Keeping Cool

Discussion Paper for a

NSW Medical Cooling Energy Rebate

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Contact:
Dr Michael Summers
Senior Policy Advisor
MS Australia
The Nerve Centre
54 Railway Rd Blackburn VIC
Ph: 03 9845 2730
Email: msummers@mssociety.com.au

Executive Summary

Heat intolerance is a significant medical problem affecting people with MS. As little as 0.5C increase in core body temperature can significantly increase MS symptoms. Heat intolerance also significantly affects some people with a range of other conditions such as Parkinson's Disease, post-polio syndrome and spinal cord injury.

There are approximately 6000 people with MS in NSW. Approximately 48% have personal incomes of less than $16,000 per annum, and also face significant disease-related out-of-pocket costs of $3,893 annually.

These out-of-pocket costs, combined with (a) rising electricity prices; (b) the increasing economic pressures on households generally and (c) the increasing number of hot days and nights due to climate change, mean it is more and more difficult for people with MS (and other heat intolerant conditions) on low incomes to keep cool on hot days and nights.

While most of us have a choice about whether or not we turn on the air conditioner, this group does not.

Both WA and VIC have energy rebates schemes in place to assist those on low incomes with a medical need to keep cool pay part of the costs of running their air conditioners. Both of these schemes indicate that this very significant need for a small group of people which can be met with minimal costs to government.

It is estimated that people with MS in NSW spend $250-300 annually operating their air conditioners in an effort to stay cool.

It is proposed that the NSW Government implement a Medical Cooling Energy Rebate to cover half of this cost: $125-150 annually.

At a minimum, eligibility should be the same as the current Pensioner Energy Rebate, with the additional requirement to have a doctor sign-off on the 'medical need' for cooling similar to VIC and WA. Consideration should also be given to including those with Healthcare Cards to ensure that all of those with low incomes and a medical need to keep cool have access.

Administratively the simplest way forward would be to structure this rebate similarly to the Pensioner Energy Rebate – a flat annual rate. This much needed support should be indexed annually to residential electricity tariffs so it is not eroded over time.

Alternatively, a percentage-based rebate could be established and should be set in such a way to ensure that $125-150 annually reaches those who are eligible. This would avoid the need for annual indexation.

There are approximately 7-8000 people in NSW that would be eligible (if eligibility is that same as that in Victoria – including Healthcare Card holders). But it will take many years for full capacity to be reached, with estimated costs to the NSW Government of $250-300,000 in the first year, and $726-871,000 in the third year.

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Introduction

Heat intolerance is a significant medical problem affecting people with MS. As little as 0.5C increase in core body temperature creates an increase in MS symptoms for 60-80% of people with MS (Hall & Hunziker 2007; Scott et al. 2005). 'Heat worsens and cooling improves negative symptoms of multiple sclerosis, sometimes dramatically so' (Baker 2001).

There are approximately 6000 people with MS in NSW, and approximately 48% have personal incomes of less than $16,000 per annum (Access Economics 2005). In addition, people with MS also face significant MS related out-of-pocket costs of $3,893 on average annually (Access Economics 2005).

These out-of-pocket costs, combined with (a) rising electricity costs; (b) the increasing economic pressures on households generally and (c) the increasing number of hot days and nights due to climate change, mean it is more and more difficult for people with MS (and other heat intolerant conditions) on low incomes to keep cool on hot days and nights.

Running air conditioners on hot days and nights is a luxury for many people, but for people with MS it is a medical necessity.

MS is a chronic, progressive and incurable disease that attacks the central nervous system (brain and spinal cord). Most people with MS are of working age (87%) and 75% are women.

Heat Intolerance

Increases in the core body temperature slows down already problematic nerve transmission, exacerbating MS symptoms such as blurred vision, extreme fatigue, muscle weakness, pain, tremors, memory problems, loss of balance, bladder and bowel problems, numbness and tingling, decreases in cognitive function, and in severe instances partial or complete paralysis.

In discussions with people with MS regarding what happens to them when they get hot, remarks such as the following are common:

> 'Once I get hot, I hit the wall and all I can do is go to bed, often for 18 hours at a time because I am so exhausted I can't even think or do anything else.'
>
> 'Last time it was hot my vision was blurred and I could hardly see anything. I just had to sit at home in my one room with an air conditioner and try and get cool. It took a few days for the tiredness and my eyes to improve.'
>
> 'It's really hard to look after my three kids when it's hot, I can't keep up.'

