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Australian red meat consumption – predominantly lean in response to public health and consumer demand

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Keywords

meat, beef, lamb, food analysis, food consumption

Disciplines

Arts and Humanities | Life Sciences | Medicine and Health Sciences | Social and Behavioral Sciences

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Title: **Australian red meat consumption – predominantly lean in response to public health and consumer demand**

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Conclusions: Dietary messages and strategies for reducing saturated fat intake have increased fat trimming practices by retailers as well as consumers. Consequently, trimmed red meat is not a major source of saturated fat in the Australian diet. Dietary advice and analyses should ensure data reflects red meat as consumed rather than as purchased to avoid overestimating total and saturated fat intake.

Introduction and methods

Public health messages in the 1970s recommended reducing total dietary fats to reduce intake of saturated fat, which was known to increase risk of cardiovascular disease (Committee on diet and heart disease of the National Heart Foundation of Australia 1974; Australian Academy of Science 1975) and this recommendation appeared in the first national dietary guidelines for Australians (Commonwealth Department of Health 1982). Whilst nutrition research identified the polyunsaturated:saturated fatty acid ratio as being the major risk factor (National Health and Medical Research Council 1992), public health messages focused on dietary fat as a simpler way to indirectly reduce the intakes of saturated fat. This was translated into practical dietary strategies to guide the public towards food choices and meal preparation techniques that would help to reduce intake of saturated fat. Foods contributing dietary saturated fat such as dairy, meat, eggs, oils and spreads were targeted (Santich 2005). Recommendations included choosing lower fat alternatives, trimming fat off meat, moderating meat consumption and promoting low fat cooking techniques such as grilling (Australian Association of Dietitians 1979; Norton 1982).

In the 1980s, there was increasing recognition amongst public health professionals that education alone was not sufficient to achieve changes in health behaviour, and that supportive environmental approaches were needed to complement individual action (Worsley 2008). Strategies were required to make healthy choices easy choices, with a focus on developing supportive environments for healthy lifestyles (World Health Organization 1986; Powles 1988). This included working with food industry to increase the availability of healthier food choices. In 1989, in a report on implementing dietary guidelines for Australians, it was acknowledged that many primary industries, such as the livestock industry, were responding to market demands for lower fat foods through the use of initiatives such as the carcase classification scheme, which promoted payment of market premiums for low fat meat (National Health and Medical Research Council 1989). In the same year, the Heart Foundation's Tick Program was launched which aimed to both influence the food supply and provide an educational message to consumers (Schrapnel 1993).

Over the last 20 years, changing public health messages and strategies have influenced the food supply. Drawing on published survey data, marketing information, analyses of meat content and qualitative research commissioned by Meat and Livestock Australia (MLA) and its predecessor the Australian Meat and Livestock Corporation (AMLC), this paper describes the impact of these messages and strategies on consumers and food industry. It also describes what changes took place throughout the red meat supply chain which has led to today's predominantly lean red meat supply and is reflected in current nutrient composition data.

Results

Influence of public health messages on consumers

Consumer attitudes and food behaviour

Consumer research commissioned by the red meat industry over the last 15 years provides interesting insights into the impact of public health messages on consumers' attitudes and behaviour in relation to red meat.

A tracking study conducted in 1993 (n=680 females), 1994 (n=680 females) and 1995 (n=680 females and 601 males) found that the main sources of advice reported for lowering cholesterol were health professionals and the media (magazine/book/TV) at 47% and 26% respectively (Dangar Research Group 1995). The main recommendations reported for controlling cholesterol were to cut back fat/oil (89%); eat more fruit and vegetables (39%); use low fat milk (33%); cut back red meat (29%). Increasing concern about dietary fat is reflected in reported dietary changes over the 3 years of the study with 61% reporting cutting back on fat in 1993; 65% in 1994; and 74% in 1995. At the same time, consumers increasingly associated red meat with heart disease, rising from 35% in 1993, to 40% in 1994 and 44% in 1995. Of those who reported taking steps to lower their cholesterol, 52% reported eating less red meat.

