above 0.5g.
The National Heart Forum (NHF) is concerned that the FSA’s use of the NDNS, coupled with average intake data, does not account for those sections of the population who may have higher than the reported UK average trans fats intake.

Hu et al studied the effects of trans fats on the risk of CHD in a nurses health study and determined that a nurse’s CHD risk roughly doubled for each two per cent increase in trans fats calories consumed (instead of carbohydrate calories). The differences in intake levels between various sub-groups of the population could, therefore, be an important contributory factor in cardiovascular disease rates.

Three per cent of the general population consume more than the maximum recommended two per cent of energy from trans fats. This is concentrated in the poorest sectors of society.

The Low Income Diet and Nutrition Survey (LIDNS) (that considered diets of the 15 per cent of the population with the lowest income with respect to material deprivation) reported that nine per cent of males and six per cent of females had intakes above the two per cent energy level.

It is important to acknowledge that while average intake data can be used to assess a large population; certain sub-groups, such as those on low-income - who are more likely to eat unhealthier foods for example, fast food and take-away meals, are at a greater risk of CHD from consuming excessive amounts of trans fats.

Research into the consumption rates among lower socio-economic groups is lacking and requires further research to determine the overall causative effect of trans fats on the poorest people.

**Stakeholder views**

**World Health Organization (WHO)**

In 2009, the WHO reviewed current research regarding the associated risk of trans fats in the diet. They concluded that “restaurants and food manufacturers should avoid using IPFTA in food products and that governments should take steps to support alternative fats or oils for trans fatty acids replacement”.

**The Royal Society for Public Health (RSPH) / UK Faculty of Public Health (UKFPH)**

In 2007, the UKFPH issued a position statement on fats highlighting the risk associated with the consumption of trans fats. The UKFPH called for a reduction in consumption of saturated and trans fats. It also called for industry to clearly label the presence of trans fats in a product.

In 2009, the RSPH published, *The rise and fall of trans fat: is the battle won?* in which it discussed the use and availability of trans fats. The report acknowledges that much work has been done to reduce trans fats (with regard to voluntary measures by the food industry) in the diet but also believes focus should now be placed on the developing world to eradicate its use entirely.

The RSPH and the UKFPH manifesto for the 2010 general election called for a ban on IPTFAs. It highlighted the work done in countries such as Austria and Denmark in virtually eliminating trans fats.

**British Heart Foundation (BHF)**

The BHF believes UK food policy should include measures to remove IPTFAs from the UK diet. It has called on the FSA to build on the voluntary work undertaken by the food industry and set robust targets. The BHF has also urged food manufacturers and retailers to clearly label trans fats alongside fat and saturated fat, enabling the public to make informed dietary choices.
The National Heart Forum (NHF)

The NHF has produced policy regarding the use of IPTFAs. They are calling for the FSA to change the way in which data are gathered, which at present is heavily dependent on food manufacturer’s claims of reformulation without independent validation.

NHF Socio-economic concerns

The NHF is also concerned that intakes of IPTFAs are likely to be substantially higher than suggested by the FSA review, particularly among some sub-groups and vulnerable population groups. The NHF indicate that 43 per cent of people asked to participate in the survey did not wish to take part. One reason being that there were ‘language difficulties’. The NHF suggests this may indicate sub groups of the population are not being accounted for.

The Soil Association

The Soil Association has called on hospitals in the UK to adopt their “food for life” mark which seeks to ensure that all food catered by hospitals is of an approved standard. Successful caterers can be awarded with either a bronze, silver or gold mark depending on how they meet the outlined criteria. The bronze mark, as a minimum, is awarded to those establishments that provide meals free from trans fats. To date, two hospital trusts have been accredited under the scheme.

Food and Drink Federation (FDF)

In April 2010 the FDF issued a position statement confirming that its members would continue to reduce IPTFA levels in its food where this does not cause a resultant increase in saturated fat levels.

The British Medical Association

The BMA’s Board of Science has developed comprehensive policy on nutrition, which has resulted in a number of publications including Preventing childhood obesity (2005) and Early life nutrition and lifelong health (2009). The BMA’s 2007 report Adolescent Health highlighted the high consumption rates of trans fats in the adolescent diet and their association with an increased risk of cardiovascular disease.

The BMA continually lobbies the EP to introduce a mandatory system of traffic light food labelling. This would encourage consumers to limit their intake of foods with harmful ingredients, such as trans fats.

Summary points

- IPTFAs have been shown to increase levels of LDL and decrease levels of HDL which in turn can cause an increase risk of CHD.
- The evidence supporting the relationship between trans fats and other associated diseases is minimal and inconclusive.
- The UK population has a trans fats intake of less than the recommended maximum of two grams per day, as such the FSA does not recommend a mandatory ban.
- There is a lack of statistical evidence regarding the consumption rates between different socio-economic groups.
- Through voluntary reformulation, the food industry has reduced the amount of IPTFAs present in food products.
The BMA has a long history of developing policy on nutrition and health, but has only recently considered the issue of trans fats.

Voluntary measures by the food industry have reduced the overall trans fats intake and the research cited in this briefing does not automatically warrant a call for a mandatory ban on IPTFAs, at this time. This reflects the relatively low levels consumed by the majority of the UK population.