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In short, heat intolerance is a significant and medically serious problem for people with MS. Symptoms usually return to their baseline status when the body temperature returns to normal, but can be serious enough to result in hospitalisation on occasion.

Heat intolerance can result in GP visits, increased use of medications, and major impacts on quality of life. Because most people with MS are of working age, and often in the middle of raising families, if they are not able to keep cool they cannot undertake basic domestic activities such as looking after children or essential employment related-activities.

Approximately 32% of people with MS have mild symptoms (no or minimal functional disability such as mild walking impairment or visual disturbances), and 46% have moderate symptoms (ranging from incontinence to being unable to undertake a full day of activity). People with severe disabilities from MS (21%) are typically unable to walk unaided over any distance without assistance such as two canes or a wheelchair (Access Economics 2005). Heat intolerance is a significant issue across this spectrum of severity, and can for example, result in those with mild symptoms experiencing severe symptoms.

Economic Impact of MS

There are significant costs associated with having MS. Access Economics (2005) found that the average annual costs to people with MS and their families in Australia is $10,500 ($3,893 out-of-pocket and $6,593 for informal care). It is this overall cost burden that makes concessions so vital to people with MS on low incomes, many of whom are on partial and full government pensions.

These overall economic costs make it more likely that people on low incomes with MS will struggle to cover the additional costs of keeping cool on hot days and nights. One consequence is not using air conditioners as much as they ideally should, resulting in increased health problems. This in turn can lead to increased costs through greater use of medications, visits to GPs, and hospitalisation, and has a significant impact on quality of life.

These very significant economic costs are borne by people with MS and their families across the financial spectrum. However, like other people in the community with chronic illnesses, overall people with MS have lower income levels than the general community. Although 87% of people with MS are of working age, and most people with MS are employed when first diagnosed, 80% are not employed 10 years after diagnosis.

Consequently, although many people with MS are employed, ultimately most end up on fixed incomes provided through part and full pensions. The combination of low incomes and the high economic costs of MS means that concessions such as energy rebates are often a critical financial factor in their daily lives.

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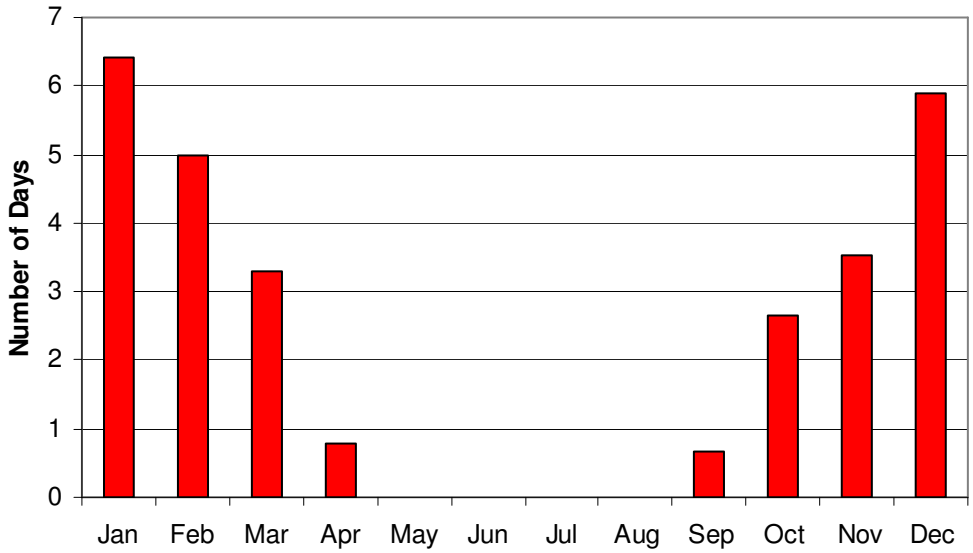
Psychologically concessions also appear to play a significant role, indicating to people with MS that they have not been forgotten. Concessions are a daily reminder that they live in a just and caring society.

Climate

As the number of hot days and nights increase, the use of electricity increases for people with MS in their efforts to keep cool, pushing up costs to a group already under considerable economic pressure. Moderate to high levels of humidity, coupled with hot days and nights, also makes it much more difficult for people to keep cool.