A quantitative study conducted in 1999 amongst 1000 respondents aged 16 years and over from both metropolitan and rural areas found that 99% of respondents had made at least some effort to improve their eating habits (Dangar Research Group 1999). The main reported dietary changes were more fruit and vegetables (81%); trimming fat off meat/poultry (78%); cutting down on oils (74%); more grain-based foods (73%); less snack foods (67%); less fast foods (66%); less sugar and salt (56%; 54%); less red meat (45% for men and 54% for women); and less dairy (30%). The main health concerns affecting food choice were weight control (67%) and cholesterol (81%). Foods mentioned spontaneously as describing a healthy diet were fruit, vegetables, grains and dairy. Only 27% voted red meat as very healthy and 22% felt that red meat was unimportant in a healthy diet. Over 69% believed that red meat should be eaten in moderation, with the majority of the sample (76%)

reporting eating red meat 1 to 3 times a week and 69% eating moderate sized portions. Almost half claimed to be eating less red meat for health reasons. These perceptions were mainly driven by concerns that red meat was high in fat.

A survey conducted in 2007 with 804 main meal preparers reported that 94% of people believed that the foods they eat will determine how healthy they are in the years to come. Consequently, 89% of participants reported a need to take responsibility for ensuring their own good by making more of an effort to eat healthily than previously. For almost 39% of the sample, a low fat diet was a "way of life for me" and 81% reported making a real effort to prepare meals as low in fat as possible (Roy Morgan Research 2007). Overall, therefore, it seems that people have accepted the message that the food they eat impacts on their health and are seeking less processed and lower fat foods as the basis for a healthy diet.

Trends in consumer meat trimming practices

In 1984 a Melbourne study reported that half of the women and 30% of men thought that trimming fat from meat was 'very important' for health' (Worsley & Crawford 1985). Table 1 summarises national studies showing trends in the proportion of Australians trimming the fat off raw or cooked meat before consumption over the past three decades. In the 1983 National Nutrition Survey (NNS), of the meat cuts that could be trimmed, around 48% of meat and poultry was reported to be consumed trimmed. By the 1995-6 NNS, the percentage of adults reporting trimming had increased to 55%, suggesting that the health messages regarding trimming of fat from meat and poultry had influenced consumer habits (Baghurst & others 2000). The percentages were higher for red meats than for poultry in 1995: 67% people aged 19+ years trimmed beef and 58% trimmed lamb, compared to 47% for poultry (Cobiac & others 2000).

Results from CSIRO State-based dietary surveys in the 1980s are consistent with the national trends, although the absolute values are different, probably reflecting methodological and population differences. In the 1985 CSIRO Victorian survey the proportion of consumers who did not trim their meat was 24%; this declined to 15% in the 1990 Victorian survey and 13% in the 1996 CSIRO Food Attitudes survey (Nardi & others

1997). In South Australian surveys in 1993 only about 10% men and less than 5% of women said that they ate all the fat on meats (Baghurst & others 1994). The same trends are reflected in the National Heart Foundation Risk Prevalence Surveys in 1980 and 1989: the proportion of adults rarely or never eating the fat on meat increased from 42.8% (men) and 51.0% (women) to 48.6% and 64.7% respectively (National Heart Foundation of Australia 1980; National Heart Foundation of Australia 1990).

The most recent data on consumer meat trimming comes from longitudinal CATI surveys conducted for MLA from 2003-2007, and suggests the trend to higher levels of trimming has continued. In 2007, 89% of consumers reported either purchasing red meat trimmed of fat (5%) or removing some or all of the fat prior to consumption (84%). Trimming practices have increased since 2005 where 86% of consumers reported either purchasing red meat trimmed of fat (6%) or removing some or all of the fat prior to consumption (80%) (The Clever Stuff 2007). In 2007, of those who reported trimming fat, 62% of respondents reported removing most of the fat, of whom 59% removed the selvedge (edge) fat whilst 40% removed both selvedge and middle section fat. Typically 72% removed the fat before cooking the meat, 15% both before and after cooking; and 13% after cooking the meat.