The Board of Science welcomed the DH 2011 Public Health Responsibility Deal pledge to remove IPTFAs by the end of 2011. The Board acknowledges, however, that this is a voluntary initiative and is limited to organisations in England that have signed up to the deal. The Board supports these voluntary initiatives while calling on UK Governments to continue to strengthen its policy on trans fats. The Board calls for greater public awareness of the adverse health effects of trans fats.

The Board also calls for more research to consider the impact of socio-economic differences on the intake of trans fats across the UK population.
Appendix 1

Fig. 1 Unilever (2008) Essential Fatty Acids for the growth and development of children

![Diagram of Essential Fatty Acids]

Fig. 2 British Dietetic Association (2006) Examples of international and national influences impacting upon NHS food and beverage services

![Diagram of International and National Influences]
Appendix 2

Department of Health Public Health Responsibility Deal (2011)

F3. Artificial Trans Fat Removal

We have already removed, or will remove, artificial trans fats from our products by the end of 2011.

The following organisations have signed up to this pledge:

ASDA
Aldi Stores Ltd
apetito Ltd
Associated British Foods – UK Grocery Division
Aunt Bessies Limited
Booker Group plc
Burger King United Kingdom Ltd
Burton’s Foods Ltd
Camden Food Co.
Compass Group UK & Ireland
Co-operative Group (the)
Costa Limited
DC Leisure
Dunhills (Pontefract) Plc
Ferrero UK Limited
Fine Lady Bakeries Ltd
General Mills UK
GlaxoSmithKline (GSK)
Greene King plc
Halewood International Limited
Iceland Foods Ltd
Indulgence Patisserie Limited
ISS Facility Services – Food and Hospitality
ISS Facility Services Healthcare
Kellogg Marketing & Sales Company (UK) Limited
Kerry Foods
KFC UK
Kraft Foods UK and Ireland
Marks & Spencer
Mars (UK)
Marston’s PLC
McCain Foods (GB) Ltd
McDonald’s Restaurant Limited
Midcounties Co-operative
Morrison Supermarkets Plc
Nestle UK
OCS Group UK Limited
PA Ross Ltd
PepsiCo UK & Ireland
Pizza Express Restaurants Ltd
Pizza Hut (UK) Limited
Premier Foods
Punch Pub Company
Sainsbury’s Supermarket Ltd
Samworth Brothers Ltd
(Seven) 7 Day Catering Ltd
Subway International B.V.
Tesco PLC
Typhoo Tea Limited
Unilever UK Ltd
United Biscuits (UK) Limited
Waitrose
Warburtons Limited
Weetabix
Whitbread Group PLC
YO! Sushi
Youths Seafood Limited

H4. Healthier Staff Restaurants

To implement some basic measures for encouraging healthier staff restaurants/ vending outlets/buffets for staff, including:

- Ensuring the availability of healthier foods and beverages in all available channels to employees
- Working with caterers to reformulate recipes to provide meals which are lower in fat, salt, and energy and which do not contain artificial trans fats
- Provision of responsibly sized portions of foods
- Provision and promotion of the consumption of fruit and vegetables through availability and price promotion
- Provision of calories and/or Guideline Daily Amounts on menus per portion as a minimum (further nutrients optional)
- Ensure that water is visible and freely available
The following organisations have signed up to this pledge:

ASDA
American Express Services Europe
Associated British Foods – UK Grocery Division
Aunt Bessies Limited
Bacardi Brown-Forman Brands
Beverage Brands (UK) Ltd
Booker Group plc
British Institute of Innkeeping
Britvic Soft Drinks
Business in the Community
Carlsberg UK Ltd.
Central YMCA
Coca-Cola Great Britain
Compass Group UK & Ireland
Consensus Action on Salt and Health (CASH)
Co-operative Group (the)
DC Leisure
Direct Wine Holdings Ltd
Enterprise Inns plc
E.ON
Everards Brewery Ltd
Fine Lady Bakeries Ltd
General Mills UK
GlanzKline (GSK)
Gonzalez Byass UK Ltd
Greene King plc
Heineken UK
Iceland Foods Ltd
ISBA – the Voice of British Advertiser
ISS Facility Services – Food and Hospitality
ISS Facility Services Healthcare
Kellogg Marketing & Sales Company (UK) Limited
Kraft Foods UK and Ireland
Let’s Get Healthy
Maisons Marques et Domaines Ltd
Marks & Spencer
Mars (UK)
Maxxium UK Ltd
McCain Foods (GB) Ltd
Molson Coors Brewing Company (UK) Ltd
Morrisons Supermarkets Plc
Nestle UK
NHS Confederation
NHS Employers
Novo Nordisk Ltd
OCS Group
PepsiCo Uk & Ireland
Punch Partnership
Punch Pub Company
Samworth Brothers Ltd
(Seven) 7 Day Catering Ltd
SkillsActive
Sodexo
Tesco PLC
Typhoo Tea Limited
Unilever UK Ltd
United Biscuits (UK) Limited
Warburtons Limited
Which?
Youth Sport Trust
Zest People Ltd

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