On average there are 28 days each year that are 30C or higher in the Sydney area (see Figures 1 below). There is also considerable variation across Sydney area locations. For example, Observation Hill averages only 15 days 30C and over annually, in contrast to Bankstown which has 42.

Figure 1: Average Number of Days 30C and Over for Sydney Area by Month

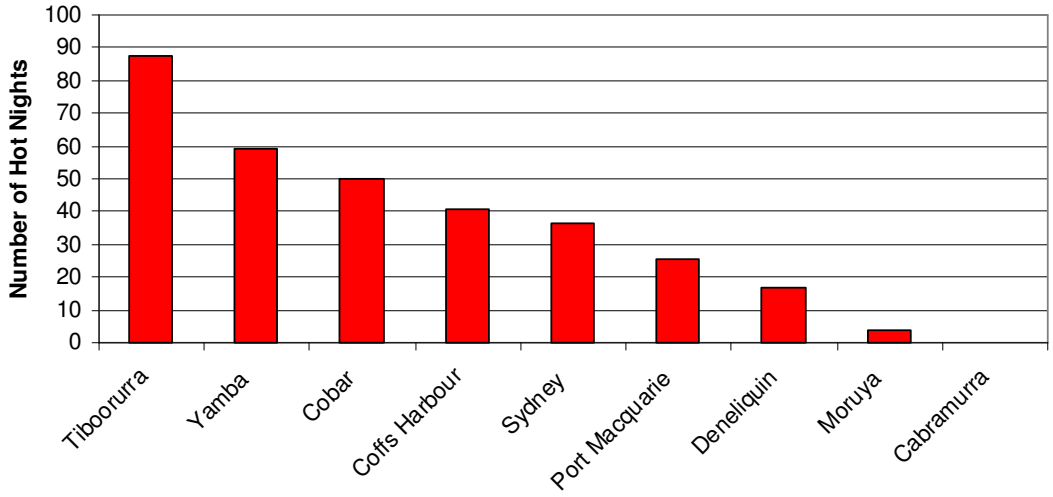


Source: Australian Bureau of Meteorology: http://www.bom.gov.au/climate/averages/; based on averaged data across 5 Sydney area sites: Observations Hill, Bankstown, Parramatta, Airport, and Riverview Observatory.

Similarly there are wide variations across NSW locations generally. Figure 2 below summarises differences in hot nights (20C or greater) between 1962 and 2006. There are more than twice as many hot nights in the north-east of NSW than there are in Sydney, and less in mountains and the southern coast.

Additionally, climate change data compiled by the Australian Bureau of Meteorology demonstrates a national trend towards more hot days and nights in recent years, which is linked to global warming (see figures A1 and A2 in the Appendix).

Figure 2: Average Number of Hot Nights Across NSW (1962-2006)



Source: Australian Bureau of Meteorology supplied the data sets from which this data was extracted. Hot nights have a minimum temperature of 20C or higher.

One of the problems of only considering air temperature is that it does not take into account the impact of humidity on the body's capacity to keep cool. When reviewing information on air temperature it is important to consider the additional impact of humidity in some parts of the state during the warmer months. Figure A3 in the Appendix compares each state's average maximum 'apparent temperature' which combines humidity and air temperature into a single measure.

Western Australian Thermoregulatory Dysfunction Subsidy Scheme

The Western Australian Government implemented a Thermoregulatory Dysfunction Subsidy Scheme in January 2007. The overall projected budget is $500,000 to provide 1500 people with $335 annually (paid in monthly instalments).

The subsidy is administered by the Office of State Revenue which also administers the Life Support Equipment Energy Subsidy. To be eligible the person suffering Thermoregulatory Dysfunction must be:

- Certified by their treating physician as suffering clinical thermoregulatory dysfunction, as a result of their condition, that is of such severity that without artificial control of their immediate physical environment they would suffer serious adverse consequences and further medical complications.
- In possession of a valid means tested concession card issued by either Centrelink or the Department of Veterans' Affairs, being either a: Pensioner Concession Card; Health Care Card; or Health Care Interim Voucher.

A review of this subsidy scheme is being undertaken, information to date indicates a lower than anticipated uptake rate due to administrative issues that are being addressed.