Trends in consumer consumption practices

From the early days of colonisation in Australia, meat has been available in abundance and consumption of beef and lamb in the 1800s has been estimated at over 800g/person/day (Clements 1986). From the end of the Second World War there has been a progressive decline of 35% in apparent consumption (Table 2). These estimates - based on production, export and import data – may be unreliable as accurate measures of absolute intakes (because of uncertainty about estimates of domestic wastage), but they are recognised as useful for tracking long term trends (Cashel & Greenfield 1994).

Data from the NNS in 1983 and 1995 (Table 3), as well a series of surveys by CSIRO from 1985 to 1993 (Baghurst & others 1993; Baghurst & others 1996) provide the best recent national estimates of intake, and they confirm the apparent recent declines in red meat consumption. In the 12 years between the two NNS, intake of plain red meat cuts fell 36% in

men and 45% in women, at a time when the intake of poultry remained relatively unchanged (Commonwealth Department of Health 1983; McLennan & Podger 1999). When estimates of additional intake from dishes containing red meat (such as pizza, pies and pasta) are taken into account, the mean weight of total cooked red meat on the day of the 1995 NNS was still quite modest at 88g for adult males, and 45g for adult females (Baghurst& others 2000).

A survey of typical portion sizes of foods as consumed by adults in Geelong in 1989-90 reported mean red meat serve sizes of 105g for men and 82g for women (Conn & others 1994). Several reviews of the trends in red meat consumption in Australia have been published since then (Baghurst 1999; Baghurst & others 2000). In the 1995 NNS, on the day of the survey 71% of men and 59% of women consumed red meat, and mean daily intakes were 73g for men and 37g for women (cooked weight of meat, as eaten) (Commonwealth Department of Health 1983; McLennan & Podger 1999). About 55% of the red meat was eaten as cuts (eg, steak, chops) and the rest in mixed dishes. Red meat intake was contributing less than one tenth of the dietary fat and saturated fat in the Australian diet (Baghurst & others 2000). These values were calculated including those who did not consume any meat on the day of the survey. Further analysis of adults including only those consuming meat on the day showed that males consumed median portion sizes of 101g for beef and veal, and 92g for lamb items, compared to 67g for women for beef and 63g for lamb (Baghurst & others 2000). These values are lower than those reported in the Geelong study five years earlier, supporting the view that portion sizes have been tending to decrease. This trend is in contrast to the general trend to increased portion sizes seen in packaged and foodservice meals (Young & Nestle 2002; Cameron-Smith & others 2002).

In a study of older Australians it has been reported that meat products were the highest contributors to total fat (24.5%) (Flood & others 2006). This is similar to the value of 19.8% reported in 1995 NNS, but this includes mixed dishes made with meat. When meat cuts were distinguished from meat dishes and fast foods (eg, lasagne, hamburgers and meat pies), red meat cuts provided only 4.3% of total fat (compared to 18.7% from fast foods) (Mann & others 2006).

More recent surveys show similar results, with quite modest average serve sizes of red meat. In an analysis of the participants in a twin and sister bone health cross-sectional study of 624 women, reported in 2008, the average intake of red meat was 56g/d in younger women (18-40y) (Nowson & others 2008) and 63g/d in older women (41-68y) (Nowson 2008). The Blue Mountains Eye study, with adults aged 49 years and older, reported that in the 10-year period from 1994 to 2004, the mean daily intake of red meat cuts had reduced significantly (from 42 to 36g for women and from 49 to 40g for men; ($p<0.001$), although there was a small rises in the intake of mixed dishes with red meat (Flood & others 2006). The same study reported that 17% of total fat and 19% of saturated fat came from red meat (Flood & others 2007).

In a study of Sydney children aged 16-24 months in 1998-2000, it was found that 92% were consuming meat and poultry products daily, with a mean intake of 29g/d for red meats (Webb & others 2005). The authors reported that carers were mostly using low fat cooking methods, and in this age group, red meat was contributing only 10.6% of total fat and 8% of the saturated fat intake (Webb & others 2008).