Victorian Medical Cooling Concession

The Victorian Medical Cooling Concession (previously known as the MS Summer Concession) was implemented approximately 10 years ago, and has provided a discount of 17.5% on summer (Dec, Jan and Feb) electricity bills for those eligible. In July 2008, the concession was expanded to 6 months of coverage (Nov-April), and the annual budget commitment was increased from $126,000 annually to $2.4M over 5 years ($625,000 annual average).

Similar to the WA scheme, to be eligible applicants must be assessed by a medical practitioner as having a significant heat intolerance problem. They must also hold a Pensioner Concession Card, Health Care Card or Veterans' Affairs Gold Card.

In 2006-07 the Victorian concession assisted 6,652 people. It is estimated that approximately 2500 of these are people with MS. Other conditions receiving the concession include:

Lymphoedema	Cerebral Palsy
Parkinson's Disease	Scleroderma
Fibromyalgia	Motor Neurone Disease
Muscular Dystrophy	Poliomyelitis and Post Polio Syndrome
Chronic Fatigue	Quadriplegia
Systemic Lupus Erythematosus	

Costs of Running Air Conditioners in NSW for Medical Cooling

One of the key issues in relation to determining the appropriate funding level for a NSW Medical Cooling Energy Rebate is the annual running cost of air conditioners for people who require medical cooling. There does not appear to be any direct research or data available regarding actual electricity consumption in relation to air conditioner use by people with a medical need to keep cool in NSW. However, estimates can be made based on several available pieces of research and data sets.

Complex modelling has been undertaken in an attempt to identify average energy consumption of household cooling over time and across states (see Figure 23 and Table 9 in Department of Environment, Water, Heritage and the Arts 2008), but the results are not readily transferable to people with a need for medical cooling. This is because for 'average households' air conditioners are used much less as a consequence of (a) people not being at home due to work, study and other out-of-home activities, (b) the temperature level at which many people with MS begin to experience problems is much lower than the average 'comfort' level of most people, and (c) because the ability to tolerate and adjust to short or long periods of warmer temperatures for the average person is very high relative to that of a person with MS –

most simply cannot 'afford' to get hot for even an hour, and it takes considerable time to cool down once they are hot.

People with MS do not get sufficient relief from fans or evaporative air conditioners because these cannot extract enough heat. Consequently they need to use the more energy intensive refrigerated air conditioning systems such as those commonly described as window units and split-systems. Data regarding running costs for these are only available for new products, which are at least 25% more efficient that previous products, primarily due to the use of inverters and other recent technological advancements.

Three different methods were used to estimate the annual costs for someone with a medical cooling need (see Figures A4, A5 and A6 in the appendix). All of the methods used are conservative for a variety of reasons related to each method utilised. Common conservative assumptions across all three methods include modelling based on a new high efficiency air conditioner to cool a single room (6m x6m x 2.7m).

Estimate results were:

- Method 1 - $141
- Method 2 - $232
- Method 3 - $184

Using the results of Method 3 (which is approximately the average of all three methods), and recalculating it based on assumptions that (a) 80% of people with MS are operating air conditioners that are a few years old and 25% less efficient than new ones, and (b) that half of these households are cooling twice the amount of space, the more likely average figure is around $330. While many people with MS do say that they have a 'cool room' set up with the bare essentials in which they 'live' on hot days/night, many others – especially those with young children and those living alone – require cooling for larger areas than just one room.

Notwithstanding efforts to make these estimates as precise as possible, they can only be a rough guide. Consequently we are proposing slightly conservative 'probable average cost' range of between **$250-300.**

Non-government Assistance

Significantly, people with MS and the MS Australia ACT/NSW/VIC are not relying exclusively on the NSW Government for assistance with heat intolerance.

To minimise running costs and the carbon footprint, it is vital that people who qualify for a NSW Medical Cooling Energy Rebate are also able to access assistance in relation to acquiring and installing the most energy efficient air conditioners available.

An important corollary to this is to also providing access to energy audits and resources to ameliorate problems identified, such as insulation, roof vents and external awnings/blinds.

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In 2008 the MS Australia ACT/NSW/VIC embarked on a major fundraising campaign to provide 2000 high efficiency/low carbon footprint air conditioners for people with MS on low incomes over the next 3 years in NSW. This program also includes energy audits and retro-fitting of items such as blinds and roof insulation (including assistance to access the NSW residential rebate scheme for up to $300 for ceiling insulation).

People with conditions other than MS who require medical cooling may not have access to similar non-government programs.

A Medical Cooling Energy Rebate

In NSW the Pensioner Energy Rebate provides broad support to people on low incomes who need assistance meeting the cost of utilities. Additionally, the Life Support Rebate provides vital assistance for people who need to operate a variety of life support equipment.

However, as indicated above, there is a small group of people in the community who need additional support to ensure that they can keep cool to maintain their health and to maximise their ability to function on hot days and nights.

Likely costs to the NSW Government for a Medical Cooling Energy Rebate appear to be modest in relation to cost minimisation and prevention regarding the ability of people to carry on their usual day-to-day domestic activities, their capacity to maintain employment and reduced demands on disability, community care and health care systems.

Eligibility

It is proposed that, at a minimum, eligibility would be the same as the current Pensioner Energy Rebate, and the additional requirement to have a doctor sign-off on the 'medical need' for cooling similar to VIC and WA.

The quote from below from the NSW Department of Water and Energy describes the current eligibility requirements for the Pensioner Energy Rebate:

> Pensioners can receive the rebate regardless of the income of other people who live with them.
>
> Pensioners who are solely or jointly liable for utility bills at their principal place of residence are eligible for the rebate if they have a:
>
> • have a Centrelink Pensioner Concession Card; or
>
> • have a Department of Veterans Affairs Pensioner Concession Card; or
>
> • receive a Department of Veterans' Affairs Pension for War Widows or War Widowers or a Disability Pension at the "totally and permanently incapacitated"(TPI) rate or "extreme disablement adjustment" (EDA) rate (as shown on the Repatriation Health Card i.e. the "Gold Card").

Consideration should also be given to expanding the eligibility criteria to those holding Healthcare Cards to ensure accessibility to additional people who have low incomes and a medical cooling need, but may not qualify for a pensioner concession card or DVA pension as described above.

Payment Structures and Costs

Administratively the simplest way forward would be to structure this rebate similarly to the Pensioner Energy Rebate – a flat annual rate. Given the above estimates of $250-300 annual running costs for those needing cooling, it is proposed that these costs be split equally between government and individuals.

An annual rebate of $125-150, indexed to average residential electricity tariffs appears to be the fairest way to ensure that this much needed support is not eroded over time. Another alternative would be indexing it to CPI, although this will not be as sensitive to electricity price changes over time, and expenditure for electricity in these households is proportionally larger than for average households.

Using the current VIC uptake levels of last year – 6652 – as a benchmark (and keeping in mind that in VIC Healthcare Card holders are eligible) it seems likely that if eligibility criteria are the same, there would currently be approximately 7-8000 people in NSW eligible for this concession (less if Healthcare Card-only applicants are excluded). However, uptake of the new WA subsidy last year was very low, and similarly it took 4-5 years for VIC uptake level to reach approximately 75-80% of current penetration levels.

Assuming that the new Medical Cooling Energy Rebate is well publicised to its target group and administratively straightforward for eligible recipients, the table below outlines possible costs to Government over the next 5 years.

Table 1: Estimated Costs Over 5 Years

Year	Uptake	Rebate*	Cost ('000)
2009-10	2000	$125.00-150.00	$250-300
2010-11	3500	$137.50-165.00	$481-577
2011-12	4800	$151.25-181.50	$726-871
2012-13	6000	$166.38-199.65	$998-1,198
2013-14	7000	$183.02-219.62	$1,281-1,537

*Rebate level assumes indexation to electricity prices with annual increases of 10%, if prices rise more or less, or a different indexation is used such as CPI final result will differ accordingly.

The other administrative option is to make the rebates a proportion of the electricity bill. This would provide some administrative challenges because existing mechanisms and frameworks are already in place for flat annual payments. However, using a proportional structure may be the most economically efficient and fairest option as it avoids the need for annual reviews and indexation, and a cap could be set to minimise excessive use. Care would need to be taken in setting any caps given the wide range of different climatic conditions across the state.

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If a percentage-based option is utilised it needs to ensure that average payments are similar to those outlined above of $125-150, and would therefore have little impact on actual costs to government.