The current trends of reducing red meat consumption have raised some concerns about potential adverse nutritional impacts. Women of childbearing age who consume less than two serves of red meat a week have lower concentrations of ferritin and B12 (Fayet & others 2008), and there is some evidence that consumption of meat may be related to higher bone density in women (Nowson & others 2008). There is also evidence from the last NNS suggesting that including red meat in a meal facilitates vegetable consumption; in 1995 mean vegetable intakes of 348g per day were recorded in those in the highest quintile of red meat intake (>175g/d) vs 216g of vegetables in the lowest red meat quintile (1-49g/d) (Baghurst & others 2000). More recently, a 2007 telephone survey of consumers found that consumption of lean red meat is associated with increased consumption of vegetables. More than three quarters of households serving a main typical meal based on red meat included at least three different vegetables with it (Roy Morgan Research 2007).

Influence of public health on red meat supply chain

In addition to the increasing emphasis on low fat in the 1980s, there was also the increasing demand by consumers for convenience with changing lifestyles as well as increasing food variety with the introduction of new foods and multiculturalism. As the market place became more competitive, changes throughout the red meat supply chain were required to ensure the industry could meet consumers' changing needs for health, convenience, variety, taste, and price.

In the late 1980s, the industry started to respond to consumer concerns about fat. Marketing initiatives included development of new cuts to meet consumers' need for health and convenience as well as information to address concerns and promote health benefits of red meat. To ensure that the corresponding retail product also met consumers' needs regularly and consistently, processes were developed and implemented throughout the red meat supply chain. Unlike manufactured foods, changes in food production processes take a number of years to develop and implement. Together, the following initiatives over the last 20 years have made a significant impact on the fat content of retail red meat in Australia.

Production practices

Genetic selection is a major ongoing innovation in the red meat industry. The major benefit of changes in breeding over the last 20 years is increased productivity that has contributed in a more efficient production of red meat. The ability to produce more saleable meat from fewer animals has important economic as well as environmental benefits.

With the decline of the wool industry, genetics allowed producers to select breeds best suited for meat rather than wool. Breeds that produce a larger, leaner carcass are best for preparing cuts composed of more meat and less separable fat. They also allowed the introduction of a new range of cuts, called Trim Lamb, in the mid 1990s. The increasing use of breeds that produce larger, leaner carcasses made a significant impact on the regular supply of a wide range of trimmed lamb cuts.

In Australia, extensive grazing production systems predominate. The use of grain finishing has increased in Australia as it enables producers to respond more efficiently to consumer demand. Use of grain finishing depends on seasonal variations as well as market demand. Typically, the majority of cattle grazed for up to 18 months on grass are then grain finished for 50 to 100 days. To satisfy the more lucrative, niche demand for highly marbled products in overseas markets, a small proportion of export cattle are grain fed for more than 200 days.

Grass-fed red meat has little marbling with less saturated fat and more omega 3 PUFA (on average 150mg/100g) than red meat produced using extensive grain feeding, as is common in US (Marmer & others 1984; Sinclair & O'Dea 1987; Williams & others 2007). In the Australian context, the impact of diet appears to be much more important than that of breed on the nutrient composition of beef (Sinclair & others 2002; Mann & others 2003). However, the short time frame of grain finishing, as practised in Australia, is likely to have minimal impact on the saturated fatty acid content of the final product (Ponnampalam & others 2006), and the biggest single determinant of the fat content of red meat, as consumed, remains the amount of separable fat trimmed prior to consumption.

Processing

The trimming of excess fat from the external surface of the standard carcass trim before chilling (hot fat trimming) is a practice that was introduced over 10 years ago. The process facilitates the slicing of meat (into primal cuts) according to specifications, while delivering processing efficiencies through reduced energy costs during the carcass chilling process. A further development over the same time period has seen buyer specifications for external fat cover in many cases being reduced from around 12mm to less than 5-6mm (personal communication, Allan Bloxsom, General Manager – Industry Systems, Meat and Livestock Australia).