Conclusion

There is a pressing need to fill this existing gap in the NSW energy rebate structure for people who require cooling as a result of conditions such as MS, spinal cord injury and Parkinson's Disease. Evidence from both WA and Victoria indicate that this can be done effectively and fairly without excessive costs to government.

While most of us have a choice about whether or not we turn on the air conditioner, this group does not.

This is a real opportunity for the NSW Government to provide much needed and well targeted assistance to a small group of people who are finding it increasingly difficult to maintain their everyday domestic activities on hot days and nights.

References

Access Economics 2005, *Acting Positively: Strategic Implications of the Economic Costs of Multiple Sclerosis in Australia*, Access Economics, Canberra.

Baker, D.G. 2002, 'Multiple Sclerosis and Thermoregulatory Dysfunction', *Journal of Applied Physiology*, vol 92, pp. 1779-1780.

Department of the Environment, Water, Heritage and the Arts 2008, *Energy Use in the Australian Residential Sector 1986-2020*, Commonwealth of Australia.

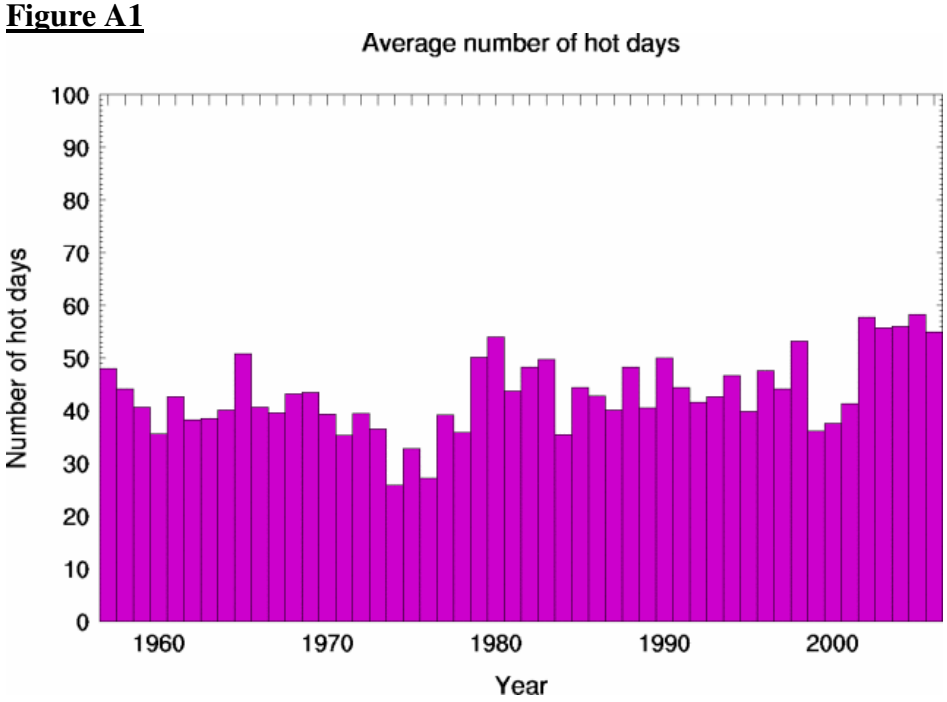
Hall, J.A. & Hunziker, J. 2007, 'Keep Cool: Multiple Sclerosis and Heat Tolerance' United States Department of Veterans Affairs, accessed 13/12/07: http://www.va.gov/ms/default.asp?action=article&ID=390

Scott, D.L., Wilson, T.E., Vener, J.M., Crandall, C.G., Petajan, J.H. & White, A.T. 2005, 'Pilocarpine-induced Sweat Gland Function in Individuals with Multiple Sclerosis', *Journal of Applied Physiology*, vol 98, pp. 1740-1744.

Tsigounis, Chrysa 2006, *Fatigue Management Performed in Individuals with Multiple Sclerosis*, MS Queensland, Brisbane.

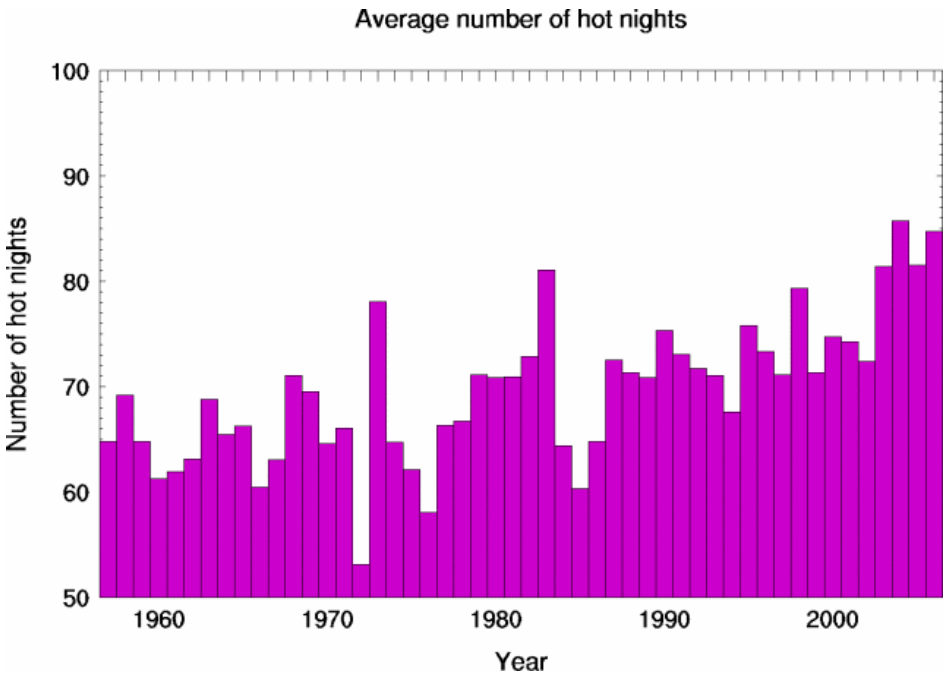
Appendix

Figure A1



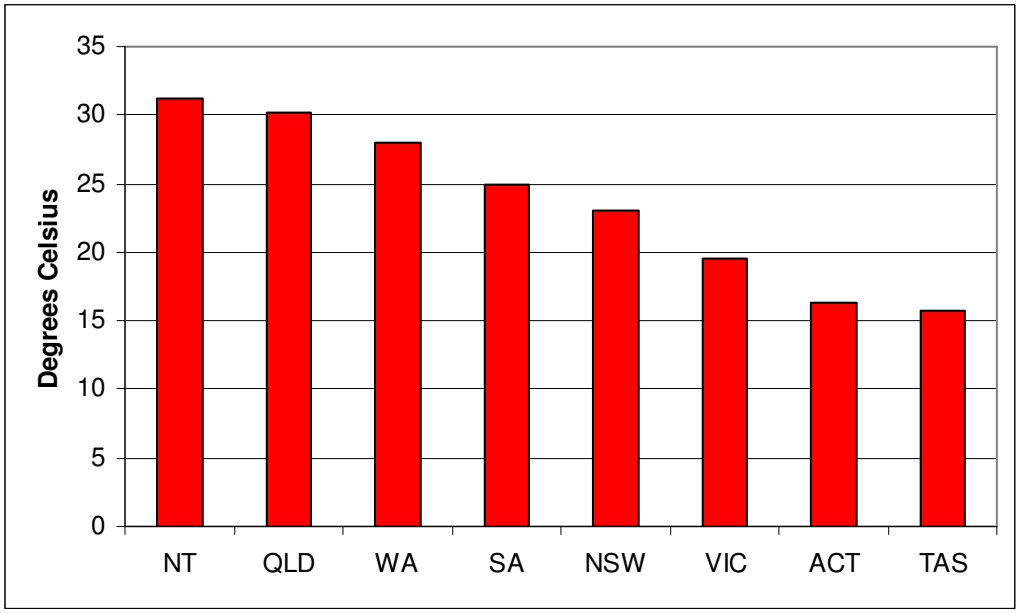
Note: Hot days are those days greater than 35C. Source: http://www.bom.gov.au/cgi-bin/silo/reg/cli_chg/extreme_timeseries.cgi

Figure A2: Average Number of Hot Nights in Australia



Note: Hot nights are those greater than 20C. Source: http://www.bom.gov.au/cgi-bin/silo/reg/cli_chg/extreme_timeseries.cgi

Figure A3: Average Maximum Apparent Temperature by State 1977-2007



Source: Data supplied by Bureau of Meteorology, Climate Division, Melbourne. Note that apparent temperature is a combined measure that takes into account the impact of humidity.