Butchering

Changes in butchering practices and distribution systems over the last 20 years have made the greatest impact on the fat content of red meat in Australia. Industry initiatives encouraged butchers to trim more fat off retail cuts of meat. At the same time, changes in the way butchers procured meat reduced the amount of fat from red meat entering the retail and foodservice sectors. Traditionally, butchers would purchase a side of beef or a whole lamb carcase from an abattoir or specialized wholesalers and would bone it in the butcher shop. With an increasing lack of skilled labour, and a more competitive market, butchers have moved towards the purchase of cartons of primal cuts of meat which are vacuum-packed and meet desired specifications for age, level of trim and tenderness. With increasing customer demand for leaner meat, the butcher can specify cartons with more highly trimmed product and so pay less for waste (bone and fat). Cartons are also more flexible, because the butcher can specify the volume required of specific cuts chosen according to their customers' requirements. All they have to do is slice and trim the cuts from the primal muscle group.

The development of quality assurance pathways to guarantee tender beef (Meat Standards Australia – MSA) provided guidelines for processing, butchering and cooking meat and introduced a new range of retail cuts. MSA set out to provide the consumer with the means of selecting and cooking meat that is predictably tender, and a means by which producers and processors could consistently produce such meat (Meat and Livestock Australia 2009). Extensive research was carried out to identify factors throughout the supply chain which influence the eating quality of meat. This program generated a range of sub-primal cuts, smaller in portion size and trimmed of visible fat. Retail butchers quickly adopted these new cuts as they could easily be prepared from cartons of trimmed primal cuts and provided more value.

Retail practices

The increasing dominance of supermarkets in food retailing also had an important influence on the way that red meat is sold in Australia. Consumer purchasing practices have changed

from purchases predominantly at butchers and independent grocers in the 1980s to two-thirds of meat being purchased from supermarkets today.

Supermarkets changed retailing dramatically. Instead of meat being purchased in bulk, by the kilogram, and being cut and prepared according to consumer requests directly to a butcher, in supermarkets meat is selected from a choice of pre-prepared cuts sold per pack price. With increasing volume, supermarkets were able to take greater control of the supply chain to ensure a consistent, quality product. Today, most supermarkets purchase livestock on-farm. Meat is then centrally processed according to strict specifications before distribution to stores. The smaller stores do not have in-store butchers. Larger stores with in-store butchers are supplied with standardised cuts charts describing trimming specifications to ensure that meat cuts on display are fat-trimmed, particularly those where claims are made that the meat is lean. These cut charts are described on posters and in manuals describing maximum levels of trim for each cut and showing how meat should be displayed. Consequently, trimmed meat is widely available in stores throughout Australia and there is little variation in the type of meat sold in different geographic areas.

Independent butchers had to adapt to remain viable in this increasingly competitive market. No longer were customers willing to accept poor quality, fatty meat. They were demanding lean meat that tasted good and which they could prepare quickly and easily. To differentiate themselves from supermarkets, butchers became more innovative and offered customers a wider range of product choice, including the newer, trimmed meat cuts.

Several responses from the meat industry can be seen at this time. In 1987, the AMLC initiated a national promotion to meat retailers to encourage the sale of lean beef cuts trimmed of visible selvage. To reinforce the importance of trimming meat, the *Short Cuts* advertising and promotional activities from AMLC in the late 1980s illustrated the use of lean portions of meat in moderate servings with other accompaniments. Throughout the early 1990s, the education of butchers to trim meat cuts became a major objective in its own right. By August 1993, 36% of all independent meat retailers offered fat-trimmed beef cuts (Lewis & others 1993).

In 1992, a new range of 16 Trim Lamb cuts was launched, derived from larger leaner lambs, and AMLC published nutritional analyses showing that most of the new lamb cuts had a fat content of less than 5% of edible portion (Sadler & others 1993). Seven new Master Trim beef cuts were also introduced and were analysed in 1995 (Sinclair & others 1999). These cuts (eg, rump medallions), each obtained by cutting along the seams of primal muscles to produce products free of any connective or fatty tissue, were very lean and smaller than traditional cuts, making them quick to cook.