Figure A4: Method 1 for Estimating Annual Air Conditioner Operating Costs for those with Medical Cooling Needs

- For a single room 6m x6m with 2.7m ceilings, you would need a unit with a minimum capacity of 4860 watts to extract the heat.
- A typical unit for this would be a Fujitsu Air Conditioner (model ASTA18JCC) with a 5200 watt heat extraction capacity, and which requires 1410 watts of electricity to operate.
- Operated for 24 hours it will consume 33.8kWhrs of electricity.
- National average cost per kilowatt hour (kWhr) is $0.15.
- $0.15 x 33.8kWhrs = $5.07
- Sydney averages 28 days a year 30C and over (and 38 nights 20C and over)
- 28 days/nights x $5.07 = **$141**.

Limitations:

- The assumptions utilised above are very conservative, and consequently actual costs of air conditioner use for people needing cooling will be higher than this. See the Method 3 discussion below regarding using Sydney rather than NSW as the benchmark. Key assumptions are outlined below:
- new very high efficiency air conditioner – most low income households will be utilising much less efficient units
- only one cool room – many will require large spaces to be cooled such as when they are caring for young children or living on their own and needing to take on a greater range of daily domestic tasks.
- most people with MS would find 30C very hot, and would typically turn on their air conditioners at lower temperatures, especially when humidity is high, and keep them running as they cannot risk the house getting too warm.
- electricity costs are on the rise (higher demand, higher production costs, emissions trading and introduction of Smart Meters), as well as the number of hot days and nights increasing over time due to climate change, so these costs will increase significantly this year and in following years.

Figure A5: Method 2 for Estimating Annual Air Conditioner Operating Costs for those with Medical Cooling Needs

An MS Queensland survey (Tsigounis 2006) of 417 respondents found that on average they had their air conditioners on for 1371 hours from October to March (inclusive). Below are the details for extrapolating this data to NSW taking into account different climatic conditions, and assuming utilisation of the same high efficiency air conditioner for a single room utilised above in Method 1.

- 1.41 kW air conditioner x 1371 hours = 1993 kWhrs
- 1993 kWhrs x $0.15 = $290 for QLD
- QLD average maximum apparent temperature (a measure incorporating both air temperature and humidity from 1997-2007) was 30.2, compared to NSW at 23.2.
- $290 x (23.2 / 30.2) = **$223** for NSW

Limitations:
The assumptions underpinning this estimate are still somewhat conservative largely as a result of: (a) the size of the air conditioner/room cooled, (b) its efficiency and (c) the assumed static costs of electricity. But it is much stronger than Method 1 largely because 'real' air conditioner use for medical cooling needs is utilised. It is also slightly stronger because statewide rather than capital city data is used.

Figure A6: Method 3 for Estimating Annual Air Conditioner Operating Costs for those with Medical Cooling Needs

Identical to Method 2, except that household 'relative cooling load by climate type' for Brisbane and Sydney (Mascot Airport) data was used (see Figure 77 in Department of Environment, Water, Heritage and the Arts 2008) instead of apparent temperature to factor in climatic differences. This measure takes into account differences in household construction as well as climate.

- 1.41 kW air conditioner x 1371 hours = 1993 kWhrs
- 1993 kWhrs x $0.15 = $290 for QLD
- Household cooling load by climate type: Brisbane = 0.6875 megajoules per square metre, Sydney = 0.4375 megajoules per square metre.
- $290 x (0.4376 / 0.6875) = **$184** for NSW

Limitations:
The advantage of this method, like Method 2 is that it utilises 'real' air conditioner use data for this group. This method also shares the conservative assumptions of Method 2: (a) air conditioner size, (b) its efficiency and (c) the assumed static costs of electricity. There is an additional conservative assumption in Method 3. The household cooling load by climate type data utilised to extrapolate the QLD results into NSW are based on a survey of sample dwellings and climate. The sample dwellings are likely to be generally representative of Queensland homes, and given that many people with MS are relatively poor the thermal performance of their homes will be on the lower end of the scale.

Additionally, while the utilisation of Brisbane and Sydney data does not provide ideal or perfect benchmarks for each state, this is the best available data. But it is important to note that these cities represent the major population centres, and in climate-terms also represent approximate mean climate zones for each state.