The Heart Foundation's Tick was starting to be used in the 1990s to reassure consumers that the fat-trimmed products could be included in a healthy dietary pattern and that they were low in saturated fat. The high profile marketing of the Tick provided a key incentive to ensure trimmed lean red meat was widely available. Butchers were supplied with point-of-sale material and instructions on how to display the material only on appropriate products. However, with over 3,500 independent butchers, compliance was difficult to police and butchers were reluctant to enter into individual legal agreements to be allowed to use the Tick logo. Consequently, the Tick was not widely displayed by butcher shops despite increasing trimming of red meat. Nonetheless, the Tick criteria (4% or less saturated fat and no visible fat) have been influential in the way meat is now displayed and presented to consumers. Changes in the butchering and marketing of red meat have resulted in a wider availability of trimmed cuts in retail settings, particularly since the early 1990s. Recent MLA data lists 18 beef cuts, 11 lamb cuts, 5 veal and 2 mutton cuts available with less than 10% fat (Meat and Livestock Australia 2007).

Food service

Interest in health was also reflected in food service menus which increasingly list the amount of calories and fat of meal options, particularly in room services of hotels (personal communication, Lachlan Bowtell, MLA). The introduction of new, leaner cuts of red meat, particularly of lamb, made a significant impact on the type of cuts and amount of red meat used in food services, which were the first to take up the new Master Trim and Trim Lamb

cuts, partly because they were more cost efficient (i.e. single portion products). As a percentage of total lamb purchased, Trim lamb was reported to represent 90% in nursing homes, 70% in restaurants and cafes, and 50% in canteens and independent fast food outlets (BIS Shrapnel 1997). Portion size in food services has reduced from 220g to 150g (personal communication, Lachlan Bowtell, MLA). The type of cut used also influenced the type of cooking method with, as a percentage of total cooking method, grilling being the most frequently used cooking method for beef in 1999 (McKinna 1999).

Advertising and promotional campaigns

Marketing of red meat consists of consumer and health professional communications programs as well as in-store point of sale material. Since the 1980s, marketing campaigns have addressed consumer interest in health and nutrition. The *Iron* campaign in the 1980s and early 1990s promoted the importance of red meat as a crucial source of iron in the Australian diet, particularly for women. The *Trim Lamb* campaign in the 1990s, supported by the Heart Foundation's Tick Program, promoted the lower fat content of trimmed meat and provided consumers and health professionals with information showing that red meat trimmed of all visible fat had less than 10g of fat per 100g of raw meat (Sadler & others 1993). More recently, the *Red Meat. Feel Good* campaign promoted the nutrient density of red meat and its contribution to vitality, wellbeing, growth and development. Presentation of red meat in marketing and promotional material has always shown lean cuts, trimmed of all visible fat and in small portion sizes. Recipe criteria from the Heart Foundation have provided guidance in recipe development to control the fat and sodium content of additional ingredients.

Scientific evidence provided the support for these communication programs. Where required, research was commissioned to understand the nutritional profile of red meat and its contribution to public health in Australia. Over the years, the red meat industry has commissioned studies to analyse the nutrient content of retail red meat cuts and these studies demonstrate the changes in the fat content of red meat as a result of changes in butchering,

retailing and consumer practices (Sadler & others 1993; Cobiac & others 2003; Droulez & others 2006; Williams & others 2006; Williams & others 2007).

Nutrient composition

In the 1970s the Australian food composition tables (Thomas & Corden 1977) generally relied on information about red meat from overseas sources, or data collected over 40 years earlier when the first Australian national dietary survey was carried out in 1944, and only presented values for cooked (untrimmed) meat products. The values for the fat content of average red meat ranged from 8.8% for grilled lean fillet steak, to 25.4% for grilled rump steak, 30.8% for roast lamb and 35.8% for grilled lamb cutlets. The first modern analyses of the nutrient composition of meat were undertaken in the early 1980s and showed that the fat levels at that time were actually lower than previously reported and lower than similar meats in the USA and UK (Hutchison & others 1987; Greenfield & others 1987a; Greenfield & others 1987b). It was noted at the time that this was not surprising and probably reflected local methods of raising animals, with pasture rather than intensive grain feeding and slaughter at an earlier age (Johnson 1987).

Since then a number of other studies have been completed. In 1990 surveys of untrimmed samples of retail beef and lamb cuts in Melbourne found wide variations in the fat content of retail samples, but the average levels were approximately 20% lower than those reported in the early 1980s (Watson & others 1992a; Watson & others 1992b). In 1992 new Trim Lamb cuts were launched and analytical data on these cuts was commissioned by the then AMLC (Sadler & others 1993). Analyses of Master Trim beef cuts and several other new lamb cuts were also performed by ANZFA for MLA between 1995 and 1998 (Sinclair & others 1999). In 2002 new studies of 30 cuts of beef, veal, lamb and mutton were undertaken, including analyses of vitamins B12 and E for the first time and significant new data on the fatty acid profile of red meat (Droulez & others 2006; Williams & others 2006; Williams & others 2007).

Table 4 summarises the trends in the fat content in some representative cuts of untrimmed red meat over a 20 year period. There have been significant reductions in the total fat of all cuts, even those that were already relatively low in the 1980s; for example the fat content of chump chops reduced by 70% and scotch fillet by 48%. The greatest part of this change has resulted from reductions in the separable fat on the retail cuts (Table 5). This is reflected in the average thickness of selvage of cuts collected for gross composition analyses in 2000-2002, which is generally 5mm or less (Table 6) (Cobiac& others 2003; Williams & others 2006). These changes are similar to the changes seen in the red meat in other countries such as the UK (Chan & others 1995).

Although there have also been some reductions in the fat content of the lean muscle meat (trimmed of visible fat), these have been less significant. For example, comparing analyses of the lean components in 1983 and 2002, the changes were from 4.4 to 2.8g/100g for scotch fillet, 1.8 to 1.5g/100g for veal stack, and 6.6 to 4.3g/100g for lamb chump chops, while some cuts such as rump and silverside remained largely unchanged (Williams & others 2006).

Despite the significant reduction in average fat content, there is still considerable variation in the products available to consumers in the marketplace and in consumer trimming practices. This can be challenging for health professionals who need to describe the meat as it is consumed rather than as it is purchased. Consequently, another outcome of the analytical studies was the presentation of nutrient composition data as “lean” (meat trimmed of both internal and external separable fat); “semi-trimmed” (trimmed of external separable fat only); and “untrimmed” (where external and internal fat remains). Internal fat is separable fat which is found between muscles. External fat is selvedge fat found on the outside of the meat (Cobiac& others 2003).

These changes in the fat content of red meat are reflected in the decreasing contribution of red meat cuts to the total fat intake of Australian adults: from 12% in 1983 (Department of Community Services and Health 1987) to 9% in 1995 (Baghurst& others 2000). However, red meat continues to be a nutrient-dense food: an excellent source of high biological value

protein, vitamin B12, niacin, vitamin B6, iron, zinc and phosphorus (providing over 25% of the RDI of these nutrients per serve) and also a source of long-chain omega-3 polyunsaturated fats, riboflavin, pantothenic acid and selenium, while contributing less than 10% to dietary saturated fat (Williams 2007). In addition, consumption of lean red meat is associated with increased consumption of vegetables (Meat and Livestock Australia 2008).

Summary

This paper has shown that over the past 20 years increasing consumer awareness of the importance of health and the role of saturated fat, driven through the media by public health organisations such as the Heart Foundation, has influenced consumer practices and the food supply. Consumers started buying more low fat food products, trimming fat off meat and eating less red meat. Demand for lower fat products drove changes in retail red meat. More trimming of fat from red meat throughout the supply chain, from processors to butchers to consumers, together with the introduction of new leaner cuts, have contributed to the predominantly lean red meat supply in Australia today. These changes have influenced the role of red meat in the Australian diet: it continues to makes an important contribution to intake of key nutrients such as iron, zinc, B12, long chain omega 3 without making a large contribution to intakes of saturated fat and energy.

There is wide variability in the amount of separable fat on retail red meat cuts. However, few consumers report consuming red meat as purchased. In dietary analysis, care is required to correctly estimate the amount of fat trimming by consumers, to ensure that the nutritional values reflect red meat as consumed rather than as purchased. Incorrect selection of data may overestimate the contribution of red meat to total fat and saturated fat intake in the Australian diet.

Table 1. Fat trimming practices

Year	Source	% adults trimming meat
1980	NHF risk factor prevalence survey (National Heart Foundation of Australia 1980)	42
1989	NHF risk factor prevalence survey (National Heart Foundation of Australia 1990)	49
1993	National nutrition survey (Worsley & Crawford 1985)	48
1995	National nutrition survey (Baghurst& others 2000)	63 beef (67%), lamb (58%)
2005	MLA – CATI survey (The Clever Stuff 2007)	86*
2007	MLA – CATI survey (The Clever Stuff 2007)	89*

*either purchase meat trimmed or trim prior to consumption

Table 2. Apparent consumption of red meat 1948-2008 (g/day) (Australian Bureau of Statistics 2000)

Year	Beef and Veal	Lamb	Mutton	Red meat total
1948/9	136	31	56	223
1958/9	154	36	63	253
1968/9	110	56	52	218
1978/9	178	39	10	227
1988/9	112	41	19	172
1998/9	100	32	12	144
2007/8*	98	31	7	136

* based on ABARE Australian Commodities data (Meat and Livestock Australia 2008)

Table 3 National Nutrition Surveys 1983 (Cashel & others 1986), 1985 (English & others 1988), 1995 (McLennan & Podger 1999) and 2007 (Bowen 2009): mean intake of red meat cuts by adults and children (g/day)

		Beef & Veal	Lamb & mutton	Total red meat cuts
Adults				
1983	Males 25+y	73	32	105
	Females 25+y	42	22	64
1995	Males 19+y	58	15	73
	Females 19+y	28	9	37
Children				
1985	Males 15y	38	18	56
	Females 15y	24	10	34
	Males10y	23	12	35
	Females 10y	21	11	33
2007	Males 14-16y	- *	-	38
	Females 14-16y	-	-	21
	Males 9-13y	-	-	24
	Females 9-13y	-		22

* not available

Table 4. Trends in analysed fat content of red meat cuts as purchased (untrimmed) from different data sets (g/100g)

Years of analyses and data sources	Rump	Blade	Round	Scotch Fillet (rib eye)	Silverside roast	Veal steak	Lamb leg	Lamb loin chop	Lamb Forequarter	Lamb Chump chop
1982/83 (Hutchison & others 1987) (Greenfield & others 1987a; Greenfield & others 1987b; Cashel & others 1989)	16.7	9.3	9.1	11.0	11.8	2.7	13.6	32.2	21.2	32.7
1992 (Lewis & others 1993; Sadler& others 1993) (Watson & others 1992a; Watson & others 1992b)	12.7	5.9	6.5	-	3.3	-	10.2	-	21.9	15.4
1996 [a]	-	-	-	-	-	-	-	17.4	-	-
2002 [b] (Williams & others 2007)	4.6	4.4	3.5	5.7	2.9	1.8	6.5	7.1	10.9	9.6

[a] AMLC 7-Cut study; analyses performed by ANZFA, unpublished
[b] Calculated for trim cuts, using values of % separable lean and fat from (Williams & others 2006) and (Cobiac & others 2003)
- data not available.

Table 5. Percentage separable fat in retail samples 1983-2002
(% of total raw weight)

	1983 (Greenfield & others 1987a; Greenfield & others 1987b)	**2000/2002** (Cobiac & others 2003; Williams & others 2007)	**% reduction**
Lamb chump chop	28.0	21.5	23
Rump steak	18.0	12.0	33
Lamb shoulder	17.0	13.8	19
Silverside roast	12.0	7.4	38
Fillet steak	10.0	6.6	34
Veal steak	3.0	1.2	60

Table 6. Mean external fat width (mm) of raw beef and lamb cuts 2000-2002 (Cobiac & others 2003; Williams & others 2006)

Cut	Mean (SD)
Beef	
Rump steak	5.0 (2.8)
T-bone steak	4.9 (2.0)
Porterhouse steak	4.5 (2.1)
Topside	2.8 (1.6)
Scotch fillet	1.2 (1.8)
Round steak	0.9 (1.8)
Lamb	
Chump chop	5.5 (5.1)
Loin chop	4.9 (1.8)
Forequarter chop	4.1 (1.9)
Leg	3.8 (2.0)
Frenched cutlet	2.1 (2.2)

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